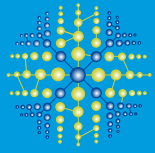


Newsletter



eLAC2015

September
2012

20

- **NFC technology: progress, obstacles and forecasts**, report
- **Downloads of records and books are increasing**, report
- **Broadband promotion law in Peru**, interview to Roberto Ortiz , Ministry of Transport and Communications of Peru
- **“What Rio has done is truly ground-breaking”**, interview to Guruduth Banavar, IBM
- **“The idea is to enable people who have a device but no Internet to connect securely and free of charge”** interview to Oliver Flögel, Digital Development Chile
- **“The advent of big data makes communications infrastructure even more important”**, interview to José Miguel Piquer, INRIA Chile
- **News brief**



New trends in ICT

Photo: 123RF Stock Photo.



Interaction via mobile phones:

NFC technology: progress, obstacles and forecasts

This seems to be the future of payment by digital device: use your mobile phone or tablet to pay for purchases, get into events or board a commuter train by simply holding it up to a terminal for a couple of seconds. However, what has been a success in Japan is making slow progress in Europe and, especially, in the United States.

Near field communication (NFC) is a wireless technology that allows a mobile phone to be used as payment, a transport card, or a means of admission to events or interaction with public information kiosks such as tourist information points. This is done by holding the device up to an NFC terminal, without actually touching it. It works similarly to some of the cards used to access workplaces or public transport. Although this technology has existed since 1983, it was not until 2004 that it began to be used for final consumers, with the creation of NFC Forum, an organization with over 160 members in the commerce and technology fields, including Visa, Sony, MasterCard, Nokia and Samsung. NFC Forum promotes the use of NFC by developing specifications, ensuring interoperability among devices and services, and educating the market about the technology.

NFC technology is being used in North America, Europe and Asia. NFC users now include Visa, Mastercard, Movistar/Telefonica, Google, Paypal, T-Mobile, O2, Vodafone, La Caixa, Amazon.com, Orange, China Unicom, RIM, Motorola and Starbucks.

The country in which NFC technology has been most successful is Japan, where using a mobile phone to pay in shops and on public transport is now an everyday thing. This is thanks to the Mobile FeliCa system, implemented in 2004 by Sony and NTT DoCoMo, the leading mobile operator in Japan. The success has been such that NFC is used by 57 million

people in 1.5 million establishments, and 80% of new cellular phone models appearing in the Japanese market have the chip to use this technology.

A number of analysts have ventured projections. According to Gartner, there are over 212 million users of payment via mobile phone, who will perform transactions totaling US\$ 171.5 billion in 2012. By 2016, users will number 448 million, representing US\$ 617 billion in transactions. Gartner also estimates that, by 2016, payment by mobile web will be the most widely used technology in North America and Europe, while payments by SMS will be the most popular in developing countries. Juniper Research, meanwhile, estimates that the total value of mobile payments for physical and digital goods, money transfers and payments via NFC will reach US\$ 670 billion by 2015.

Juniper Research also projects that payments made specifically with NFC will be worth US\$ 50 billion worldwide by 2014, by which year one in five smartphones (some 300 million) will have an NFC chip. Frost & Sullivan projects this figure at 863 million by 2015. IE Market Research estimated in 2010 that by 2014 NFC use would represent 32.8% of global mobile transactions, i.e. US\$ 1.13 billion. Celent forecasts that by 2013 there will be 410 million mobile payment users in China, of whom 169 million will use NFC: this will make China the largest user of mobile payment systems in the world.



