

An Indonesian Digital Review - Internet Infrastructure and Initiatives

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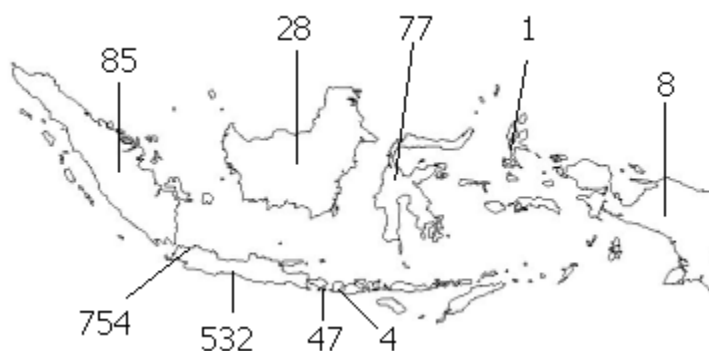
OVERVIEW

Community based and private sector with awfully limited, if no, government support is forming the Indonesian ICT infrastructure. The ICT infrastructure is currently serving only 1-5% of country's population. The country should be currently satisfied by an estimated 7.1 million 100% digital fixed phone line infrastructure, and approximately the same number of cellular subscribers as estimated in 2002.

As reported by IDC, in 2001, Indonesia is spending US\$752 million in IT hardware, US\$124 million in software, US\$ 85 million in IT services. It is estimated a total of US\$ 1,228 million of IT spending in 2001. Adding telecommunication spending into the picture, a total of US\$ 3.539 million of ICT spending is estimated in 2001. ICT/GDP is about 2.2% or about US\$16.6 ICT/Capita. Software over hardware spending is only 16.5%. Internet commerce is very low at 0.10% to total commerce, and it is about US\$2.11 per capita. Only 9.8% of IT spending is on eBusiness technology.

In 2001, there is an estimated 2.3 million PCs in the country. Most of these PC, about 1.9 million are used in business and government. Only about 251.000 PCs are used in Indonesian household. More than 60.000 educational institutions are currently using only about 58.000 PCs.

In 2001, there are approximately 4 million Internet users with 600.000 Internet subscribers. It is not surprising to see 60-70% Internet access is performed through 1500+ Internet cafés in the country. Thus, Internet café seems to be the most common access



point for Indonesian communities. It is quite affordable ranging from US\$ 0.3-1 / hour. However, in tourist areas, such as, Bali, fare can be as high as US\$5-6/hour. Unfortunately, Internet cafés are distributed unevenly and ~50% concentrated in Jakarta as shown in the figure.

Dial-up service over noisy line is commonly used to access the Internet. Not surprising many of the Internet café as well as private sector will likely to bypass Telco's last mile infrastructure using WiFi 11Mbps equipment running at 2.4GHz. Some are currently using 5.8GHz equipments for higher speed. Most of these wireless access points are in cities.

Wireless infrastructure may be away to go for deploying Internet for rural, under-served, poor Indonesian neighborhood. However, issues in rural areas would not only telecommunication / Internet access technology, it is more on the demand, people, social, cultural side as well as the higher stumbling block in the regulatory framework. Need on information and knowledge is virtually non-existence in such areas. Education processes would be most strategic to create the need and demand.

Lead by Indonesia Linux User Group (KPLI) www.linux.or.id, the Indonesian Linux community is struggling to grow. Various Indonesian Linux mailing lists hosted at linux.or.id, such as, linux-admin@linux.or.id, lead most of the awareness and education activities among Indonesian Linux users. Physical interaction is still a potent strategic tool to convey Linux knowledge to the society. It is not surprising to see a very high rate 3-4 seminar, talk show, or road show per week. Not to mention a significant number of magazines and Linux book published, and drive many young Information Technology (IT) authors to emerge.

No indigenous fonts and scripts are used, as Indonesian is currently using the western alphabet. Our major problem is mainly lack of content written in Indonesian. Speak-and-listen is much common way to communicate in Indonesian culture as compared to read-and-write. By simple evaluation through google.com, it can be clearly seen that only 15.3% of Indonesian content is in Indonesian language. The rest are written in English by various sources.

CONTENT

Evaluation of content consumed can be honestly performed through analyzing log report of Web proxy server, such as, Calamaris log report. While Indonesian content produced would be a bit more difficult to access. An attempt would be reported in evaluating the content produced by evaluating the result of google search after putting appropriate keywords in certain topics. A more elaborate analysis on interactive content, such as, mailing list will be described in the section on e-community.

Analyzing several Calamaris log reports from the Institute of Technology Bandung (ITB) collected in a period of November-December 2001 and Internet Café in Makassar, a fairly similar behavior is apparent. Typical web consumption behavior can be summarized as follows,

- Search engine & web mail are the most accessed sites. It basically tells that most beginners would roam through the Internet through the help from search engines, while e-mail seems to be their main activities.
- News & online media are next in the row.
- Right after it is the Indonesian pornographic site, although, it is only small only percentage. In contrast to heavily cover by the media, pornographic sites are not the main focus for most beginners.
- Quite high percentage of the users are normally mistyped the URL. Thus, users may be vulnerable to crackers who create sites that catch mistyped URLs.
- Yahoo.com & its family are the most (10-13%) accessed sites. It seems to be a common phenomenon worldwide.

In evaluating the Indonesian content produced on the Web, google search is used as a major tool. Indonesian content in different topics in Indonesian language as well as in English will be evaluated. More than ten (10) commonly found word in certain context are used as keywords to analyze the number of certain topics and certain language.

A large number of URLs are found after Google search. It is interesting to note a significantly different emphasis of content in Indonesian as compared to English. More emphasis on technology, news and current affairs, education, culture and literature are apparent in Indonesian language content. While Indonesian content in English, which aim to reach a broader English audience on the Internet, put more emphasis on commerce and tourism, industry/business, civil society, and government. Thus, the interest, the needs of Indonesian readers seem to be different than that of English readers. In both Indonesian and English content, not many content produced in rural development, non-government organizations and agriculture.

Ratio of Content in Indonesian Language relative to English is listed in the following table.

