Glasnost on the Internet

Greater transparency on the Internet forces service providers to refrain from blocking data streams

Internet service providers are restricting data exchange visibly less often since the Glasnost Project uncovered the practice. The red dots show where there were restrictions in the US in 2008 (left) and 2009 (right).

Illustration: MPI for Software Systems (2; adaptation: designergold)

SCIENTISTS at the Max Planck Institute for Software Systems have succeeded in establishing greater freedom of movement on the Internet. Through their work, they ensure that users can detect when Internet service providers systematically block data streams – that is, if these streams are generated using BitTorrent software. Many Internet users around the world use this software to exchange large volumes of data, such as music and film files.

The Max Planck scientists developed a software program that Internet users can use to test whether their service providers allow BitTorrent packets to flow unhindered. The service providers themselves did not disclose how they regulate Internet traffic. More than 250,000 users have since used the software. As a result, it came to light that two service providers from the US and another from Singapore repeatedly blocked BitTorrent packets. Once these interventions became known, however, the providers removed the blockades.

The researchers see the result of their study as the first step in a project they call "Glasnost." The aim of the project is to make the activities of the service providers more transparent using specially designed software. Spurred on by their insights into BitTorrent traffic, a number of renowned researchers from all over the world created a platform at www.measurementlab.net, where they provide tools for creating transparency on the Internet. Google sponsors the platform, but does not influence its content in any way. Information about data traffic is also of interest to regulatory authorities in the telecommunications industry. PH

The Search Engine That Thinks

A program that recognizes search terms in context

ONE OF THE IMPRESSIVE THINGS about Internet search engines is their speed. In just fractions of a second, they can hunt through billions of documents to find the terms being searched for. No less – but also no more. With their CompleteSearch engine, scientists at the Max Planck Institute for Informatics in Saarbrücken have shown that it's possible to do a lot more in the same time.

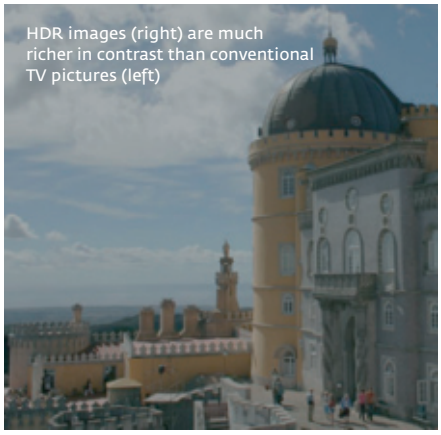
Even while still typing, the engine suggests additional search terms – items that will lead to good search results. The engine actually suggests words that occur in documents in conjunction with the term entered. At the heart of the process is a new type of index that, besides linking words with documents, also knows what the words mean.

"This function saves typing and time spent trying to guess the best search terms," says Hannah Bast. She headed the development of CompleteSearch in Saarbrücken before moving on to work as a researcher for Google in Zurich. CompleteSearch also offers suitable refinements if the original search terms produce too many hits. Entering "beatles musician," for example, garners the suggestions "John Lennon" and "Paul McCartney."

CompleteSearch can be put to the test at http://search.mpi-inf.mpg.de/ with the three million English-language pages of Wikipedia. As Hannah Bast points out, the search engine is also ideal for e-mails, literature databases or even medical and legal case files. Christian Meier | MI 1200-3452-ZBC

Light and Dark Crowded Together

Max Planck researchers have developed a compression method to store videos that are particularly rich in contrast



HDR images (right) are much richer in contrast than conventional TV pictures (left)

STANDARD COMPUTER SCREENS make too few demands on the human eye, as the eye can perceive substantially greater differences in brightness than an LCD screen can display. This is about to change: future displays will show a moonless night as convincingly as a scene in glaring sunlight – thanks to High Dynamic Range technology (HDR).

However, the large number of brightness levels in HDR videos requires an enormous amount of storage capacity. Researchers at the Max Planck Institute for Informatics in Saarbrücken are now compressing the data to a usable size without the eye detecting the slightest difference.

To save on storage space, the researchers in Karol Myszkowski's group are making use of the fact that, when darkness increases, the eyes detect weak contrasts with increasing difficulty. This is noticeable, for instance, when reading in the fading light of dusk. The researchers in Saarbrücken are thus reducing the many levels of brightness with which HDR cameras also shoot scenes at night or in the shade. And fewer levels mean less space needed for storage.

This enabled the scientists to compress HDR images into a format that uses hardly any more storage capacity than the usual MPEG-4 format. "It certainly stores pictures as well as the eye sees, and is therefore suitable for all future HDR displays," stresses Myszkowski. The computer scientist sees further possible applications for the new format in computer graphics and digital cinema, as well as for telemedicine and surveillance technology.

Christian Meier | MI 1200-3292-ZBC

A Step Ahead of the Spammers

A filter anticipates junk mail strategies

THE FORCES battling spam e-mails, phishing and computer viruses are going on the offensive. New software created by computer scientist Tobias Scheffer at the University of Potsdam could soon be added to their arsenal. This tool automatically detects the spammers' strategy and identifies their tricks before they have the chance to attack. Scheffer developed the basic principles of his spam filter in cooperation with Internet service provider STRATO while he was still working at the Max Planck Institute for Informatics in Saarbrücken.

Currently, spam filters come into play after the attack has already been launched. They use recurring patterns in spam e-mails to create a model that distinguishes spam from legitimate messages. However, these models are based on data from the past, and the spammers' tricks vary from day to day. Scheffer's software, on the other hand, uses game theory to stay a step ahead of the spammers. Like a chess player, the program calculates the moves that spammers will make. But whereas in chess the number of possible moves is limited, the destructive creativity of these Internet villains knows no bounds.

"With an infinite number of spam possibilities to choose from, the software selects those that appear to be the most promising," says Scheffer. The program even takes into account the fact that the attackers may try to predict the defenses used against them. The next step is to implement the software as a scalable product that STRATO can deploy on behalf of its millions of customers.

Christian Meier

Photos: Fotolia (bottom), MPI for Informatics – Karol Myszkowski (2, top)