

# .id

## Indonesia

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### OVERVIEW

Indonesia is an archipelago of more than 17,000 islands with a total population of 224.9 million people. About 43,000 villages (65 percent of the total) do not yet have a telephone line. While the number of mobile phone subscribers has grown significantly, Internet and computer penetration is still low. Among those with access to the Internet, some online services like e-banking, e-shopping, and e-ticketing are becoming quite popular.

A key national ICT initiative in 2007 was the implementation of the national single window at Tanjung Priok Harbor in line with the Association of Southeast Asian Nations (ASEAN) Single Window Agreement (see details in 'Key ICT Policies and Programs'). In addition, the House of Representatives passed the Electronic Information and Transaction Act on 25 March 2008. The Universal Service Obligation (USO) policy and the Palapa Ring project are expected to play an important role in connecting the unconnected in Indonesia. There are also important grassroots ICT initiatives, such as making a parabolic antenna using a frying pan and establishing open source-based citizen Voice over Internet Protocol (VoIP) telecommunication infrastructure.

### TECHNOLOGY INFRASTRUCTURE

#### Satellite

The Indonesian Satellite Association (Asosiasi Satelit Indonesia—ASSI) predicted that the value of the satellite service and its derivatives would reach USD 480 million in 2007, representing a 15–20 percent increase over 2006 values. By the end of

Total population	224.9 million (as of December 2007)
Literacy rate	Male: 94.5% Female: 89.2% (as of 2005)
GDP per capita	USD 3,843 (as of 2007/2008)
Computers per 100 inhabitants	2.8 (as of June 2007)
Fixed-line telephones (PSTN) per 100 inhabitants	3.89 (as of September 2007)
Fixed Wireless Access (FWA) per 100 inhabitants	4.03 (as of September 2007)
Mobile phone subscribers per 100 inhabitants	36.39 (as of September 2007)
Internet users per 100 inhabitants	11.1 (as of December 2007)
Domain names registered under .id	38,461 (as of June 2007)
Broadband subscribers per 100 inhabitants	0.2 (as of December 2007)
Internet domestic bandwidth	80 Gbps (as of December 2007)
Internet international bandwidth	5 Gbps (as of December 2007)

(Sources: APJII 2007; Statistics Indonesia 2008)

2007, transponder needs in Indonesia had reached 150 units. However, there are only 97 transponder units provided by domestic satellite while about 40 transponders still use overseas satellites. The capacity of one transponder is about 50 Mbps. The 53-unit shortage in transponders means a 2.65 Gbps shortage in bandwidth from satellite. The shortage is expected to be filled via the Telkom-3 satellite, the Palapa D satellite, and the replacement of the Cakra Warta satellite. Both the Telkom-3 and Palapa D satellites will be launched in 2009. The Palapa D has a 40-transponder unit capacity, of which 40 percent will be used by Indosat.

In 2006 the number of satellite-based services increased significantly following the issuance of the Communication and Informatics Ministerial Decree No. 13/2006, which requires companies who use satellite to register. The approximate business value in 2006 was USD 140 million from retail of very small aperture terminal (VSAT) providers, USD 196 million from telephony trunking, and USD 45 million from 14 transponders. The ASSI hopes that all operators will optimize the slot orbit and regulation support from government and use the 3.5 GHz frequency.

#### Phone Services

Indonesia's telecommunication sector grew by 48 percent in 2007. Active mobile phone numbers reached 80 million, representing a mobile phone teledensity of about 30 percent. Only about 8 percent of the total population have landlines, of which 3.89 are fixed-line telephones (PSTN) and 4.03 are fixed wireless access (FWA).

FWA costs even less than mobile phones. From the investment side, FWA service is much less expensive than fixed phones: building up one FWA connection service costs only USD 7, whereas the investment cost for a fixed line is about USD 500–1,000. Thus, incumbent operators Telkom and Indosat are giving priority to developing FWA and the FWA market grew to 10.5 million customers by the end of 2007.

Third generation (3G) cellular phone services, which were introduced only at the beginning of 2006, are being aggressively promoted and sales are rising. There were five 3G operators and four million 3G customers at the end of 2007. The majority of 3G customers use the service for video calls and for downloading music. 3G services in Indonesia have grown livelier with three operators (Telkomsel, Indosat, and Excelcomindo) upgrading their services to High Speed Downlink Packet Access (HSDPA) technology, which offers 10 times faster cellular access compared to the older 3G technology (i.e. 3.6 Mbps via HSDPA compared to 384 Kbps). HSDPA-based service costs about USD 38 for 1.2 Gbps of usage per month.

