



**SALESIAN
COLLEGE**
SILIGURI & SONADA

DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

DECEMBER 2015



1 National Workshop on Creation of Institutional Repository using Open Source Software

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2 Chemistry - Its Relevance in Technology

What would life be like if nobody had ever studied chemistry?
It's easy to grumble about the homework, but we can never underestimate the role of chemistry our daily lives. Look around your home and count the number of things around you that have emerged out...

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There is genius in every person!!!

I am convinced of the fact that everyone has the potential to be an achiever, to flout the stability, to challenge the paradigm and to create new avenues which others could imitate. There is brilliance in every person and people are designed for accomplishment and all that one needs to do that to have lofty dreams, dreams that engineered for success and fulfil one's aspirations. I personally believe the statement of Anatole France who once said, "To accomplish great things we must not only act, but also dream; not only plan, but also believe."



Bill Gates is a classic example for all of us. He is an American business industrialist and philanthropist who founded the Microsoft Corporation, the world's largest personal-computer software company along with Paul Allen. He has become a worldwide leader in softwares; services and solutions that help millions of people and businesses realize their full potential. He not only contributed to the technology ridden world but also to humanity by his foundation that supports initiatives in education, world health and skill development. He is on a mission of eradicating polio from the world. The dreams and brilliance



he had, is diversified in manifold ways to help the humanity.

I congratulate the initiative taken by the department of Computer Science and Applications in bringing out biannual e communiqué. Surely it will help you my dear students to realize your latent talents and abilities even in a minute way. I conclude by quoting Ronald Reagan, "My philosophy of life is that if we make up our mind what we are going to make of our lives, then work hard toward that goal, we never lose - somehow we win out."

Fr. Aju Kurian sdb
Vice Principal and Campus Minister
Salesian College Siliguri

Congratulation

Darshika Jajodia, BCA, Batch of 2015,
for securing First position at the University Level.

We wish her greater success & recognition in future



Message from HoD

It is a great joy to see our very own departmental newsletter take shape. We have called it DigiTrek to convey the idea that our journey in the world of Computer science and technology is like trekking in the digital world. There are some well defined routes and many that are to be discovered by individuals by way of their learning experience. For some years the two professional departments - Bachelor of Business Administration (BBA) and Bachelor of Computer Applications (BCA) - have jointly contributed to the newsletter Evolve. However, now the college management has bestowed confidence in our Department and has given us the go ahead to come up with our own. So, it is with mixed emotion - that of parting ways with our BBA friends and adventuring with excitement into a new initiative - we are beginning a new thread in our story. We would like to express our gratitude to the management for guiding us.

I would also like to congratulate all who have taken interest to collect, provide and compile information; contribute by way of writing articles, reviewing and providing feedbacks. I would like to specially thank Mr. Pramod Rasaily who kindly lends his professional expertise in reprographics.





**National Workshop on
Creation of Institutional Repository using Open Source Software
August 26-28, 2015**

INFLIBNET Centre, Infocity, Gandhinagar, Gujarat

-Report by Dhirodatta Subba, faculty

The Information and Library Network (INFLIBNET) is an autonomous Inter-University Centre of the University Grants Commission (UGC). The objectives of the Centre are to modernize libraries and information centres for information transfer and access, to support scholarship, learning and academic pursuit by establishing a national network of libraries and information centres in universities, institutions of higher learning and R & D institutions in India. Creation of national union database (IndCat), National Repository of Indian Theses and Dissertations (Shodhganga) and Synopses/ Research in progress details (Shodhgangotri), development of an integrated library management software (SOUL 2.0), human resource development, on-site training, providing bibliographic information services, extending technical help and guidance from time to time to academic libraries in automation and networking are some of the major activities of the Centre. The Centre provides access to e-resources under UGC-Infonet Digital Library Consortium. The Centre also provides access to 6500+ e-journals and 97,000+ e-books to the colleges in India through programme entitled "National Library and Information Services Infrastructure for Scholarly Content (N-LIST)".

Institutional Repository (IR)

It is a software that is used for the collection, dissemination, preservation and management of digital assets such as thesis, dissertations, teaching materials, course content, publications, data set etc. It can also help improve the visibility, usage and impact of research conducted at the institutions.