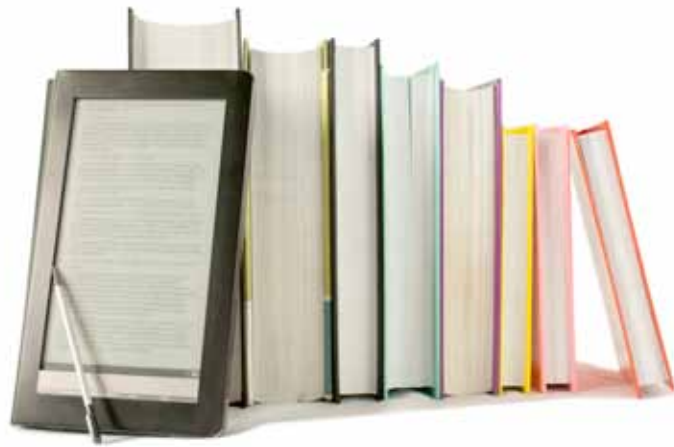
Despite the vaunted progress, however, critics says that, eight years after NFC Forum started up, use of the technology is still marginal, the system has still not taken off among mobile device manufacturers and there is no NFC ecosystem in either in Europe or the Americas that would allow further development. In fact, not even Nokia, the world's largest mobile phone manufacturer and an NFC Forum founder, has launched NFC-enabled mobiles on a massive scale.

Another late developer is Google, which in September 2011 launched Google Wallet, a service designed to "load" all information related to bank cards, loyalty points schemes, discount coupons, transport cards and even driving licenses and other vital personal information in its application for Android phones. However, almost a year after its launch, Google Wallet worked only with the MasterCard issued by Citibank, the operator Sprint and a few models of smartphones, like the Samsung Galaxy Nexus, the LG Viper 4G LTE, the LG Elite Optimus and Nexus 7, the Google tablet. It was not until August 2012 that Google Wallet expanded its range to Visa, American Express and Discover.

Another explanation for the cumbersome advance of NFC technology has to do with infrastructure: it is not enough

to equip mobile phones and portable devices with the chip, which is useless unless shops and establishments have NFC terminals, but these have yet to be adopted on a large scale. The reasons for this range from the question of who should invest in or pay for the terminals (the store owner, the mobile operator, the phone manufacturer or a neutral entity) to uncertainty on the part of businesses and store owners, who prefer to wait for the public to trust and accept NFC before letting it onto their premises (according to Crone Consulting, the United States has only 150,000 NFC-enabled stores, versus 1.5 million in Japan, in addition to 6 million locations that accept credit cards). The success of NFC in Japan is due in large part to the use of existing technology, the FeliCa smart card system, which avoided the need for from-scratch investment in infrastructure. As well, the Japanese were already familiar with NFC use, which smoothed the transition.

Finally, large companies in the United States, such as PayPal and the mobile operators AT&T, Verizon and T-Mobile, are now snubbing the NFC standard, despite having joined it early on. This is because they all want to develop their own wireless payment system: PayPal on its own and the mobile operators through ISIS, a partnership formed in 2010, whose results are still unreleased.



Sales of virtual products are on the rise:

Downloads of records and books are increasing

The development of e-commerce and content-scanning technologies represent a trend that has caught the attention of market and analysts alike: for the first time, sales of downloadable digital products, such as music and books, have overtaken sales of the physical products.

Internet sales of music and virtual books have been increasing ever since Apple opened its iTunes store in 2003 and Amazon began to sell e-books in 2007. Already in this decade, we are seeing how virtual products are gaining the upper hand over physical goods.

Figures from the Recording Industry Association of America (RIAA) show that CD sales have been declining steadily since 2001: that year almost 882 million CDs were sold in the United States, down from 942 million the year before. Despite the odd year when CD sales have improved on the previous year, the overall trend is down. RIAA figures for 2011 show 330.6 million physical CDs sold, up by 1.4% on 2010 (326.2 million), but far short of the figures of almost 1 billion early last decade.

Meanwhile, sales of downloadable digital music have done just the opposite. In 2003, when RIAA began keeping these statistics, 139.4 million song tracks were sold in the United States; by 2011, the figure was 1.27 billion. In addition, according to research by the consultancy firm Nielsen and Billboard magazine (United States), 2011 was the first year in which the download sales exceeded CD sales, capturing

50.3% of the United States music market. Worldwide, however, digital music has gained less ground. Figures from the International Federation of the Phonographic Industry (IFPI) show that Internet music sales represent 32% of industry revenues.