At the end of 2007, there were eight operators licenced to provide mobile telecommunication services. The government has declared that no new cellular telecommunication licence will be released in 2008.

Compared to other forms of telecommunication, fixed phone penetration in Indonesia is the lowest. Only 100,000 new customers were added in 2007 to the 8.7 million connections registered in 2006. The lack of growth is due to the difficulty of developing and maintaining cable network infrastructure. However, the government does not want to abandon fixed-line services and has scheduled an open bid for fixed phone services in mid-2008 under the USO program. The target is to increase fixed line telephone penetration especially in the rural areas.

## Computers

PC ownership in 2007 increased by about 38.5 percent compared to 2006 figures. The Indonesian Computer Business Association (Asosiasi Perusahaan Komputer Indonesia — APKOMINDO) reported a 29 percent increase in personal computer (PC) sales, from 1.4 million in 2006 to 1.8 million in 2007. Sixty-five percent of the PC sales in Indonesia is dominated by local brands or locally assembled PCs. Notebook sales, on the other hand, are dominated by overseas brands, according to APKOMINDO. PC sales are predicted to increase by around 39 percent to reach 2.5 million in 2008.

## Internet

According to the Indonesian Internet Service Providers Association (Asosiasi Penyelenggara Jasa Internet Indonesia —

APJII), there were about 25 million Internet users in Indonesia by the end of 2007, up by 25 percent since 2006. Many Internet users find the bandwidth cost in Indonesia expensive, particularly since the Internet service provider (ISP) purchasing price for bandwidth has been reduced to USD 1,800 per Mbps from a high of USD 2,200–2,500 per Mbps.

The APJII also noted that by the end of 2007 Internet traffic in Indonesia had reached 5 Gbps for international bandwidth usage and 80 Gbps for domestic traffic.

## Domain Name

As of June 2007 there were 38,461 domain names under .id in the Indonesia Domain Name Registry (Pengelola Nama Domain Indonesia — PANDI). Forty-eight percent of these are commercial. There has been a 50 percent growth in the numbers over the last two years, with 18,000 domain names added since 2005.

PANDI predicts the number of registered .id domain names to reach one million in 2010. To boost the increase, it has sponsored a .id logo design contest and a writing contest on the importance of the Internet domain name. In 2007 the Department of Communication and Information Technology (Departamen Komunikasi Dan Informatika — Depkominfo) also launched the ‘Dot ID Saja’ program with a ‘.id for your id’ tagline. The program aims to increase domestic bandwidth use and optimize international bandwidth use for overseas services that are accessed by many Internet users in Indonesia, like blogs, mailing lists, instant messaging, and search engines.

## Local WiMAX

The Directorate General of Post and Telecommunication (Dirjen Postel) will open for tender the development of 2.3 GHz local Worldwide Interoperability for Microwave Access (WiMAX) in 2008. The government has set aside about USD 1.93 million for this purpose. However, as of September 2008, no significant progress had been made in the tender process.

WiMAX development will involve government, the private sector, and academic institutions, including the Indonesian Institute of Science (Lembaga Ilmu Pengetahuan Indonesia — LIPI), Technology Institute of Bandung (ITB), University of Indonesia (UI), Gajah Mada University (UGM), Hassanudin University (Unhas), Technology Institute of 10 November (ITS), State Ministry of Research and Technology, Technology Research Group, PT Inti and PT Harif. Each is assigned a specific role: ITB for chipset development, Ristek through the Agency for the Assessment and Application of Technology (Badan Pengkajian dan Penerapan Teknologi — BPPT) for

final terminal development, LIPI for baseband radio frequency, UI for antenna, and ITB for operating system. There will be 40 researchers from each group.

The Dirjen Postel Director has noted that WiMAX development in Indonesia will develop the local IT and manufacturing industry, which in turn will support downstream industries such as the content industry.