Commerce and tourism	7.1%
Industry/Business	11.6%
Civil society	12.1%
Government	15.7%
Culture and literature	16.9%
News and current affairs	22.0%
Education	18.9%
Technology	27.1%
Political groupings	11.2%
Health/Nutrition	23.7%
Rural development	17.2%
Non-government organizations	8.5%
Agriculture	9.7%

In the average Indonesian content in Indonesian language contributes only about 15.3% of all content on Indonesia. The percentage of Indonesian content in Indonesian language reaches its 27.1% peak in technology related areas; followed by health/nutrition at 23.7% and news current affairs at 22%. The Indonesian techies seem to get the most benefit from the network.

IMPORTANT INDIGENOUS SOURCES OF CONTENT:

The important indigenous source of content listed is mainly based on Calamaris log report of large proxy servers in Indonesia, namely, Institute of Technology Bandung (ITB) and InterNux (Makassar city). Indonesian language is primarily used.

Yahoo www.yahoo.com

As shown in calamaris log report, the most and consistently popular Internet site in Indonesia is surprisingly yahoo.com, including www.yahoo.com, mail.yahoo.com, groups.yahoo.com. For various reasons, Indonesian Internet users use yahoo.com and its various services for most of their activities. To best of our knowledge, there is no specific service on Indonesian language is on yahoo.com. There are currently more than 45,000 Indonesian mailing lists are hosted at groups.yahoo.com.

Google www.google.com

The second popular search engine used by Indonesian people is surprisingly www.google.com. It is clearly shown that the International service on the Internet serves the need of Indonesian Internet users.

Most actively accessed Indonesian sites, as reported by Calamaris log report, are the Indonesian news and current affairs sites. These includes,

KOMPAS www.kompas.com

KOMPAS is one of the two top news sites in Indonesia. KOMPAS has the advantage of having the high circulation of its conventional printed newspaper. It is in Indonesian language. It may have version in English.

DetikCom www.detik.com

www.detik.com is the leading online media in Indonesia. It does not rely on any printed media. It gains much of their reputation of being the most accurate breaking news site especially during the 1998-1999 riots when all the students fight for the fall of Suharto's regime. The news is in Indonesian.

Online news was started around 1997 by Republika news paper at www.republika.co.id. News and current affairs might be one of the most active web site category in Indonesia as a significant number of Indonesian printed media has their own web site. Some of active sites are www.bisnis.com, www.pikiran-rakyat.com, www.tempo.com; as well as some English online media, such as, www.jakartapost.com

BolehMail www.boleh.com

www.boleh.com may be one of the most commonly used Indonesian webmail service after plasa.com. It is privately run and designed for young Indonesian Internet users that enable them to receive their information over mail and mailing lists.

Geocities www.geocities.com AKA geocities.yahoo.com

Many Indonesians try to put up their web site on the Internet. www.geocities.com also known as geocities.yahoo.com might be one of the main free web hosting for Indonesians. Free web hosting on the Internet is a great place for beginners as well as advance users to publish their work and interest for others to read.

There are several major Indonesian Web directory services. The Indonesian ICT business communities can be explored through these directory services.

Indonesian YellowPages www.yellowpages.co.id
www.yellowpages.co.id might be one of the best Indonesian Internet directory service. This service is part of the Indonesian phone book company. It is not surprising to see an accurate and significant number of companies listed on www.yellowpages.co.id. It is in English.

IndoPage www.indopage.com
www.indopage.com may be one of unofficial Indonesian chamber of commerce directory service. It contains the web site of Indonesian businesses on the Internet. It uses mixed Indonesian and English.

ONLINE SERVICES:

E-GOVERNMENT

There are several competing activities within the Indonesian government body to claim for the principal e-government center.

Indonesian Government www.indonesia.go.id

One of the major page representing the e-government of Indonesia might be www.indonesia.go.id, through which should hopefully reach other government agencies. A significant increase in activities to build Web sites of various counties, cities and region begins in the early year 2002. The majority, if not all, of Indonesian government sites on the Internet are basically providing information on the potential of each region, and also rule and regulation, things that should be abided by the Indonesian people. At the moment in time, to best of my knowledge, no known public service is electronically provided via the Web.

Indonesian Parliament www.mpr.go.id

www.mpr.go.id carries the information and activities performed at the Indonesian parliament. We will likely to see major activities, especially during major planetary meetings or when election time is closing as the representative need people to vote for continuing their term.

Indonesian House of Representatives www.dpr.go.id

The house of representative can be viewed at www.dpr.go.id. All member of the house have their own e-mail addresses. Thus, we should hopefully be able to interact with Indonesian party leaders and the member of the house via e-mail under the domain dpr.go.id. The Web activities of www.dpr.go.id is fairly similar to www.mpr.go.id.

There are basically two (2) major government institutions that influence the Indonesian ICT environment, these institutions are the Directorate General of Post and Telecommunication (www.postel.go.id), which controls the telecommunication and internet infrastructure, and the Ministry of Industry and Trade (www.dprin.go.id) that controls the ICT industries.

DISTANCE EDUCATION & E-LEARNING

Formal distance education and e-learning would be rare in Indonesia as current regulation prevent such services to be provided to the Indonesian people. In addition, transfer of credit may or may not be applied in some cases, and would create difficulties in providing distance learning services. To best of our knowledge, there are two (2) major distance education activities running in Indonesia.

Indonesian Open University www.ut.ac.id

Indonesian Open University is the formal open university run by the Indonesian government. Some works are currently underway at the directorate general higher education at ministry of education on setting some distance learning programs in some public universities.

IBUTEledukasi www.ibuteledukasi.com

IBUTEledukasi seems to be a new comer in Indonesian distance learning business in 2002. Their activities seem to be in collaboration with many other institutions, including University Tun Abdul Razak in Malaysia. They seem to provide courses in high technology, such as information technology courses.

Information on formal non-distance learning institutions can be found on the Web. A total in excess of 1300 higher educational institutions are providing higher educational degree in Indonesia. Detailed information on various higher education services can be found at the director general of higher education Web site, i.e., www.dikti.org.