Aims and Objectives of the workshop

The aim of the workshop was to spread awareness about the open source software and their proper use for library services. The workshop provided detailed knowledge about three most widely used OSS in library field i.e. **DSpace**, **Greenstone Digital Library Software** (GSDL) and **EPrints**. The workshop was intended to equip participants with skills for developing their own digital libraries/institutional repositories.

The workshop was inaugurated by the lighting of the lamp by

the Director Dr. Jagdish Arora

Course content covered theoretical discussions and practical exposure on the following aspects in creating Institutional Repository using DSpace, Greenstone and EPrints:

- What is Open Source Software (OSS) & Why? Overview of institutional repository software, their features and functionality
- Guidelines for starting an institutional repository



- Application of Open Source Software in the Libraries
- Introduction to Linux, installation of Ubuntu/Cent OS (to dual boot along with Windows), understanding Ubuntu file system layout, creation of user and group, basic commands
- Introduction of DSpace, Greenstone and EPrints
- Practical experience of establishing IR by Installation, Administration, Configuration – Case study of Shodhganga implementation
- Customization and Management, Workflow and Submissions
- Metadata standards followed in digital library
- IPR and Copy Right issues
- Backup and Restore, Import and Export

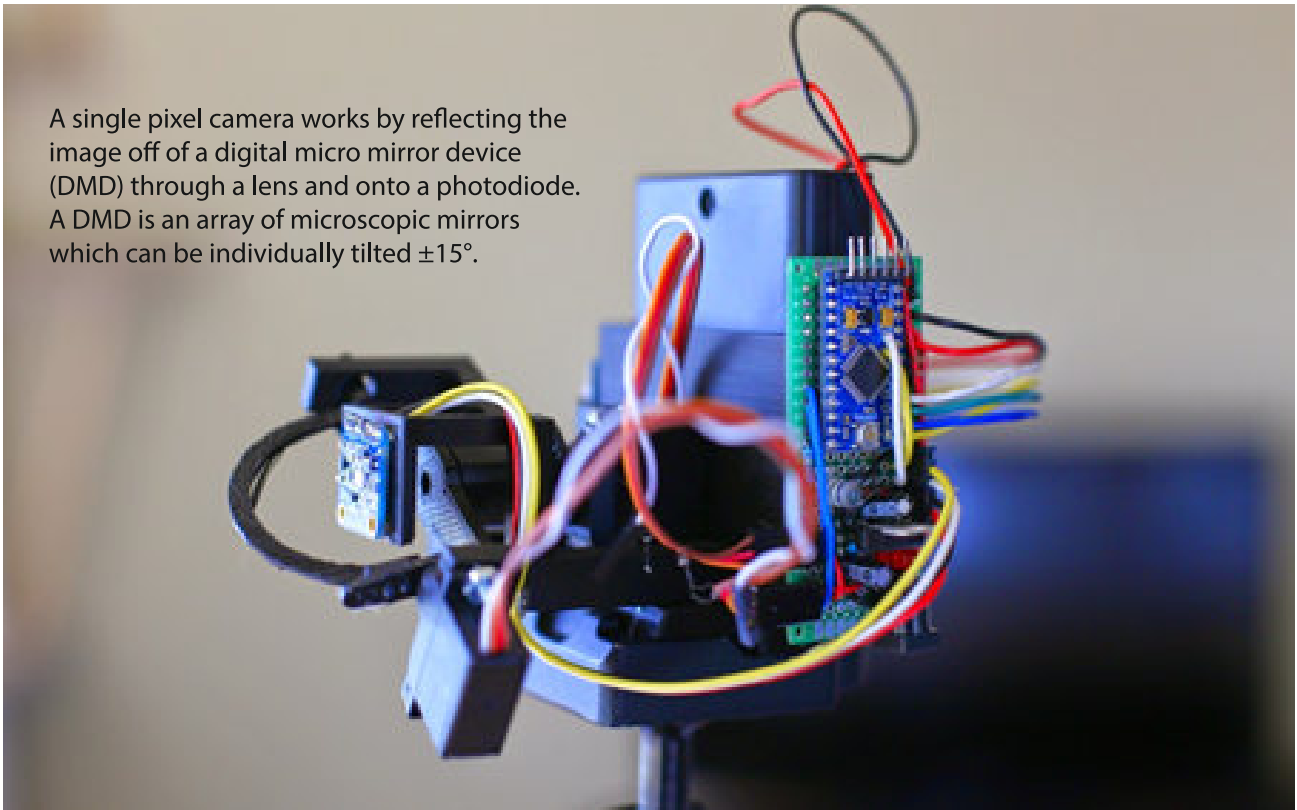
Structure of the program was as follows:

Day	Topic	Resource person
1	INFLIBNET activities and services	Mr. Manoj Kumar K, Scientist D, INFLIBNET Centre
	Overview of the software, their features and functionalities	Mr. Manoj Kumar K, Scientist D
	Introduction to DSpace, Greenstone and EPrints	Mr. Abhishek Kumar, Scientist C, INFLIBNET Centre
	Introduction to Linux, Ubuntu / Cent OS	Mr. Gaurav Prakash, Scientist B, INFLIBNET Centre
2	Hosting of IR	Mr. Divyakant Vaghela, Scientist B, INFLIBNET Centre
	Creation of IR using EPrints	Dr. Atul M. Gonsal, Associate Profesor, Saurashtra University
	Establishing Institutional Repository using DSpace	Mr. Swapnil Patel, Scientist B, INFLIBNET Centre
	DSpace administration and submissions	“
3	Creation of IR using Greenstone	Dr. Nishtha Anilkumar, Librarian – PRL Ahmedabad
	Experience of establishing IR – case study of Shodhganga implementation	Mr. Manoj Kumar K, Scientist D, INFLIBNET Centre
	Valedictory session	



Two faculties from our College - myself and Mr. Jiwan Pradhan from Sonada Campus - participated in the program. We would like to thank our College management for giving us the opportunity to participate in this workshop.

A single pixel camera works by reflecting the image off of a digital micro mirror device (DMD) through a lens and onto a photodiode. A DMD is an array of microscopic mirrors which can be individually tilted $\pm 15^\circ$.



A faster **single-pixel** camera.

Ayushi Choudhary, BCA 1st Semester

New technique greatly reduces the number of exposures necessary for "lensless imaging."

Compressed sensing is an exciting new computational technique for extracting large amounts of information from a signal. In one high-profile demonstration, for instance, researchers at Rice University built a camera that could produce 2-D images using only a single light sensor rather than the millions of light sensors found in a commodity camera.

A standard digital camera uses a large number of photo sensors to determine the amount of light in each area of the image, referred to as a pixel. This works very well for optical light and is relatively cheap because of the maturity of CCD and CMOS technology. However, since CCDs and CMOS imagers only work in the optical range, infrared or ultraviolet cameras can be much more difficult and expensive to produce.

One solution to this is to use a single pixel camera. A single pixel camera uses only one light sensor to measure the entire image. This allows the use of one really good light sensor as opposed to 10 million very cheap ones. Compressed Sensing is used to measure the entire image using only a single sensor. Compressed Sensing is a mathematical process by which a signal can be under sampled (below the Nyquist rate), and recovered by using ℓ_1 minimization, given that the original signal can be represented as a sparse signal and that the sampling process is incoherent to the sparse signal.