## INSTITUTIONS AND ORGANIZATIONS DEALING WITH ICT

The National ICT Council (Dewan TIK Nasional — DETIKNAS) was established in 2006 to accelerate Information and Communication Technology (ICT) growth through policies that would synchronize the ICT programs of all government departments, ministries, and units. DETIKNAS has seven flagship programs:

1. e-Pendidikan (e-Education) — intended to establish an education network (see ‘ICT-related Education and Capacity-Building Programs’).
2. e-Pengadaan (e-Procurement) — now on a trial run at the National Development Planning Agency (Badan Perencanaan Pembangunan Nasional — Bappenas) and the National Education Department.
3. e-Anggaran (e-Budget) — to merge the routine budget and the development budget into one budgeting format to reduce the intersect allocation.
4. National Single Window (NSW) — an integrated system to accelerate customs clearance, cargo clearance, and the custom facilitation process, thereby cutting the high costs associated with customs services.
5. Single Identity Number (SIN) or National Identity Number (NIN)
6. Palapa Ring — the national telecommunication backbone organized as a fibre optic ring surrounding the entire Indonesian archipelago to accelerate access, increase telecommunication quality, and ensure universal availability of the telecommunications infrastructure.
7. Software legalization program — to promote use of licensed software in government and non-government institutions, with open source software as the main choice.

The implementation of telecommunications standards, rules, and policies is the joint responsibility of Dirjen Postel, which is under the Depkominfo, the Indonesia Telecommunication Regulatory Body (Badan Regulasi Telekomunikasi Indonesia —

BRTI), the Directorate of Telecommunication, the Directorate of Radio Frequency Spectrum Satellite Orbit, the Directorate of Post and Telecommunication Standardize, and the Directorate of International Post and Telecommunication Institutional.

BRTI is an independent regulatory body charged with protecting the public interest and fostering healthy competition in the telecommunications sector. It coordinates with Dirjen Postel and gives periodic reports to the Depkominfo.

The State Ministry of Research and Technology (Kementerian Negara Riset dan Teknologi — Ristek) is working on expanding the ICT infrastructure through telecommunications and Internet development, development of energy-saving and low-cost computers, and open source applications.

Private sector participation in ICT development in Indonesia is led by the non-profit Indonesia Infocomm Society (Masyarakat Telematika — MASTEL), which serves as a bridge between government and ICT industry groups. MASTEL has seven working groups: telecommunication blueprint, policy development, broadcasting, ICT roadmap, taxation, ICT for the rural areas, and dispute resolution.

The Indonesia Information Technology Federation (Federasi Teknologi Informasi Indonesia — FTII) is composed of associations in ICT-related fields with the common aim of promoting the growth of IT applications and the development of the IT industry.

The Indonesia ISP Association (APJII) seeks to develop the Internet in Indonesia. Its concerns include the management of the Indonesia-Network Information (ID-INC) and Indonesia Internet eXchange (IIX), and negotiating the telecommunication service infrastructure fee. APJII provides its members with Network Information Resources (NIR), gives advice to government, and organizes training programs.

The Indonesia Domain Name Registry (PANDI) was established in December 2006 to reduce Indonesia’s dependence on overseas domains. Its duties include developing and providing services related with domain names.

The Indonesia Security Incident Response Team on Internet Infrastructure (ID-SIRTII) is responsible for the control of Internet traffic in the country. Its aim is to discourage and eliminate misuse and misapplication of Internet infrastructure particularly through cyber terrorism and Internet crimes like hacking. Its activities include collecting logs from ISPs, conducting traffic system analysis, and fostering collaboration for the protection of information security.

There are also civil society or consumer groups contributing to ICT development in Indonesia. One of these is Air Putih Foundation, a group of IT volunteers in Aceh providing ICT facilities and services in disaster areas since the Asian tsunami

in December 2005. The Indonesia Telecommunication Users Group (IDTUG, [www.id.tug](http://www.id.tug)) was established in 2004 as a non-profit organization of companies, educational institutions, individuals, and other users of telecommunications services and infrastructure. The Center for ICT Studies Foundation (ICT Watch, [www.ictwatch.com](http://www.ictwatch.com)), a non-profit group established in 2004, focuses on ICT-related research and social programs. One of the latter is ‘Internet Sehat’, a campaign for the safe and responsible use of the Internet.