In reality, most of the distance learning and e-learning processes are taken place in a very informal manner. It basically says that no certificate, no accreditation, no permit necessary in the real life distance learning & e-learning processes adopted by most Indonesian online communities. Most of these Indonesian learning communities can be found at yahoogroups.com (<http://groups.yahoo.com>). Transfer of knowledge is performed through a long term on going e-mail discussions. Hundreds of these mailing lists can be easily found at yahoogroups.com. Mailing lists name, such as, *indoprogram*, *indoprogram-vb*, and *javaid*, is representing such vast virtual communities that provide informal platform for rapid knowledge exchange. It should be noted that knowledge provided by communities for communities are very current as well as practical knowledge. None of this knowledge may be sufficiently obtained through the formal education system, which very much controlled by the conventional top-down national curriculum. Having such practical knowledge and community acknowledgement would be a license to success in IT communities; not to mention other professions. It is not surprising to see much of these communities would gather around certain learning mailing list on the Internet.

E-COMMERCE / E-BUSINESS

Google search using keyword e-commerce Indonesia, Indonesia e-business, indonesia e-trade and indonesia commerce reveals an overwhelming 500,000 URLs. These URLs will be mixed Indonesian and a significant number of English pages. Using very Indonesian keyword, such as, usaha export import and dagang luar negeri, reveals only about 5000 pages.

It shows that Indonesian e-commerce / e-business content on the Internet are quite massive. One of such example is www.indo.com. It is one of the favourite site for tourism in Indonesia. It carries various tourism related pages, such as, information of the culture, booking of hotels as well as Indonesian handy craft page.

Web pages may not reflect all Indonesian e-commerce / e-business activities on the Internet. Electronic mailing lists would be best place to probe a more active interaction among Internet users. [Yahogroups.com](http://www.yahogroups.com) is the best place to probe interaction within the Internet communities. Searching in <http://groups.yahoo.com> using very Indonesian keywords, such as, e-commerce Indonesia, dagang, peluang usaha, and perdagangan, reveals about 150 Indonesian mailing lists related to e-commerce / e-business. However, only few of them are very active and having large number of subscribers. Some e-commerce / e-business activities are performed not in a general e-commerce mailing list rather specific topics / areas mailing list.

Based on data obtained from Digital Planet 2002, published by WITSA <http://www.witsa.org>, we will find that e-commerce in Indonesia is not very attractive. Indonesian e-commerce contributes only 0.10% of total commerce or about US\$2.11 per capita in 2001.

TELEMEDICINE

To investigate pages related in Indonesian telemedicine, several keywords, such as, Indonesia telemedicine, Indonesia kesehatan, kesehatan, sehat, and konsultasi kesehatan, will reveal in excess of 264.000 pages related Indonesian telemedicine after google search. Kesehatan (meaning health in English) reveal close to 50% of the Indonesian telemedicine pages.

Most of the telemedicine activities on the Web are not as advanced as most people think. It is basically community health consultation activities. One of such example is www.infokes.com, where people may found many articles on health as well as direct interaction with the physicians. Some Indonesian hospitals are also putting information on their Web sites. Having health related sites triggers the development of pharmacy related sites. We can easily find many Indonesian pharmacy related sites.

Those who like to investigate more advanced medical electronics and telemedicine practices, in which patients can be remotely treated, are currently in research activities in several universities in Indonesia. Prof. Dr. Soegiardjo Soegidjoko from Electrical Engineering Department of Institute of Technology Bandung (www.elka.ee.itb.ac.id) is one of the leading scientists in Indonesian medical electronics and telemedicine research activities.

Web is traditionally very passive in interacting with Internet audience. To see a more active interaction, one may check <http://groups.yahoo.com> that carries a significant portion of Indonesian Internet communities. Using several keywords, such as, kesehatan, obat, sehat, and konsultasi kesehatan, will reveal in excess of 400 health related Indonesian mailing lists. Most of these mailing lists are having a few subscribers, only few dozen of mailing lists have an ample number of subscribers. Several of such example is obat-traditional@yahoo.com and kesehatan-indonesia@yahoo.com.

E-CONFERENCE / FORUM / E-COMMUNITY

The e-community activities can be easily probed through the way they interact on various Indonesian mailing lists on the Internet. It was started in early '90, some Indonesians started the first Indonesian mailing list at Indonesians@jamus.berkeley.edu. It gradually grows into many mailing lists. In '96, Institute of Technology Bandung (ITB) was putting two (2) Pentium servers on-line the Indonesian Internet community. It manages to serve more than 200+ mailing list. Currently, major Indonesian mailing lists can be found at

- <http://www.yahogroups.com> also known as <http://groups.yahoo.com> may be the busiest mailing list server on the Internet, which serves 45.000+ Indonesian mailing lists. In this work, we will evaluate more closely the characteristics of mailing lists at <http://groups.yahoo.com>.
- <http://groups.plasa.com> runs by TelkomNet, the Indonesian Telkom ISP. As of mid February 2002, reported by Luqman El Hakiem Syamlan (luke@telkom.co.id) they serve 2299 Indonesian mailing lists.

The evaluation process of the characteristics of Indonesian community on the Internet can be easily performed at <http://groups.yahoo.com>. In the evaluation process, we use 100+ keyword to find 45.000+ Indonesian mailing lists on <http://groups.yahoo.com>. <http://groups.yahoo.com> provides the name of mailing list, description of the mailing list, number of subscriber, and type of mailing list (open or closed mailing list). The one with >100 subscribers are thoroughly evaluated.

By clicking the name of the listed mailing list, we may find more information on particular mailing list, such as, total member, date the mailing list was found, language usage, archive of messages, monthly statistics of messages, as well as many administrative back office utilities to support the operation of the mailing lists.

Number of Mailing Lists	1278
Pornographic	73 (5.7%)
Social Functions	360 (28.2%)
Religious	158 (12.4%)
Politics	96 (7.5%)
Knowledge	257 (20.1%)
Hobby	110 (8.6%)
Business	224 (17.6%)

During the end of the year 2001, I was evaluating <http://groups.yahoo.com>. I managed to see 30.000+ mailing lists out of 45.000+ mailing lists, of which only 1278 mailing lists have more than 100 subscribers. It is interesting to note that most (28.2%) of the Indonesian cyber communities are using the mailing list mainly to say hello and other social functions. Next are the communities for getting knowledge (20.1%) and business activities (17.6%). The number of mailing lists on pornographic, religious, politics, and hobby are much less.