IFPI says that the factors driving this growth include:

- The ease of Internet access and varied customer choice;
- Improved cloud computing technology, which supports better shopping and storage services;
- The opening of new stores and expansion of existing ones: for example, the iTunes store opened in 28 countries last year, making a total of 50, including the entire European Union;
- Increased demand for tablets and smartphones, which multiply the gateways to digital music.

The publishing industry, too, has seen a gradual rise in the sale of virtual products to the detriment of physical books. Global studies are few and incomplete, but the 2007 report

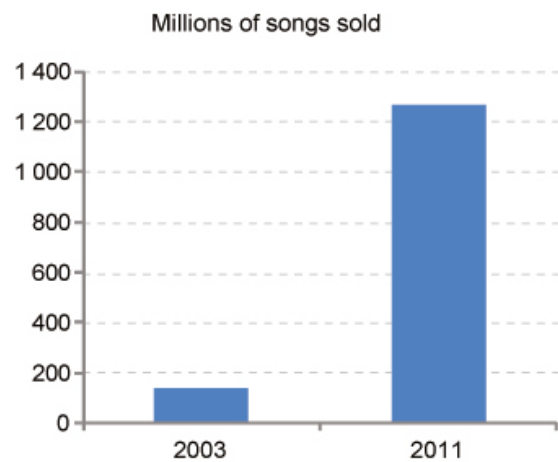
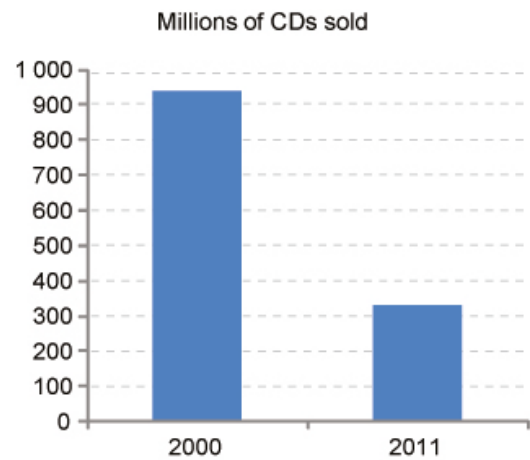
The Global eBook Market by *Publishers Weekly* states that in the United States e-books account for 6.3% of the publishing market, with 950,000 titles available. The report adds that in the United Kingdom e-books have a market share of 6%, with almost 1 million digital titles available to customers.

The Association of American Publishers reports that in the first quarter of 2012 download book sales outstripped sales of paper books: at US\$ 282 million versus just under US\$ 230 million. Similarly, the online store Amazon, which has popularized the e-book with its Kindle reader, states that in the last quarter of 2010 sales of virtual books exceeded those of paper books for the first time: 115 downloadable books were sold for every 100 paper books, not counting publications in the public domain that are downloaded free. Amazon's United Kingdom subsidiary reported the same trend: in May 2012, the store had sold 114 e-books for every 100 paper books thus far in the year. This is a remarkable increase considering that the Kindle was launched in the United Kingdom only in August 2011, and in the United States, in November 2007.

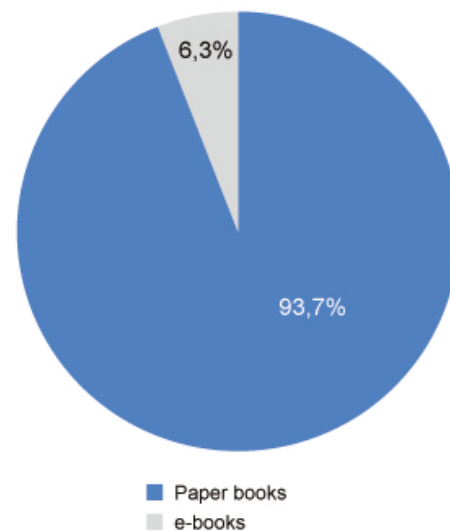
The reasons for the rise in digital reading are very similar to those for the upsurge in music downloads:

- Ease of transport and storage of digital books: reader capacity generally starts at around 1,200 books, with an average weight of 1 Mb;
- The ecological aspect: digital reading represents a significant saving in paper production;
- The great variety of devices on which to read digital books, such as smartphones and tablets;
- Ease of purchase: reading devices are associated with specific stores, like Amazon's Kindle or Barnes & Noble's Nook, which means books can be bought directly, without using any other device.