## ICT AND ICT-RELATED INDUSTRIES

### ICT Industries

According to the Department of Industry, Indonesia’s ICT industries are distributed as follows: hardware, 5–10 percent; multimedia software, 30–40 percent; and consulting services, 50–65 percent. The value of the ICT market is estimated to be USD 979.9 million for hardware, USD 211.7 million for consulting services, and USD 110.3 million for software. In 2006–2007, the sector had an investment value of USD 54.7 million, a production value of IDR 40.3 quintillion, an export value of USD 2.8 million, and an import value of USD 2 million. The industry employs around 58,000–60,000 people.

To give ICT industries a boost, the Indonesian government has set up Regional IT Centers of Excellence (RICE) in 10 cities: Jakarta, Bogor, Cimahi, Bandung, Surabaya, Denpasar, Manado, Makassar, Balikpapan, and Medan. RICE management includes stakeholders from government, academia, and the business community.

### Internet Service Providers

According to Dirjen Postel, as of the end of 2007 there were 298 licenced ISPs, 44 licenced Network Access Providers, and 25 multimedia companies. Of the total, only 202 companies have registered with the Indonesia APJII. Many APJII members are companies that need services such as IP address allocation and assistance in connecting to the IIX.

### Internet Kiosks

The number of Internet kiosks, called *warnet* (for Warung Internet), is growing steadily. In 2007 there were more than 10,000 Internet kiosks, according to the Indonesian Internet Kiosk Association (Asosiasi Warnet Indonesia — AWARI). Many have been raided by the police for illegal use of proprietary software. Internet kiosks play an important role in providing Internet access in Indonesia, with 40 percent of the 20 million Internet users in Indonesia accessing the Internet from *warnet*.

On average, an Internet kiosk has 12 PCs, with each PC being used for up to seven hours per day. Users are charged IDR 4,000 per hour.

## KEY ICT POLICIES AND PROGRAMS

In September 2007 the government declared PT Bakrie Telecom as the winner of the tender for international direct calls (Sambungan Langsung Internasional — SLI). In exchange for the exclusive right to run SLI services, PT Bakrie Telecom must build two international central gateways (Sentral Gerbang Internasional — SGI) in the west and east of Indonesia.

The Palapa Ring broadband fibre optic development is designed to connect all of Indonesia in one Internet infrastructure circle. This grand project consists of seven rings to cover 33 provinces and 460 regencies. The project has a budget of USD 255 million for laying 35,280 kilometres of submarine cable and 21,708 kilometres of land cable. Each ring will forward bandwidth frequency access from one point to another in every regency, providing a high-speed connection of 300–1,000 Gbps. The development is expected to take one year (all of 2009) and services will commence in the first quarter of 2010. In May 2007, a consortium of seven companies signed a memorandum of understanding with the government to undertake Palapa Ring Phase I, which will cover east Indonesia. The consortium was committed to deposit USD 11.2 million or 5 percent of the total project value.

At the end of 2007 Indonesia finally implemented the National Single Window (NSW) system in Tanjung Priok Harbor, Jakarta. With the NSW system applications for customs clearance and the necessary permits from the Food and Drugs Authority Agency (Badan Pengawas Pusat Obat dan Makanan), Directorate General of Overseas Trade (Dirjen Perdagangan Luar Negeri), Agriculture Quarantine Agency (Badan Karantina Pertanian), and Sea and Fish Quarantine Agency (Pusat Karantina Ikan) are made online at [www.insw.go.id](http://www.insw.go.id) (see ‘Clearing Customs in 30 Minutes Instead of 5.5 Days’).

The USO program aims to build basic telephone infrastructure in 38,741 villages from a fund to which telecommunications operators shall contribute 0.75 percent of their annual gross revenue contribution. The program target is at least one phone line per village by 2010 and Internet access for at least 50 percent of the villages by 2015. In September 2007 the Indonesian government began to implement the USO program through a tender process that began with 23 companies expressing interest. Eleven companies actually made a tender and, after a thorough evaluation, two — PT Telkom and PT Asia Cellular Satellite — were declared as finalists. However, in December 2007 the USO tender was cancelled as the two finalists were found to be unable to meet the technical and administrative requirements.