Total subscribers	465,749
Pornographic	59,871 (12.9%)
Social Functions	89,372 (19.2%)
Religious	56,035 (12.0%)
Politics	32,388 (7.0%)
Knowledge	83,648 (18.0%)
Hobby	48,342 (10.4%)
Business	96,093 (20.6%)

Subscriber distribution follows closely the distribution of mailing lists. Note that pornographic mailing lists seem to attract more subscribers. It is interesting to note that the number of total subscriber is only 450.000+ subscribers, far less than the four (4) million Indonesian Internet users as claimed by APJII. Seems most of Indonesian Internet users are beginners, and not knowing how to interact or join the Indonesian mailing lists.

Message Distribution in 2001	1,635,395
Pornographic	42,590 (2.6%)
Social Functions	376,604 (23.0%)
Religious	194,714 (11.9%)
Politics	187,588 (11.5%)
Knowledge	291,396 (17.8%)
Hobby	236,023 (14.4%)
Business	306,480 (18.7%)

The total messages generated in the year 2001 follows fairly similar pattern as the distribution of mailing lists. It is interesting to note that pornographic messages comprise only 2.6% of total messages.

Subscriber Activeness	Average Messages / Subscriber / Month
Pornographic	0.71
Social Functions	4.21
Religious	3.47
Politics	5.79
Knowledge	3.48
Hobby	4.88
Business	3.20

The activeness of subscriber to interact can be measured as the average number of messages generated per subscriber per month. A surprising fact pop up, people in political communities seems to much talking with an average message close to six (6) messages per subscriber per month. Unfortunately, most people do not like to listen to them. It may represent the typical political atmosphere in Indonesia. Hobbyists are next in the row on those who like to talk.

Total consumed bandwidth	1,732 Kbps
Pornographic	704 Kbps (40.7%)
Social Functions	237 Kbps (13.7%)
Religious	149 Kbps (8.6%)
Politics	113 Kbps (6.6%)
Knowledge	270 Kbps (15.6%)
Hobby	103 Kbps (6.0%)
Business	153 Kbps (8.8%)

Assuming an average 5Kbyte per message on normal mailing lists, and 30 Kbytes per message on pornographic mailing lists, it is found that the Indonesian mailing lists consume 1,7Mbps bandwidth with pornographic (40.7%) consumes most of the bandwidth. Bandwidth-wise, the normal traffic may actually subsidize those who download pictures from the Internet.

The most difficult task is to lead the mass within the mailing lists, one should understand techniques, such as, information warfare and psychological warfare, to lead such mass. It is an art in itself. Only knowledgeable leaders will be respected by the communities and would be able to drive communities in cyber space.

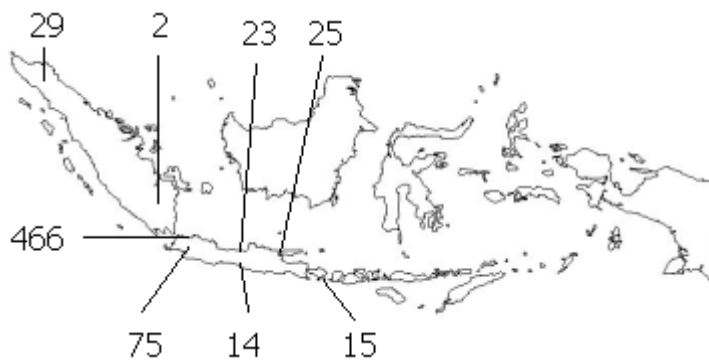
ICT INDUSTRIES AND SERVICES:

Quite significant & consistent ICT industrial data can be found in the Indonesian Chamber of Commerce site (www.kadin.net.id/businessnet/) and the Indonesian Yellow Pages (www.yellowpages.co.id). A list of 574 ICT companies all over Indonesia can be found at the Indonesian Chamber of Commerce site.

A total of 649 Indonesian ICT companies can be easily searched through the Indonesian Yellowpages www.yellowpages.co.id, which is somewhat consistent to the Indonesian Chamber of Commerce. The summary is as follows

computer consultants	53
computer internet	59
computer programming consultants	52
computer software	68
computer total solution	27
multimedia	13
software	88
e-commerce	2
information technology	24
internet - services	133
internet data	13
internet portal	25
internet provider	90
web design	2

It is shown clearly that demand in Internet related business is quite high. Computer consultants, programming, software, as well as providing total solutions are also maturing to meet the demand.



Based on the Indonesian Yellowpages data, the Indonesian ICT companies are distributed unevenly. Most (>60%) of them are located in Jakarta, followed by Bandung, which is only 4 hours drive from Jakarta. Only few companies spread outside Jawa Island.

As reported in Digital Planet 2002 (www.witsa.org), detailed IT & ICT spending of several countries can be found. The Indonesian ICT is spending in million US\$ every year. In the year 2001, the ICT spending in IT Hardware is US\$ 752M; US\$ 124M Software; US\$85 M in IT Services; and US\$ 68M in other office equipment. Total IT spending in 2001 is US\$ 1,228M, which is significantly less than telecommunication

spending at US\$ 2,311M. Most of IT spending is in IT hardware. Only small fraction of the IT spending is on software, services and other office equipments. The economics is not fully recovered and, thus, ICT spending is still much below the peak in 1997. During the 1998 economic turmoil, a dip in ICT spending is expected.

INDONESIA INTERNET INFRASTRUCTURE

The easiest way to probe the Indonesian Internet infrastructure development is through monitoring the expansion of Indonesian Internet Service Provider (ISP). The first commercial ISP was started by IndoInternet, which is known as IndoNet <http://www.indo.net.id> in 1994.

Most of the commercial Indonesian Internet infrastructure can be investigated through the Indonesian Internet Service Provider Association also known as Asosiasi Penyelenggara Jasa Internet Indonesia (APJII) <http://www.apjii.or.id>. As of mid 2001, there are

- 170+ Principal ISP license Holder
- 125 Member APJII
- 50+ active in providing services
- in 100+ cities, all provinces
- APJII provide common facilities, such as,
- APJII Indonesia Internet Exchange (IIX)
- APJII IDNIC
- Domain Registration & NIR (APNIC)

Currently, 170+ ISP licenses have been granted with about 50+ operational ISP. In reality, various form of Internet cafes serve 60-70% Indonesian Internet users. It is interesting to note that all of these activities are privately driven with no government funding.