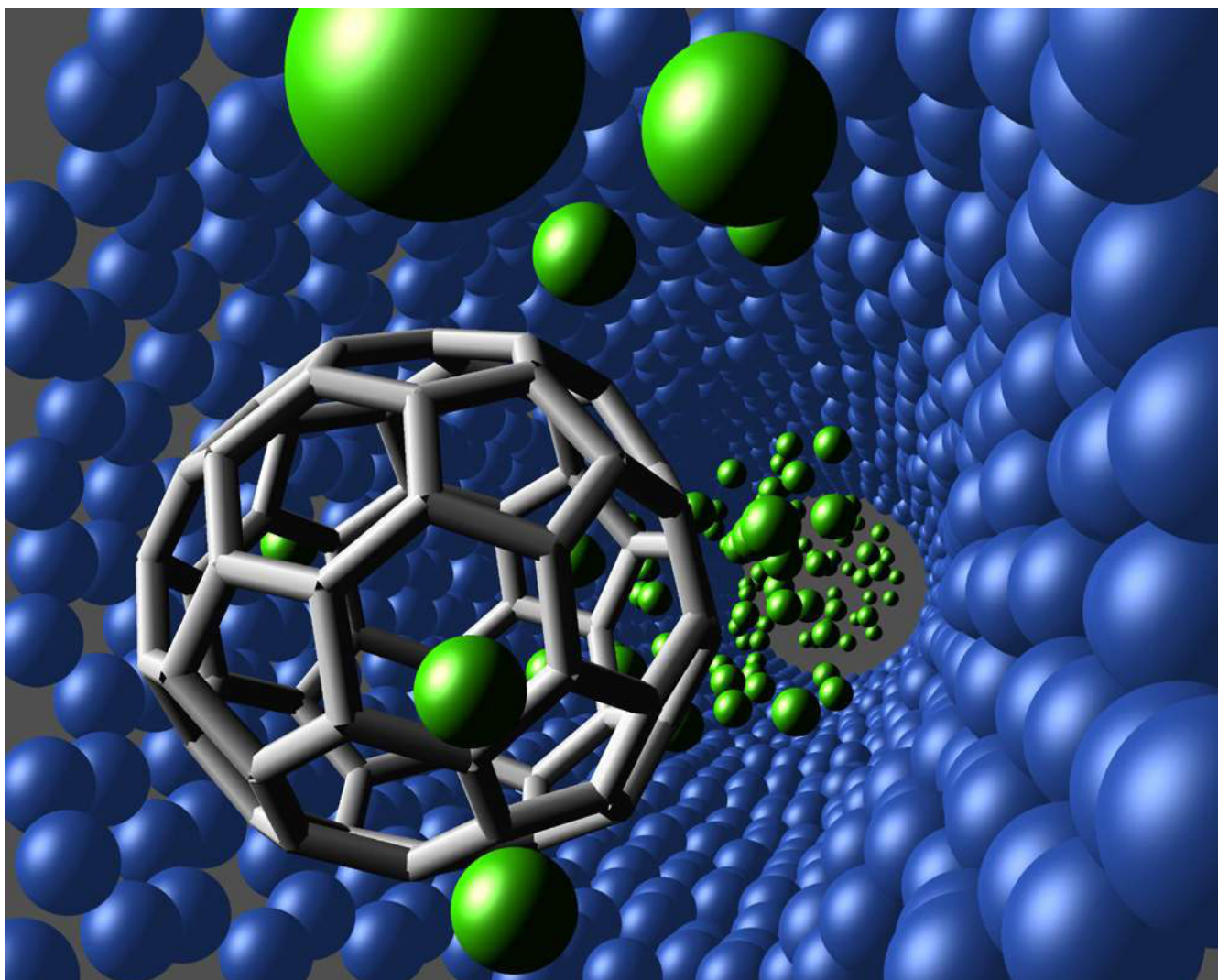
The micro mirrors are tilted in such a way as to allow only some of the pixels to focus on the photodiode at any given time, while the rest are focused onto a light absorber. By doing this thousands of times and measuring the intensity of the light for each different mirror arrangement, we can physically realize the sampling matrix of a compressed sensing system. Any radiation which can be reflected from a mirror (including UV and IR) can be sampled this way, allowing for a UV or IR camera much cheaper than is currently available.

So, there is potential for the imaging to become faster if the switching speed of the mirrors increases. However, even at this speed the camera could be used for many non-video applications.

References,

<http://news.mit.edu/2017/faster-single-camera-lensless-imaging-0330>

<https://www.vocal.com/compressed-sensing/single-pixel-camera>



Chemistry - Its Relevance in Technology

Bishek Thapa, BCA 1st Semester

What would life be like if nobody had ever studied chemistry?