## Clearing Customs in 30 Minutes Instead of 5.5 Days

With the new National Single Window (NSW) system, getting customs clearance at Tanjung Priok Harbor has been reduced from 36 steps in the previous system to just five steps. The new system is also expected to eliminate opportunities for bribery (i.e. customs broker fees of as high as USD 100), which would reduce the cost of getting customs clearance to only about USD 11. The NSW will also reduce the time it takes to exit the harbor with customs clearance from 5.5 days to 30 minutes.

The NSW will also be implemented in Tanjung Perak — Surabaya Harbor, Tanjung Mas — Semarang Harbor, Belawan — Medan Harbor, and Soekarno Hatta International Airport. This is part of Indonesia's compliance with the ASEAN Single Window Agreement that seeks to establish a viable, simplified, standardized, and integrated environment for cargo clearance in line with international best practice as part of improving international trade in all ASEAN countries by 2015.

The government re-opened tender for the USO program in October 2008.

## LEGAL AND REGULATORY ENVIRONMENT FOR ICT DEVELOPMENT

In March 2008 Indonesia's House of Representatives passed the Electronic Information and Transaction Act, which covers information protection, certificates of authority, domain names, dispute resolution, and intellectual property rights. The law prohibits online pornography, gambling, slurs and defamatory attacks, and extortion and threats. It has provisions against misuse, hacking, and unauthorized system interception. The biggest penalty it imposes is about USD 1.3 million and/or 12 years imprisonment for falsification of electronic documents.

The law has received mixed reviews. Some sectors, in particular bloggers and members of the media, fear that the government could use the law to curtail freedom of expression and the right to information.

## DIGITAL CONTENT INITIATIVES

The Indonesian Blogger Fiesta (Pesta Blogger) was held for the first time in December 2007 with about 500 bloggers in attendance. As of last count there were approximately 130,000 bloggers in Indonesia. Even the government ministers blog. Defence Minister Juwono Sudarsono ([juwonosudarsono.com](http://juwonosudarsono.com)), Agriculture Minister Anton Apriyantono ([apriyantono.com](http://apriyantono.com)), Public Housing Minister Yusuf Asyari ([yusufasyari.com](http://yusufasyari.com)), State Secretary Yusril Ihza Mahendra ([yusril.ihzamahendra.com](http://yusril.ihzamahendra.com)), and Forest Minister Malem Sambat Kaban ([mskabanet.com](http://mskabanet.com)) maintain blogs. Some politicians, artists, and members of the legislative and executive branches of government are also bloggers. Local blog sites such as [www.blogdetik.com](http://www.blogdetik.com) and [www.dagdigdug.com](http://www.dagdigdug.com)

are well received as they are accessed much more quickly and do not involve overseas bandwidth use.

Online local news sites, such as [Okezone.com](http://Okezone.com), [Inilah.com](http://Inilah.com), [Kompas.com](http://Kompas.com), and [Detik.com](http://Detik.com), are also experiencing significant growth. [Detik.com](http://Detik.com) marked its 10th anniversary in July 2008 with more than 500 million page views per month and over eight million unique visitors (based on IP addresses) per month. It is the most widely read local news website in Indonesia.<sup>1</sup> [Detik.com](http://Detik.com) has a mobile content service ([mobile3845.com](http://mobile3845.com)), and is now exploring Internet-based television content ([tv.detik.com](http://tv.detik.com)), a blog service ([blogdetik.com](http://blogdetik.com)), and a discussion forum service ([detikforum.com](http://detikforum.com)).

In the education sector, some universities (e.g. Bina Nusantara University, [www.binus.edu](http://www.binus.edu), and Pelita Harapan University, [www.uph.edu](http://www.uph.edu)) are using integrated learning management systems and offering lecture materials online. Moreover, Webometrics lists 17 Indonesian universities<sup>2</sup> among the top 5,000 in terms of Web presence. This means that these universities are accessible and visible through a university website, electronic publications, research activities, connectivity with the industrial world, and international activities.

The Department of Culture and Tourism (Departemen Kebudayaan dan Pariwisata — Depbudpar) has launched its official website ([www.my-indonesia.info.id](http://www.my-indonesia.info.id)) to promote 'Visit Indonesia Year 2008' among overseas and domestic tourists.

## ONLINE SERVICES

E-Banking is becoming popular among Indonesian Internet users with online services offered by some of Indonesia's most reputable banks like BCA Bank ([www.klikbca.com](http://www.klikbca.com)), Mandiri Bank ([www.bankmandiri.com](http://www.bankmandiri.com)), BNI 46 Bank ([www.bni.co.id](http://www.bni.co.id)), and Lippo Bank ([www.lippobank.co.id](http://www.lippobank.co.id)).