Based on the annual report of the Indonesian ISP Association (APJII) that can be downloaded from <http://www.apjii.or.id>, the estimated Internet users and subscribers up to the end of 2002 is as follows,

	Subscribers	Users
1998	134.000	512.000
1999	256.000	1.000.000
2000	400.000	1.900.000
2001	581.000	4.200.000
2002*	1.000.000	8.000.000

Table: Growth Indonesian Internet Subscribers and Users

*Estimated up to the end of 2002

Source: APJII (www.apjii.or.id)

More detail study on its profile can be found in the research done by APJII. It is common to see a majority of male, young (25-35 years old) and educated people (high school graduate, university students or young professionals) would compose the majority of the Indonesian Internet users.

Although, Indonesian would prefer to use international domain naming, such as, .com and .org, due to its flexibility and easiness in getting the name. A growth in new domain registered in the Indonesian top-level domain ID-TLD is apparent.

	New Domain	Total Domain
1998	1.480	2.526
1999	2.153	4.679
2000	4.239	8.918
2001	3.945	12.413

Table : Indonesian Domain

Source: www.idnic.net.id

In the year 2001, there is a decreased in new domain. Budi Rahardjo, the ID-TLD, argues that the reduction is mainly due to global dotcom failure worldwide. Budi is not commenting on the use of .com or .org on Indonesian sites.

The allocated public IP address and AS number in Indonesia is growing as clearly shown in the table.

	Accumulative IP block	AS Number
1999	256	3
2000	1072	16
2001	1553	29
2002*	1649	34

Table : Increase in IP address and AS Number.

*up to April 2002

Source: APJII (www.apjii.or.id)

To reduce the international Internet traffic, APJII sets two (2) Indonesia Internet Exchanges (IIX) in Jakarta, i.e., in Elektrindo Building in Mampang, Jakarta and in Telkom Building in Jalan Gatot Subroto, Jakarta. Both IIX are interconnecting with each other. The IIX serves the connection of all ISPs in Jakarta at zero interconnection charges. The same principle is currently being pursued in various cities in Indonesia. It is needed, as most of intra-city traffic is now routed through Jakarta.

From MRTG (*Multi Router Traffic Graph*) reports administered by Johan Alam (johar@the.net.id) the IIX administrator, we will find a significant number of increase in peak bandwidth through the IIX.

	Feb 99	Jan 00	May 01	Mar 02	Sep 02
Peak (Mbps)	2.05	3.07	40.96	245.76	255.4

Table: Peak IIX Traffic

Source: IIX (www.iix.net.id)

By analyzing the above traffic one may find that the traffic increased is mainly due to increase in corporate subscribers with an estimated increased of 2.500 dedicated lines. In addition to it, Indonesian Internet users find more interesting Internet applications that require high bandwidth, such as, transferring MP3 files, multimedia, and online gaming over the network.

As reported by Johan Alam (johar@the.net.id) the administrator of Indonesian Internet Exchange (admin@iix.net.id), in the year 2002, the total IIX in country peak bandwidth is in access of 250Mbps. Since the international traffic is normally about three (3) times of local bandwidth, the peak Indonesian international bandwidth is estimated about 800Mbps. The peak bandwidth is normally about 80% of the maximum bandwidth. Thus, it is safe to estimate a maximum bandwidth of 1Gbps from Indonesia to the Internet. The ratio of in-coming and out-going Internet traffic volume is about 1:10 as Indonesian is still consume more information rather than produce information.

In theory, the Indonesian government, namely DIRJEN POSTEL <http://www.postel.go.id>, provides two steps of licenses, namely,

- Principal License – saying principally the government gives the permission for one to setup the ISP and completed within one year.
- Operational License – after going through an evaluation process, those who pass the process will receive operational license as the permit to provide service to the public.

There are several type of licensed services, namely, Internet Service Provider (ISP) basically the point of presence; Network Access Provider (NAP) basically the backbone; and Multimedia Provider basically the content. No licensed is required for providing reseller services, such as, Internet café.

As reported by APJII, the table shows clearly that the government grant a large number ISP licenses. Thus, it seems no restriction is applied and only the professional would be able to show its capacity to operate an ISP and receive the operational license.

	ISP	NAP	Multimedia
1994	2		
1995	18		
1996	37		
1997	43		
1998	44		
1999	50		8
2000	139	5	18
2001	172	16	24
2002*	179	16	24

Table: Lisence provided by DIRJEN POSTEL

*up to first quarter of 2002.

Source: APJII (www.apjii.or.id)

Of the above licensed companies, some may apply for membership at the Indonesian ISP Association APJII www.apjii.or.id. As shown on the table, there are about 125 member of APJII as of the first quarter of 2002.

Not all licensed companies will joined the Indonesian ISP Association (APJII). APJII member is growing from 41 members up to around 125 in the first quarter of 2002. Shown in the table is the growth of APJII member by type of license.

	1999	2000	2001	2002*
ISP	41	74	105	112
NAP	-	1	3	5
Multi-Media	-	3	5	6

Misc**	-	-	2	2
Total	41	78	115	125

Table: Growth of APJII Member

*up to the first quarter 2002

** Wireless Internet & Internet for Research Education (IPTEKNET)

Source: APJII (www.apjii.or.id)

Not all APJII members require services, such as, IP address allocation and interconnection to the Indonesian Internet Exchange. Current status of APJII member is shown in the table.

	1999	2000	2001	2002*
Member	41	78	115	125
Operational	35	63	82	86
Connected to IIX	12	24	49	54

Table: APJII Member Status

* up to 1st quarter 2002

Source: APJII (www.apjii.or.id)

In the end of October 2002, Indonesian Internet Body is established. It serves a fairly similar role as ICANN or IANA, especially acting as the National Internet Registry (NIR) as other NIR such as JPNIC, TWNIC etc. Especially to provide IP address allocation and domain name for those who needs it. It is supported by several supporting groups, namely,

- ALM: At Large Membership
- GAC: Government Advisory Committee
- NGAC: Non Government Advisory Committee
- ASO: Address Support Organization
- DNSO: Domain Name Supporting Organization
- PSO: Protocol Supporting Organization

As it is a fairly new organization, the interaction is currently performed at internet-id@yahoogroups.com.

EXAMPLES OF INNOVATIVE AND KEY INITIATIVES:

OVERVIEW OF INDONESIAN INTERNET INITIATIVES

From the field experience, to build the Indonesian Internet infrastructure & society, human factor is the most important key. Ability to educate, provide free education on various aspects of the Internet would be paramount in shifting the mind set of Indonesian society in looking at Internet. Mind shift within the society will surprisingly ignite them to invest & build their own infrastructure at virtually no cost from the government and any donor agencies.