A study by Pew Research Center on reading habits and e-book penetration found that in the United States, one in five people read one e-book per year (four times the figure for 2009), and that they spent more time reading in general. The study also found that an average e-book reader read 24 books in both formats in 2011, compared with the 15 read on average by the traditional reader. Users also indicated that the e-book is better in terms of variety of titles, accessibility and transport, but they still prefer paper books for lending to friends and reading with children.



e-book participation in the editorial market - United States
Year 2011



Source: Publishers Weekly.

Broadband promotion law in Peru

Roberto Ortiz, general manager of regulatory and international affairs of the Ministry of Transport and Communications of Peru, explains this standard, the first of its kind in the region, which governs the construction of a broadband backbone and the creation of REDNACE, a digital platform for government entities.

[The law gives a definition of broadband. How did you arrive at that definition?](#)

It's quite a broad definition, using fairly generic terminology: "Uninterrupted, high-speed data transmission connectivity, mainly to the Internet". The law does not define high speed, but states that the Ministry will decide on a regular basis what those speeds should be. The idea is to have a flexible definition is based on a minimum speed to ensure efficiency of applications and uses.

[The law states that the operation of the backbone will be tendered out to neutral operators, to carriers who will not deliver the broadband service to end users. Why is that?](#)

That is not really as bad as it sounds. This measure might appear to discriminate against companies that could deliver the final link of the service and perhaps play an efficient part. But operators who have the capability to deliver the final service as well as provide transmission could set up an additional company and possibly deliver the final link through it.

The intention, in any case, is that the backbone should be only a transporter or a carrier, so that we can control the transport business from start to finish. When the carrier also provides the final link, monopoly effects can sometimes arise that would be unfair to other companies that deliver final service from where the backbone ends. This sort of dynamic can ultimately turn into a market failure that prevents proper price regulation, which is why the idea is to clearly separate transmission and distribution, to have separate accounts and monitor the competition better.

[Will the backbone be for fixed broadband only, or for mobile broadband as well?](#)

Both services will be provided: not by the backbone itself, however, but by the company that provides the final link, because the backbone reaches only as far as the provincial capitals. From there, other companies will deliver the end services, which could be mobile broadband or fixed broadband, depending on preference.

[Under the law, infrastructure projects such as power grids and oil and road networks must be capable of conveying optical fibre. Does this apply to both State and private-sector scheme?](#)

Yes, it is mandatory for all companies in the energy, oil and highway sectors. That was agreed in advance with all the operators, because the idea is to use that infrastructure to reach more isolated locations without having to go through an assessment process with local governments. Before, you wouldn't necessarily get the agreement of the local mayor when you needed to take a fibre optic network to a particular place. Now, though, the power grid, for example, can be used to carry optical fibre to these locations without major investment. Instead, you have to pay the power company for the costs it incurs to give you access to its transmission network.

[How does REDNACE fit into this plan? Are the end users only government entities or the general public as well?](#)

State entities are the end users. REDNACE is not intended to be an access point, like a website, but a transport mechanism, an information platform for government entities, and it will also generate demand for the backbone operator. REDNACE could be used to develop, for example, tele-health tools that could be used by the Ministry of Health, hospitals, local clinics, and so forth. The idea of REDNACE is for the State to provide its telemedicine or tele-education services efficiently via an effective broadband mechanism.



Oliver Flögel,
Executive Secretary of Digital
Development Chile:

“We aim to enable people who have a device but no Internet to connect securely and free of charge”

The head of Chile’s digital agenda explains the details of the Government’s scheme to install 1,000 free wireless Internet hotspots across the country, which will soon be put to tender.

What sort of timescales are you looking at to have all the free hotspots up and running?