However, although there has been significant growth in cell-phone use in Indonesia, mobile banking and mobile payments

have not followed suit. Some of the local banks, such as the BCA Bank and Mandiri Bank, are collaborating with mobile phone operators to provide mobile banking services. But at present most cellphone users in Indonesia are limiting themselves to voice calls and text messaging services. Telkomsel is promoting a mobile wallet service called T-Cash, which allows customers to use their cellphones to buy and pay for services online (through short message service — SMS) or offline (using a card to transact at participating stores).

e-Ticketing services are also common. Several local airlines — Lion Air ([www.lionair.co.id](http://www.lionair.co.id)), Mandala Airlines ([www.mandalaair.com](http://www.mandalaair.com)), Sriwijaya Air ([www.sriwijayaair-online.com](http://www.sriwijayaair-online.com)), and national flag carrier Garuda Indonesia ([www.garuda-indonesia.com](http://www.garuda-indonesia.com)) — now issue e-tickets that can be reserved and bought online.

e-Commerce sites are increasing in number. Recently opened sites include computer and electronic sites ([www.bhinneka.com](http://www.bhinneka.com) and [www.glodokshop.com](http://www.glodokshop.com)), a community site for photographers ([www.fotografer.net](http://www.fotografer.net)), online travel bureau ([www.indo.com](http://www.indo.com)), gift shop ([www.iyoushop.com](http://www.iyoushop.com)), bookstore ([www.kutukutubuku.com](http://www.kutukutubuku.com)), and career sites ([www.karir.com](http://www.karir.com)).

In addition, the first ever online wedding was held in Indonesia in 2006 (see 'Getting Married Online').

## ICT-RELATED EDUCATION AND CAPACITY-BUILDING PROGRAMS

There are 476 universities in Indonesia offering ICT programs and 136 universities offering communication programs. Together they account for about 25,000 graduates annually.

But this number is not sufficient to meet the demand in the local ICT industry. According to a study by the Center of Data and Analysis Tempo, IT graduates will be the most in demand among graduates in the next three years. About a thousand graduates will be completely absorbed by IT companies within a week at a starting salary of about USD 430 a month.

Meanwhile, the government is preparing all Echelon III and IV functionaries in every department/ministry to be their unit's chief information officer (CIO). In the future, the CIO will be positioned right under the minister or department head, and a CIO position will be introduced in the provincial government as well. A CIO is expected to develop and support the institution's e-government program, and justify the key performance indicator in the area to the National ICT Council. The CIO candidates will have three semesters of full-time study at the Gajah Mada University or Bandung Institute of Technology.

Two education networks have been established by the National Education Department (Departemen Pendidikan Nasional — Depdiknas) — JARDIKNAS, the National Education Network (Jaringan Pendidikan Nasional), and INHERENT, or the Indonesia Higher Education Network. JARDIKNAS is a network connecting over 3,000 educational institutions in Indonesia, whereas INHERENT is an inter-university network composed of 200 universities as of 2007.

The term JARDIKNAS was used for the first time in July 2006. The plan was to develop a national online network infrastructure for school zone interconnection needs in every city/region in Indonesia. The online network infrastructure would also connect to provincial offices of education as local nodes of JARDIKNAS. These provincial offices would then distribute

### Getting Married Online

Rita Sri Mutiara Dewi, a 50-year-old woman based in Bandung province, and Wiriadi Sutrisno, a 52-year-old man based in the United States, held their wedding ceremony last 11 December 2006 via the Internet. Using video conferencing through VoIP, they were declared legally married by a Muslim leader.

Rita is a teacher in Malaysia. She went home to Bandung to get married, with her family and the Muslim leader in attendance. Wiriadi, who comes from North Sumatra, is a physiotherapist at a hospital in California, USA. During the wedding ceremony, Wiriadi was at his office with a friend who served as a witness. The couple, who had not met face-to-face prior to the wedding, met via a chat room. They conducted their courtship through photo exchanges and phone conversations.