Having computer-based media, information & knowledge flow can be really accelerated. Most of the knowledge put in softcopy is public domain. CD-ROM and Web servers are typical packaging technique used in disseminating knowledge in electronic form. As distribution of knowledge electronically accelerated, more mass and audience will be affected and, thus, more value for the distributed knowledge. In this kind of process, copyright renders the acceleration knowledge distribution and, thus, reduces the value of the distributed information / knowledge. It is not surprising to see most of the Indonesian Internet activists would prefer to put their knowledge in copyleft & copywrong.

Most of the Indonesian Internet activists, such as, I Made Wiryana (Germany), Michael Sunggiardi (Bogor), Adi Nugroho (Makassar), Irwin Day (Makassar), Ismail Fahmi (Bandung), RMS Ibrahim (Jakarta) etc. would prefer to publish their work freely on the Internet. You may find their work in Indonesian Digital Knowledge Foundation (IDKF) <http://www.bogor.net/idkf>, Pandu Team Website <http://www.pandu.org>, or VLISM <http://bebas.vlism.org>. It contains more than five thousand (5000+) articles and references on various aspects of the Internet.

Since most, if not all, of the necessary knowledge is freely distributed, some may ask - what about the reward, especially financial reward, for those who provide the free knowledge? Fortunately, God is fair and provides ample rewards in unimaginable ways. One may be surprised by the amount of funding & sponsorship received by putting the copylefted knowledge in public domain. Depending on the coverage of the audience / readers, it may surpass the salary of professional executive with fixed job and fixed income in Jakarta.

In schools, we provide seminars for free in many schools. This program is arranged by the Indonesian School Information Network (Jaringan Informasi Sekolah) <http://www.jis.or.id>. It is our hope that the young generation will have a much better living environment than ours the old ones.

Since the necessary knowledge is freely available to public, in most cases, it will attract the public to invest on its own infrastructure using their own money. In economic framework, the small medium entrepreneurs are putting their money in IT businesses &

gradually turn their money into profit and re-invest it as the business goes well. This gradual cycle of investment and business operations may gradually accumulate public's money in IT businesses and enable them to build their own Internet infrastructure using the freely available knowledge on Internet. Consequently, it is not surprising to see the grassroots movement has much stronger roots in the society rather than any action done by the government.

A GLIMPSE ON COMMUNITY BASED INTERNET INFRASTRUCTURE

The Indonesian Internet network topology in early 1993 is fairly simple. It connects four (4) institutions, namely, BPPT Ministry of Research and Technology, University of Indonesia, LAPAN Indonesian Space Institute, and Institute of Technology Bandung. Using the amateur radio technology based, a radio network running at Very High Frequency 144MHz, and Ultra High Frequency 430MHz are used to link all of these institutions at painfully slow 1200bps speed.

As Internet café grows, it spurs alternative technology to use old 486 machines as Internet terminal. Linux with Linux Terminal Server Program (LTSP), described in <http://www.ltsp.org> or <http://www.ltsp.or.id>, solves our problem in both low cost investments as well copyright problem.

Currently (late 2002), there are 2000+ Internet Cafes in Indonesia. About 1489 Internet Café is registered at <http://www.natnit.net/warnet/>. Unfortunately, we will likely to see an unequally distribution of Internet Café over Indonesia. More than 50% of the Indonesian Internet café is located in Jakarta & its surrounding areas. About 87% are located in Jawa Island. While the rest of Indonesia should be pleased with only 200 Internet Café, of which, 25% is located in Bali and a large portion in Sumatera Island.

Most of the Indonesian Internet Cafes are self-finance with no government funding. US\$5-10.000 Investment for Internet café would return easily within one (1) to two (2) year time. Thus, it is not surprising to see many small medium businesses as well as schools are now putting their money to build their own Internet infrastructure. Internet Café is an affordable solution for Indonesian to access the Internet.

Most of us are hanging out at asosiasi-warnet@yahoogroups.com at an average of 50-100 e-mails per day. The Indonesian Internet Cafés are organized under Indonesian Internet Café Association (AWARI). AWARI was founded in 25 May 2000, and currently leads by Judith M.S (me@judithms.com), Michael Suggiardi (michael@batutulis.com), and Abdullah Koro.

Analyzing cash flow in these Internet cafés, it would clearly shown that most of the money is actually going into Indonesian Telco pocket for paying the telecommunication lines, not to mention, current increase in Indonesian Telco's tariff. It really drives the community to seek alternative to build our own network with out having to rely on Indonesian Telco. Low cost WiFi equipments seem to be a favorite tool to bypass the Telco. With approximately US\$150 / unit, one with strong Linux background may easily build a low cost gateway / router to integrate a LAN or a community to the Internet at 11Mbps. An access point at 5-12 km away can easily be reached by putting sufficient gain external antenna.

Having the solution to build an alternative for high-speed local access network, we need to think on how to build the regional network. The only liberalized infrastructure for

regional network is the satellite network. Most of Internet cafes in Bandung, Jogjakarta, Surabaya, Malang etc, are now adopting a hybrid satellite and wireless Internet infrastructure to build the whole community based infrastructure with no Telco dependency.

Satellite access is quite expensive, it costs approximately US\$5000 per Mbps per month. Thus, sharing the cost with 10-20 Internet cafés is very logical to reduce the cost to US\$250-500 / month / Internet café. US\$500 / month / Internet café is affordable knowing some of these cafés can easily get US\$50-100 / day from their customer. High-speed wireless technology is used to share the bandwidth among these Internet cafés.

Another emerging controversial technology is the Internet telephony as it freely available on the Internet. It can be used to build a community based telephone network at very low cost. More and more heroic stories may pop up in the near future in building the infrastructure and bypassing the high tariff-ed conventional incumbent infrastructure. As expected, the government would likely to protect the interest of incumbent telecommunication operators.

I have to admit that these solutions may not be appropriate for some countries, especially those with tight rules on frequency usage. Most, if not all, the time, we run the equipments without any license from the government. Fortunately, the Indonesian media helps keep us from being jailed. We only hope to give the best and low cost solutions for the Indonesians to be integrated into the Internet & reducing any existence of digital divide.