We are currently writing the rules for the tender process for the 1,000 Wi-Fi points. The company that wins the tender should begin setting the hotspots up in January 2013 and have the last one connected before the start of the 2014.

Will all the hotspots be in public places (such as town squares) or will some be in indoor locations (like libraries and community centres)?

The idea of the free public Wi-Fi access is to set up a network of hotspots Arica to Punta Arenas. The access points will be in town squares, municipal buildings and libraries. The location is strategic, because we aim to enable those who have a device but no Internet to connect securely and free of charge.

What will the terms of the tender be? How will private companies be involved and how will they benefit?

The Wi-Fi network is being implemented through the Development Fund for Telecommunications (FDT) and all companies and operators now offering infrastructure services can participate in the tender.

How does the tender of the 700 Mhz spectrum fit into this project?

The two projects complement each other. In Chile the spectrum tenders are conducted like a beauty contest: that was how the 4G network was tendered out and the companies which were awarded spectrum blocks had to connect 543 isolated locations. With the tender of the 700 Mhz spectrum we expect the same to happen: coverage will be expanded and the digital gap will be narrowed. As demand for connectivity grows, many more access points will be developed with multiple communications services in schools, hospitals, police stations and banks, which will enhance digital inclusion.

“What Rio has done is truly groundbreaking”

In late 2010, Rio de Janeiro began to change into a smart city, whose heart is an operations centre that monitors, in real time, every aspect of its performance.

The project leader explains how this new system of municipal management has developed, whose size allows the city to be considered a “test model” for future technological cities.

What's IBM's idea, or definition, of a smart city?

A Smarter City is any urban area that exploits information to optimize the delivery of city services in a way that makes it more sustainable in the long term.

We can now monitor, measure and manage nearly any physical system at work in our cities. We have the ability to collect and analyze real-time information on everything from transportation networks to hospitals to the electricity grid. The uses for this information are nearly limitless. It can be used to empower citizens, build political capital, or develop new business models and partnerships with the private sector. It can be used to model and predict how changes to one system will affect others, decreasing the risks of change and speeding the return on investment.

Why did you choose Rio de Janeiro as a test field? How did this particular project begin?

Following a series of floods and mudslides that claimed the lives of nearly 100 people back in April 2010, the City of Rio de Janeiro announced a significant overhaul of its city operations. Rio needed a more coordinated response to emergency

Guruduth Banavar,

VP and CTO, Global Public Sector, IBM:



management – one that would have all city departments working together, not only to respond to issues, but to predict where they would arise so that they could minimize impact and effectively assist people. Based on an innovation workshop, Mayor Eduardo Paes of Rio de Janeiro turned to IBM to help design what would become the Rio Operations Center. With less than a year before the next rainy season began, they had to act quickly. In just six short weeks, they had a technological and physical blueprint in hand and construction began on the operations center which then opened at the end of 2010.

Which elements and activities of the city do you control so far? Do you have a goal in this matter?

The Center, operated and managed by the City of Rio, integrates and interconnects information from over 30 government departments and public agencies in the municipality to improve city safety and responsiveness to various types of incidents, including locally critical flash floods and landslides. Prior to the operations center, the city did not have a way to monitor emergency situations or oversee a coordinated response. With the 2014 World Cup and 2016 Summer Olympics on the horizon, the Mayor sought a more centralized command center to predict and prepare for extreme weather and other public safety issues. Rio now has a hub for information on anything that has an impact on the city's day-to-day life. This means the level of stress in the city and the level of risk to citizens are greatly diminished. The system was designed initially for forecasting floods and related emergencies, but is extensible to any event occurring in the city – be it the Reveillon Party at Copacabana beach, the exit of fans from a soccer match at the Maracana or a traffic accident. The Center enables city

leaders to make decisions and deploy resources in emergency situations based on real-time information.

What are the biggest achievements of the project, so far?

Since it opened in 2010, the Rio Operations Center has integrated information and processes from across 30 different city agencies into a single command center that provides a 360 degree view of how the city is functioning. It allows city officials to effectively predict and coordinate response to incidents across the city. To date, the system has helped Rio improve emergency response time by 30 percent, making Rio a safer city.