The online wedding was declared legal by Muslim leader Penghulu, who noted that the requirement that the groom see his wife's face had been met. The wedding was made possible with the assistance of a technician from PT Telkom. Using a video screen and speakerphones, the couple pronounced their marriage vows (*Ijab Qabul*). The entire ceremony took 25 minutes and cost IDR 100,000. The plan was for Rita to go to California to finally meet her husband two weeks after their online wedding.

(Source: Pasangan Indonesia Nikah di Internet)

JARDIKNAS to all schools, including the vocational school that functions as the ICT centre in each region. JARDIKNAS was officially announced by Indonesian President Susilo Bambang Yudhoyono at the opening of the Southeast Asian Ministers of Education Organization (SEAMEO) conference in Bali in March 2007. The announcement was witnessed in 34 other locations around Indonesia through the JARDIKNAS video conference system.

INHERENT was an initiative of the Directorate of Higher Education that began in 2006 with 83 universities connected to the network. The network used several technologies, such as fiber optics, microwave, wireless connection and satellite connection. The backbone capacity is 45 Mbps for the Java area, 8 Mbps for Sumatra, Kalimantan, Sulawesi, Bali, and Nusa Tenggara Island, and 2 Mbps for other islands like Maluku and Papua. The applications running on INHERENT include video conferencing, tele-teaching, remote learning, digital library network, telemedicine applications, grid computing infrastructure, and earth sciences applications (weather and climate prediction). The network is also a test bed for applications such as VoIP and Web caching.

In May 2007, the House of Representatives (Dewan Perwakilan Rakyat — DPR) evaluated the ICT program of the Department of National Education and recommended the integration of the management and infrastructure of JARDIKNAS and INHERENT to improve effectiveness and efficiency. Since August 2007 the integrated program has been known officially as JARDIKNAS. INHERENT infrastructure is now fully integrated as a component of JARDIKNAS serving the higher education zone. There are four network zones in JARDIKNAS: the education official office zone, the higher education zone (formerly INHERENT), the school zone, and the personal zone.

In 2007, the number of JARDIKNAS connections increased by more than 100 percent to 1,104 nodes. The greatest increase was in the higher education and government zones.

## ICT RESEARCH AND DEVELOPMENT

Wajanbolic (*wajan* is the Javanese word for frying pan) is a parabolic antenna made from a frying pan. It was invented by Gunadi, who lives in Purworejo, Central Java. According to information from his blog, the wajanbolic technology allows access to a 2.4 GHz wireless Internet signal from a distance of 3–4 kilometres. In clear line of sight conditions, the signal has 60–70 percent stability and allows for Internet speeds of up to 54 Mbps. Each set costs only about USD 41. Some private institutions, schools, and Internet kiosks are utilizing

the wajanbolic technology photos of which are available at the inventor’s blog, <http://gun001.multiply.com/photos>.

Ristek’s National Research Agenda 2006–2009 specifies the development of a food information system to facilitate bi-directional information flow for both fresh and processed food commodities between the food production and industry centre and the domestic or international market. The system is also designed to be used as a medium for providing the public with food-related information such as nutrition facts or suggested food processing methods. Investors can use the system to access information about the food production industry, such as the location, price, and production capacity for certain commodities. This system was designed to use various possible ICT tools like website or SMS so that it can be easily accessed by agro-business stakeholders and even by farmers.

Rural NGN (R-NGN) refers to research on Next Generation Network (NGN) technology applications for the countryside. It is expected to provide affordable Internet access as well as telephony service for people in the rural areas.

The digital broadcasting program was designed to provide better broadcast quality compared to traditional analog broadcast but at a relatively low cost, considering the economic condition of most Indonesians. Based on this reality, Ristek worked with research institutions from several universities to create some kind of inverter so that analog television (TV) can be used to receive digital broadcasts. In 2006–2007, this program carried out research and development (R&D) in packetized elementary streams (coding, compression, formatting) and stream multiplex and transport stream program. In 2007–2008, the research focus is on the RF/Transmission System (8-VSB modulation), the Cable Head-End (16-VSB) cable system, and the receiver and top box set (inverter for the analog TV). The program also involved the National Standard Board for the standardization, as well as state-owned enterprises and domestic industries to provide components and equipment.