Behind all the movement and activities in deploying such heroic infrastructure that rely heavily on the community initiative, I have to admit that educated, dedicated & militant people is the key to success. It shows clearly the strength of community education in attempting to transform Indonesia into knowledge-based society. The persons behind these high technology gadgets are young and energetic enthusiasts.

INDONESIA DIGITAL LIBRARY NETWORK

Lead by Ismail Fahmi (ismail@itb.ac.id) at Knowledge Management Research Group (KMRG) kmrg@kmrg.itb.ac.id, a free software for Digital Library has been developed. A working network of the Indonesia Digital Library can be found at <http://www.indonesiadln.org> and <http://gdlhub.indonesiadln.org>. The International Development Research Center (IDRC, <http://www.idrc.ca>) Canada and Yayasan Litbang Telekomunikasi Informatika (YLTI, <http://www.ylti.or.id>) funded their initial research activities.

The Ganesha Digital Library 3.1, an open-sources/free software, can be run on a system running Unix/Linux or Windows 98/NT/2000 or Windows 95 with winsock32. Apache web server using PHP4 scripting language to interact with MySQL database may be used by dedicated or dial-up infrastructure to create the knowledge infrastructure.

It is currently able to integrate 30 digital libraries all over Indonesia as well as some Asian countries, e.g., a Pakistani NGO (peace786pk@yahoo.com) and Penang Library Network at University Science Malaysia (USM). There are 80 institutions has been registered to use and to try being part of the library. A total in excess of 1500 download of digital library software have been performed; not counting those who receive and copy the software from available CD-ROM.

Having such technology will enable institutions, individuals as well as access centers, such as, Internet café to be part of a large knowledge infrastructure. It promotes sub-networks, such as, health, agriculture and human right. Not surprising to see awards have been given to this initiative by American Society for Information Science and Technology (ASIST) in November 2001 as well as e-Award from Indonesian Infocom Business Community (I2BC) in September 2002.

Work is currently underway to implement an open, free environment to share universal knowledge, and, thus, enable the integration of the current infrastructure to a much larger open archive activities at <http://www.openarchive.org>.

ENABLING POLICIES

The government of Indonesia (GoI) has been setting several national committee & loan a large amount of funding for ICT. It was all started in 1998, lead by Pak Jonathan Parapak, we worked on the Nusantara 21 concept; the softcopy of Nusantara 21 concept can be downloaded from <http://www.bogor.net/idkf/>. At that time, many nations were working on their National Information Infrastructure (NII) ignited by Al Gore's Global Information Infrastructure (GII) initiative.

The Nusantara 21 concept was than being used as reference by the National Coordinating Team for Telematics set by the Indonesian president (both Mr. Habibie and Pak GusDur). Their concept was adopted by BAPPENAS (the National Development Coordinating Body) and was used for getting a World Bank's specific investment loan. As reported in World Bank (<http://www.worldbank.org/ict>), the World Bank funded US\$ 34,5 million Indonesian Information Infrastructure Development Program (IIDP) was approved in November 1997. There is no grant & charity in the commitment. The project closing date is 06/30/2003. IIDP consists of several smaller projects, such as,

- TATP the Training Assistantship for the civil servant at Ministry of Industry and Trade as well as small percentage to selected Small Medium Enterprises.
- IPTEKnet concept at Ministry of Research and Technology, for integrating the government institutions to the Internet. It would be the base for Indonesian e-government.
- E-commerce concept at Ministry of Tourism.
- Copyright Law at Ministry of Law & Legal Matters.
- National Information Technology (IT) Framework at BAPPENAS, the National Development Coordinating Body.

If I can say it in a plain language, most, if not all, of the funding is gone for paying the International consultants to write pages of concepts, working papers, law & legal matters. To best of my knowledge, no investment in real infrastructure that will enable the people in accessing the Internet. Thus, the US\$34.5 million has unfortunately very little direct impact on the Indonesian people.

Recently in the year 2001, the state ministry of research and technology is launching the Internet Café Technology & Science Technology CD. Since the Indonesian government has budget limitation, the one who drive behind the activities are mostly coming from the private sector. The Internet Café Technology aims to build 9000 Internet café with the investment from private sector, such as, Myoh.com and Hewlett Packard (HP) Indonesia. The investment will then be returned by the Internet café users though its access fee. In the early 2002, they managed to build a couple of these Internet cafés.

The Science Technology CD contains research done under the state ministry of research and technology. It is distributed freely to the public. Sekolah 2000 foundation (<http://www.sekolah2000.or.id>) and Master Data with a lot of sponsorship from private sectors supports the production and distribution of the CDs.

To best of my knowledge, the only government movement that managed to provide significant impact on Indonesian Internet society is the vocational school's Internet movement (dikmenjur@yahogroups.com). Dr. Gatot H.P. (gatothp@aol.com), the director of vocational schools at ministry of education, is the one who drive the movement. Unlike other bureaucrats, Dr. Gatot H.P is very responsive on e-mail. In the year 2001, he works closely with other Indonesian Internet societies and manages to push 1400+ (out of 4000) Indonesian vocational schools into the Internet. We are very proud on their accomplishments. Having 25.000 high schools with 2-3 million students body, it would a strategic move to increase the Internet penetration by Interneting the schools. If conducive policy is implemented, it may enable 20+ million Indonesians to Internet in next 4-5 years.

The Indonesian people should be happy with the support coming from the Indonesian private sector. Private sector's investment and various sponsorships are the one that keep Indonesian Internet alive today. It is sad that only small fraction of the US\$ million loan directly reaches the Indonesian people. One may ask the necessity of the US\$ 34,5 million loan.