For example, in January 2012, a 20-story office building next to the municipal theater in downtown Rio de Janeiro collapsed. The operations center, which was set up to handle emergencies like this, took immediate action: alerting the fire and civil defense departments and working with the local gas and electric companies to shut down service surrounding the building. The operations center employees also handled related tasks such as halting the underground subway, diverting traffic, securing the site and nearby buildings, and alerting local hospitals. The operations center also used its own Twitter feed to alert Rio citizens about the incident, which helped divert people away from the site and preempt traffic congestion. All in all, the center played a critical role in the overall response coordination and efforts to minimize impact.

Another great example is Carnival, where the operations center was able to plan and coordinate this year's events – helping map out routes and timing for street bands, plan for security and crowd control, and coordinate street cleaning after the festivities were over.

During emergencies, the operations center announces instructions and updates to citizens via a public address system installed in high-risk areas, as well as through text messages and social media for registered citizens.

The operations center also plays a key role in the day-to-day life of citizens. Not only can citizens call into a common phone number for reporting incidents, but they can also plan their routines based on the events and plans for the city broadcast from the press room at the Ops Center on radio, TV, and other media channels many times a day.

How has the work with the city's authorities been?

Prior to the operations center, each of the municipal departments operated semi-autonomously. They were silos of information and communications. When disaster struck, they were not able to launch a well informed and coordinated response. In the past, it was a challenge to get municipal agencies to cooperate with one another, but city leaders found

that once they had integrated communications information, and put everybody in the same physical space, a level of inter-organizational collaboration that could not have been possible in the past suddenly became natural.

What Rio has done is truly ground-breaking from the standpoint that it is the first city that has taken a collaborative approach to integrating all of the city departments under one roof with the goal of having a better managed city that is able to deliver better services to their citizens.

The operations centre has, obviously, human workers. Do you think there'll be a time when a smart city will be operated without human intervention?

No, operating a smarter city requires the right combination of human tasks and automated tasks. My view is that we will never reach the point at which smart systems do not need humans, and we should not aim to get there. The human component is necessary to understand the overall environment of these systems and to lead many of the strategic, higher-level policy decisions, which are critically important. A smart city is defined by having the right people, in the right numbers, working the technology in the right way at the right time.

What if, for any reason, the operations center fails? Is there a risk for the city to stop working?

The operations center was designed with multiple levels of backup. First of all, there is power and connectivity redundancy at the operation center to be able to operate even with power and network outage. Second, the protocols and procedures can be executed by the staff of the City Hall wherever they are located in the city, using their mobile computers or devices to access the city's servers from a resilient data center that is not co-located within the operations center facility. Third, each department, e.g., the transportation department, has its own facility for managing key processes -- these secondary centers can continue operating even without the operations center. As the city operations center evolves, there will be further redundancies built into it, so that the city will continue working in the best possible way even in the face of disruptions.

If the Rio experience proves satisfactory, what are the next steps?

In Rio, we continue to refine and expand the capabilities of the operations center. With the 2014 World Cup and 2016 Olympics rapidly approaching, the city is undergoing a massive transformation. The operations center will continue to play a critical role as the city prepares to play host to these events which will bring crowds that will put major demand on the city's resources. Outside of Rio, IBM is working with thousands of cities around the world to implement solutions to help cities deliver better services to people and enable sustainable growth.



“The advent of big data makes communications infrastructure even more important”

José Miguel Piquer, academic and researcher, highlights the importance of institutions being able to handle what is known as “big data” (information whose volume and complexity are too great to process on current computer systems) and talks about the infrastructure needs which must be resolved to develop it, in light of his work on the subject at the helm of the Chilean branch of the National Institute for Research in Computer Science and Control (INRIA) of France.

Why is special, specific research needed on big data?

“Data deluge” is a recent, but growing, phenomenon: the data available to be stored and processed is growing exponentially and current technologies are not capable of browsing, viewing, analysing and understanding these sizes and complexities. The major culprits are the devices that connect to the Internet. Data are not longer generated only by humans; the vast majority are generated automatically by all sorts of sensors and devices that are connected to the network.