It's easy to grumble about the homework, but we can never underestimate the role of chemistry in our daily lives. Look around your home and count the number of things around you that have emerged out of breakthroughs and inventions in chemistry. Without chemistry we wouldn't have light bulbs, mobile phones, Facebook or Twitter. Chemistry is the essential content of much of the food we eat, clothes we wear and the medicine we take. If we had never studied chemistry we wouldn't have liquid oxygen which was developed in the 1800s and is now probably best-known for its role as rocket fuel. Without rockets, the space race wouldn't have happened, or all programmes we enjoy- from satellite TV to the internet would have been a distinct reality without it. Some fascinating facts about chemistry mentioned below give a clear indication about how chemistry plays a key role in the universe.

Sky is blue - An object is coloured because of the light that it reflects. The white light from the sun contains all the

wavelengths, but when it impacts on an object some of its wavelengths are absorbed and some reflected. The colour of the sky can be explained considering phenomena named Rayleigh scattering that consists on the scattering of light by particles much smaller than its wavelength. This effect is especially strong when light passes through gases.

Ice floats on water- Ice is less dense than liquid water. The heavier water displaces the lighter ice, so ice floats on top.

How sunscreen works? Sunscreen combines organic and inorganic chemicals to filter the light from the sun so that less of it reaches the deeper layers of your skin. The reflective particles in sunscreen usually consist of zinc oxide or titanium oxide.

Meals are cooked faster in a pressure cooker? A pressure cooker has a more elaborated lid that seals the pot completely. When we heat water it boils and the steam cannot escape, so it remains inside and starts to build up pressure. Under pressure, cooking temperatures rise

much higher than under normal conditions, hence the food is cooked much faster.

The chemistry of love- Chemistry is at the bottom of every step in a relationship. When we fall in love, our brain suffers some changes and also certain chemical compounds are released. Love is driven by these hormones: oxytocin, vasopressin, endorphins.

Coffee keeps us awake- Coffee keeps us awake because of the presence of a chemical called adenosine, in your brain. It binds to certain receptors and slows the nerve cell activity when sleep is signaled.

Vegetables are coloured- Many vegetables and fruits are strongly coloured because they contain a special kind of chemical compound named carotenoids. These compounds have an area called chromophore, which absorbs and gives off particular wavelengths of light, generating the colour that we then perceive.

How soap cleans? Soap is formed by molecules with a 'head' which likes water (hydrophilic) and a long chain that hates it (hydrophobic). Then when soap is added to the water, the long hydrophobic chains of its molecules join the oil particles, while the hydrophilic heads go into the water. An emulsion of oil in water is then formed, this means that the oil particles become suspended in the water and are liberated from the cloth. With the rinsing, the emulsion is taken away.

We cry while cutting onions- Onions make you cry due to the presence of sulfur in the cells which break after the onions are cut. This sulfur gets mixed with moisture and thus irritates your eyes.

The Importance of Chemistry in Computer Technology

Chemistry is the branch of science that deals with the study of the nature, properties, and composition of matter, transformation of energy, and how these undergo changes. The simple fact is that chemistry plays a very significant role in human's life from the moment we're born. Most common household items contain batteries, which are very much chemically dependent. These batteries contain positive and negative electrodes which is also all about chemistry. Chemical components are part and parcel of most of the electronic gadgets we use daily. Experts have been working for many years to understand how to work with electronic material produced on an increasingly small scale. In the emerging field of nanoscience and nano-technologies it is important for scientists to control the structure and bonding of molecules that are used in creating small scale electronic components for products such as computers. Scientists have succeeded in imaging and forming a unique bond between a single gold atom and a single organic molecule called a pentacene. They managed to bind the atom to the pentacene and take images of rearrangements of the electrons participating in the formation of the chemical

bond. The pentacene has been selected as it is a special class of molecule that has qualities of particular use in molecular electronics.

One of the greatest achievements - the use of semiconductors

The development of semiconductors is clearly among the most significant technological achievements to evolve from the study of solid-state chemistry. Aside from their well-known applications in computers and electronics, semiconductors are also used in a wide variety of optical devices such as lasers, light-emitting diodes, and solar panels. The diversity of applications can be readily understood with only a basic understanding of the theory behind these materials.