## OPEN SOURCE/OPEN CONTENT INITIATIVES

Ilmu Komputer.com or IKC (*Ilmu Komputer* means ‘Computer Knowledge’) is a website that contains free lectures, tutorials, translations, reviewers, and other materials about computer technology, delivered in Bahasa. Hundreds of volunteers from all over Indonesia and abroad contribute to the site, which received recognition at the World Summit on the Information Society (WSIS) as one of ‘The 21 Continental Best Practice Examples in the Category e-Learning’.

In February 2007, Ristek announced that the ministry would provide a USD 5,300 technology assistance fund for small and medium enterprises willing to use open source software in running their business. In another move, the provinces of Nangroe Aceh Darussalam and Special Region of Yogyakarta announced in July 2007 plans to migrate to open source software, with the assistance of Air Putih Foundation.

The Indonesia Goes Open Source (IGOS) program was launched in 2004 to promote the development and use of open source software in the country. Penggerak Linux Indonesia Foundation, established in 1990, is also supporting open source software development and has developed BlankOn Linux Lontara, which uses Bahasa as the interface language. With the advocacy of these two groups, many local sites now use open source platforms.

VoIP Rakyat (Citizen VoIP, [www.voiprakyat.or.id](http://www.voiprakyat.or.id)) uses an open source platform to provide VoIP services. The free service, which was developed by Anton Rahardja, has served more than 250,000 calls and has around 17,800 active accounts. It can be used to make cheap calls to fixed line and cellular phones. Thirty-year-old Anton has also created other open source programs such as SMS gateway PlaySMS (<http://playsms.sourceforge.net>), the Banjar bandwidth management software (<http://banjar.sourceforge.net>), and a Web-based billing software for Internet cafés called PlayBilling (<http://playbilling.sourceforge.net>).

## CHALLENGES AND OPPORTUNITIES

According to Ristek, there are eight weakness that can slow down the growth of the ICT industry in Indonesia: (i) unfavourable business conditions due to weak law enforcement; (ii) relatively weak support for R&D and transfer of technology due to insufficient funding; (iii) lack of a national standard for ICT products; (iv) a limited export market; (v) high dependency on imported components and production equipment, resulting in vulnerability to global price changes; (vi) a limited number of professionals in ICT development; (vii) lack of optimal effort in developing ICT-based enterprise such as an animation industry; and (viii) software piracy. The latter cost the software industry a loss of USD 411 million in 2007.

In his note titled 'Strategy and Policy in Communication and ICT Development', the state minister of state-owned enterprise Indonesia, Sofyan Djalil (formerly the Minister of Communication and ICT), said that although Indonesia has the advantage of having a large number of demographic and geographic resources, having many islands could be an obstacle to ICT build-up and development. He recommended giving priority to ICT development in areas with high economic value, such as Java and parts of Sumatra.

In a presidential lecture held on 9 May 2008 with Microsoft Chairman Bill Gates in the audience, Indonesian President Susilo Bambang Yudhoyono noted that ICT can help resolve many of the country's problems, such as poverty, corruption, conflict, violence, deadly diseases, natural disasters, and mismanagement. However, although there are more and more computers in the districts and villages, few people understand how they can be harnessed to improve lives and foster development. The President underlined the fact that while there is a lot of useful know-how and creativity with ICT, these initiatives remain scattered and they are not being deployed in a coherent and even way to help the poor. Indeed, harnessing ICT for national development is the challenge confronting ICT advocates in Indonesia.

## NOTES

1. Its sister sites include [detikhot.com](http://detikhot.com) (celebrity news), [detikinet.com](http://detikinet.com) (ICT news), [detiksport.com](http://detiksport.com) (sports news), [detikfinance.com](http://detikfinance.com) (financial news), [detikfood.com](http://detikfood.com) (culinary news), [detikbandung.com](http://detikbandung.com) (Bandung, capital city of West Java regional news), and [detiksurabaya.com](http://detiksurabaya.com) (Surabaya, capital city of East Java regional news).
2. The 17 universities include Gajah Mada University, Bandung Institute of Technology, University of Indonesia, Brawijaya University, Bogor Institute of Agriculture, Petra Christian University, 10 November Institute of Technology, Hassanudin University, STT Telkom, Airlangga University, Gunadarma University, Surabaya Electronics Polytechnics, Bina Nusantara University, Parahyangan Catholic University, Duta Wacana Christian University, Padjajaran University, and Lampung University.

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