What sectors of society stand to gain most from big data?

Ultimately, all sectors should benefit in one way or another. It's about having all the historical data available for analysis, so we can model, predict and understand much better all the complex phenomena that elude us today: economics, climate, pollution, and so on.

What sort of infrastructure is needed to process big data? In addition to powerful processors, do you need “indirect” infrastructure, such as energy sources or high speed data transmission lines?

Processing, storage and communications are the three basic types of infrastructure, but the first two are a priority: data analysis can wait until the capacity becomes available, but data transmission and storage cannot wait.

Today big data is being talked about as a novelty. Will there come a time when what we now think of as big data is no longer “big”?

Of course. These are fast-growing phenomena, just like bandwidth, storage and processing capacity were before. What is “big” today will be negligible in 10 years' time.

Should big data be processed in specialized centres on demand, or is it better for each institution to process its own data?

I see a strategic aspect to data: the most valuable data for an institution over the long run are its own data. For example, in a mine, historical raw data (on the quality of the ore in a particular sector, the cost of processing, or the exact quality of ore ready for shipment, for example) will be crucial for production planning a few years down the line. If that data is lost, it is a serious matter for the business. So it makes more sense for firms to store and understand their own data than to use a third party. However, for a while the infrastructure for intensive processing will probably have to be shared. There's no sense in every company buying its own parallel processing centre, because that hardware will be obsolete in a few years.

Should development of big data be a government priority or can private firms deal with it? Should governments include it in their digital agendas, for example?

I think governments should make sure the necessary communications infrastructure is in place. A country's

network is like its highways: an item of national infrastructure that is crucial to its economic development. The advent of big data just makes it even more important. Getting optical fibre to all Chilean cities, for example, is a must so that every industry and area that needs sensors and data can set them up anywhere in the country and process them from wherever they need to.

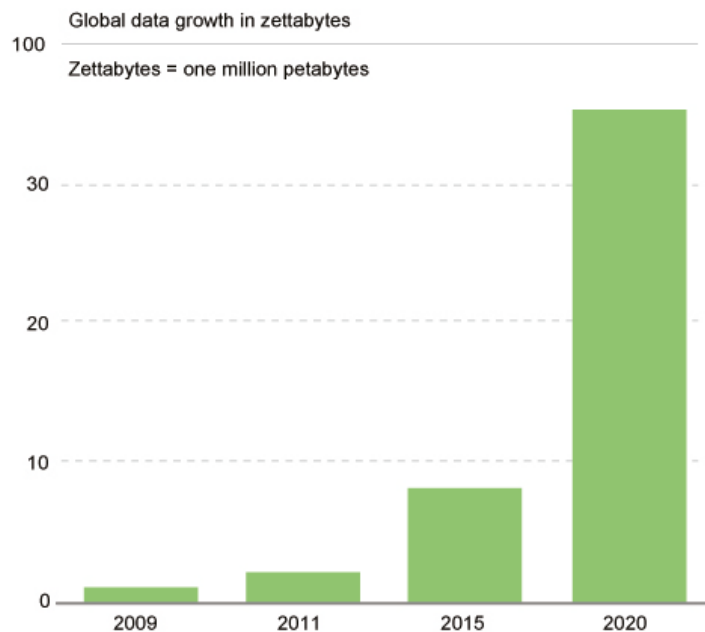
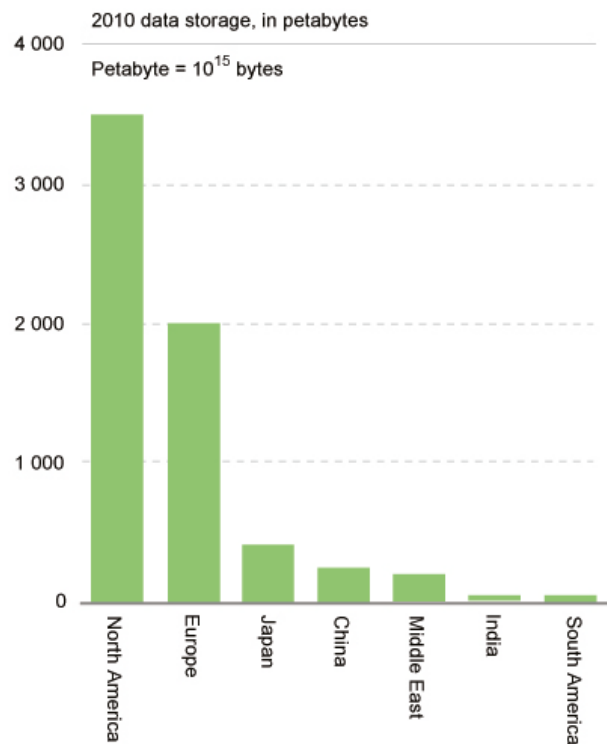
Can we talk about a big data ecosystem the way we speak of the broadband ecosystem?