Semiconductors are used extensively in solid-state electronic devices and computers. The majority of materials for these applications are based on doped silicon. An important property of p-n junctions is that they allow electron flow only from the n side to the p side. Such one-way devices are called diodes. If a positive voltage (also called a forward bias) is applied that lowers the energy barrier between n and p, then the electrons in the conduction band on the n side can flow across the junction (and holes can flow from p to n). A reverse bias, however, raises the height of the barrier and increases the charge separation at the junction, impeding any flow of electrons from p to n.

Diodes have several important applications in electronics. The power supplied by most electrical utilities is typically alternating current (AC); that is, the direction of current flow switches back and forth with a frequency of sixty cycles per second. However, many electronic devices require a steady flow of current in one direction (direct current or DC). Since a diode only allows current to flow through it in one direction, it can be combined with a capacitor to convert AC input to DC output. For half the AC cycle, the diode passes current and the capacitor is charged up. During the other half of the cycle, the diode blocks any current from the line, but current is provided to the circuit by the capacitor. Diodes applied in this way are referred to as rectifiers.

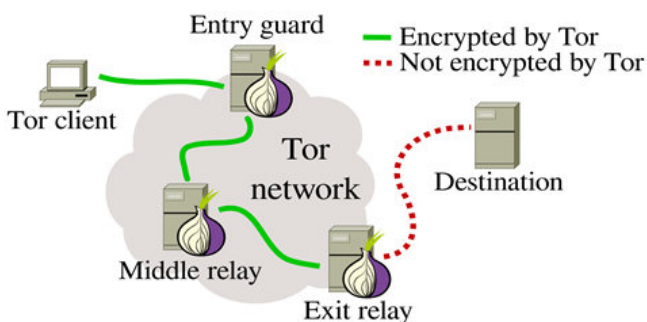
By far the most important application of semiconductors is as logic gates and transistors in computers. Logic gates, such as OR and AND gates, take advantage of the one-way nature of diodes to compare the presence or absence of current at different locations in a circuit. More complex solid-state transistors are composed of npn or pnp junctions. The device geometry is slightly more complicated than that observed in a diode, but the result is materials that allow for the generation of the zeros and ones required for the binary logic used by computers.



Anonymity is one of the greatest features of the Internet (or one of its worst features, depending on whom you ask) :. Leaving aside the sorts of problems that spring forth from anonymous interaction, such as the lack of consequences, Internet privacy and anonymity is important for preventing some serious crimes, like identity theft.

The Basics of Onion Routing

The best way to understand onion routing is to start with the concept of Proxy Servers. A proxy server acts as a gateway between a local-network and internet. It intercepts the connections between the sender and the receiver. By blocking the direct access between two networks, proxy servers make it difficult for hackers to get internal address and details of a private network. For example, if someone traced your IP address, they'd see it as the proxy server's IP address instead of your local address.



But proxy servers aren't exactly anonymous. As they keep logs of all the traffic that passes through it, they can actually point back to you if necessary. Your anonymity will simply become revealed if your proxy service was hit with a subpoena for your IP information.

But don't worry. Here comes something better. Onion routing is like an advanced form of proxy routing. Instead of routing through a single unprotected server, it uses a network of nodes that constantly encrypt your data packets at every node. Only at the end of this "chain" of onion nodes does your data become decrypted and sent to the final destination. In fact, only this "exit node" has the power to decrypt your message, so no other node can even see what you're sending.

Due to the multiple layers of encryption, which resemble the layers within an onion, it's extremely difficult to trace your information back to you (to the core) as the source when you use onion routing.

How You Can Benefit From Onion Routing

One way to utilize an onion routing network is to set up your website within the network to keep it secret from prying eyes. For example, you can do this on Tor to make it so only Tor network users can view and access your site. Some people might use this opportunity for dark and nefarious purposes, but there are also legitimate reasons for hiding your site on an encrypted network.

Conclusion

The Internet is never truly anonymous. For the most part, your activities can be traced back to you; the only difference is how difficult it is to trace your actions back to you. That's where "onion routing" comes in.

Reference

<http://www.tomsguide.com/us/what-is-tor-faq,news-17754.html>