I don't think so. Big data is more of a technological phenomenon generated within the broadband ecosystem.

What other research is INRIA getting involved in?

The visualization of big data is a priority. Besides that, we are looking at the Internet and its future development, smart integration of unconventional renewable energies in the core system and smart management of renewable natural resources.

Big data: growth and projections



Source: Nasscom - CRISIL GR&A analysis.

News brief

A “3D printer” for growing biological tissue

Scientists at the Vienna University of Technology have created a method for growing biological tissue using a technique similar to 3D printers. By using a laser to alter the tissue at microscopic levels, they have been able to make certain molecules—and even cells—adhere to it.

One of the project leaders, Dr. Aleksandr Ovsianikov, explains that “building a material with small blocks with different chemical properties would be extremely complicated. So we started by forming a three-dimensional scaffold, then began to stick the molecules we wanted in just the right position.” The method, then, is to alter the molecules within a tissue so that they will “call” cells that will make it grow to adhere to it.

This system can be used to grow tissue with a high degree of precision. Although it has been done on two-dimensional surfaces, however, certain complex structures, such as capillaries, need a three-dimensional technique.

Bioengineering is not the only field of application for this kind of 3D printing: it can also be used in sensors and photovoltaic technology. In a very small space, molecules can be altered to adhere to specific chemicals and thus become detectable.

Water droplets under study as a computing method in Finland

A new computing system based on the interaction between water droplets is being studied at Aalto University, Finland. Scientists there discovered that two water droplets colliding on a highly repellent surface behave like billiard balls: they move in a precise, calculable and predictable manner.

Using a silver-coated copper surface slightly modified by a fluorinated compound, scientists succeeded in getting several droplets to take preset paths to perform simple logic operations.

This system, which its researchers call “superhydrophobic droplet logic” could support the creation of autonomous devices that use simple logic and run without electricity, and could even be used to build memory devices.

Ericsson looks at the human body as a data transmitter

Ericsson is experimenting with digital data transmission using the human body as a conductor. The idea behind the “Connected Me” concept is that the body can transmit electricity (which drives the nervous system) and, using special devices, data to a mobile phone. In tests even video and sound have been transmitted at a speed of 10 Mbps.

Ericsson showcased the technology at the Consumer Electronic Show in Las Vegas and at the Mobile World Congress in Barcelona, and is currently working on ways to mass produce it. Among the potential practical applications of Connected Me is e-commerce: simply touching a sensor with a hand could replace credit card use.

@LIS2 (Alliance for the Information Society, phase 2) is a European Commission programme that supports the development of a sustainable, competitive, innovative and inclusive information society and co finances three projects: ECLAC @LIS2, RedClara and RegulateL.

ECLAC @LIS2, executed by ECLAC, seeks to continue to promote and, at the same time, improve and expand the dialogue and experiences on the information society in Latin America, as well as strengthen political, technical and social ties between the region and Europe in this area.

The present material was prepared with financial support from the European Union. Its content is the exclusive responsibility of ECLAC and should in no case be considered to reflect the official opinion of the European Union. The opinions expressed in this publication are the responsibility of the authors and do not necessarily reflect the views of the organizations involved.

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