REGULATORY ENVIRONMENT:

Table. Summary of laws and regulations affecting the ICT sector

Issues	Status
Electronic transaction	Drafted, by University of Indonesia (UI)
Cyber-crime	Drafted, by Pajajaran University
Consumer laws for e-commerce and distance trading	<i>Not available</i> ; There is a conventional Consumer Protection Act (UU 8/1999).
Data protection and privacy	<i>Not available</i> .
Broadcasting licensing and content regulation	Broadcasting Act (UU 24/1997); fight is underway to make it more people oriented.
Internet-related licensing for Internet services providers, Internet cafes, telecentres, etc.	Telecommunication Act (UU36/1999); no license required for Internet Café & TeleCenters.
Digital signature	Drafted, by University of Indonesia (UI)
Convergence and multimedia regulation	Telecommunication Act (UU 36/1999); still lacking in addressing convergence.
Intellectual property rights regime	Intellectual Property Right Act (UU 19/2002)
WTO status, regional memberships, basic commitments related to telecommunications under WTO, foreign equity limits	WTO member
Telecommunication Act	Telecommunication Act (UU 36/1999)
Local domain name registry and dispute resolution	Ministerial Decree on Telecommunication Services (KEPMEN 21/2001)

Most of the softcopy of Indonesian laws and regulations can be downloaded from the Web. Sites that carry related softcopy are,

- <http://www.internews.or.id> - on broadcasting and telecomm policy & law. Internews provides the English translation for some Act.
- <http://www.hukumonline.com> - softcopy of various law, regulation as well as news.
- <http://www.postel.go.id> - policy & regulation in telecommunication sector.
- <http://www.dprin.go.id> - data, policy & regulation in various industries (including ICT).

Theoretically, all draft of law and regulation can be submitted by anyone; and must be approved by the House of representative (DPR) prior to officially signed by the President. In reality, government agencies submit most drafts as ordinary people have no interest and no funding for such activities. In ICT sector, the drafts are created by

- Directorate General of Copy Right and Patent.

- Directorate General of Post and Telecommunication (<http://www.postel.go.id>).
- Ministry of Industry and Trade (<http://www.dprin.go.id>).

In ICT sector, economics investigator within the police force (<http://www.polri.go.id>) performs the law enforcement. Unfortunately, not many economics investigators equipped with the necessary knowledge and, in some unfortunate cases, money talk. In some cases, it may be better to discuss it through appropriate person in the media, such as, Majalah Forum, Hukum Online, and Internews, as they have a much better networking and much rapid responds.

OPEN SOURCE MOVEMENT:

Indonesian Open Source movement is very active. Linux education processes are very intense; community based seminars, talk show, workshops are frequently organized and sponsored by many local, national and international companies. The Indonesian Linux user group, A.K.A, Kelompok Pengguna Linux Indonesia (KPLI) at www.linux.or.id drives a significant portion of Indonesian Linux activities.

The Indonesian Linux users cluster around several mailing lists and Web sites. Most active Linux mailing lists are located under linux.or.id, such as, linux-admin@linux.or.id and linux-setup@linux.or.id, and some are located at yahoogroups.com, such as, majalahneotek@yahoogroups.com, linux-heboh@yahoogroups.com. The Indonesian Linux users counting project is done at www.linux.web.id.

At the moment, there are at least three (3) Indonesian Linux Distribution, namely,

- Trustix Merdeka (www.trustix.web.id).
- Bijax written by University Bina Nusantara (www.binus.ac.id) students.
- WinBI adopted from Trustix Merdeka and supported by Ministry of Research and Technology.

Linux Terminal Server Program (LTSP) <http://www.ltsp.org> is making a significant influence on Indonesian ICT arena as it provides a low cost solution in many Internet café and school networking.

Most of the favorite Linux Web sites are usually associated with Linux magazines, such as, InfoLinux magazine (<http://www.infolinux.web.id> & www.infolinux.co.id) and Neotek magazine (<http://www.neotek.co.id>), more focus on hacking techniques.

A significant number of Linux, Internet, and IT books written by Indonesians have been published only in the last 4-5 years. Several publishers, such as, Elexmedia Komputindo (<http://www.elexmedia.co.id>) in Jakarta, and Andi Offset in Yogyakarta, are the most active Indonesian IT book publishers.

Vote results from www.linux.web.id, www.infolinux.co.id, & Jakarta.linux.or.id, it clearly shows that RedHat, Mandrake, Slackware and SuSE to be the favorite Linux distribution in Indonesia.

Militancy of Indonesian Linux users is pretty high. Based on the vote results run on www.linux.or.id, questioning would Microsoft wins its war against Open Source? Only 13.04% answer Yes; the 80.82% majority answers No, and the 6.14% rest unknown.

Some important insight into the Linux communities can be found in several votes performed in various Web sites. Some of the vote results done at www.infolinux.co.id show that, MySQL seems to be favorite database software among Indonesian Linux users; KDE seems to be the most favorite Windows among Linux users and,

interestingly, a significant number of Indonesian Linux users actually use AMD as their processor of choice.

RESEARCH INTO ICT

Only in the last ten (10) years, two (2) Indonesian ministries, namely, ministry of research and technology (www.ristek.go.id) and ministry of education (www.dikti.org), invest in excess of US\$3 million on more than 110 research activities in ICT. In addition to the government's funded researches, smaller portion of research activities are performed through private sector contract works. Unfortunately, it would be much more difficult to investigate private sector research activities.

The Indonesian National Research Council at the Ministry of Research and Technology has been providing funding for about 88 ICT researches. There are five (5) ICT research themes performed, namely, electronics components, telecommunication technology, software, signal processing, and power. 65% of the research activities are on electronics components and telecommunication technology. Less than 20% are on software research. More than 40% of the ICT researches, funded by Ministry of Research and Technology, are done and lead by researchers at Institute of Technology in Bandung (www.itb.ac.id).

The Higher Education Directorate General at Ministry of Education (www.dikti.org) is supporting more than 36 research activities in ICT. About 44% of the research is in electronics system; followed by software research at 25%. The rest of the research is in telecommunication technology, signal processing and power.

Some of private sector research activities can be probed from some university pages, such as, inter university center on microelectronics (<http://www.paume.itb.ac.id>), computer science department at university of Indonesia (<http://www.cs.ui.ac.id>) or electrical engineering department at University of Indonesia (<http://www.ee.ui.ac.id>).

FUTURE TRENDS

No government, private sector and academia might be the two (2) most influencing part in Indonesian ICT industry. Indonesian private sector enjoy the benefit of free market competition in PC and IT market. The Indonesian policy and regulatory framework seem to aim for a non-monopolistic telecommunication industry. In reality, Indonesian telecommunication industry is virtually a "strongly" regulated market. It is hoped that a more egalitarian policy and regulatory can be implemented in the telecommunication sector.

Academia is in reality driven by energetic young educated Indonesians that adopt new technology through Internet Web access and various Internet mailing lists. Some of these students influence their surrounding communities by building and running Internet café, writing articles and books in Indonesian language, which, in turn, significantly impact their communities.

In terms of technology, a significant activities may be apparent in low cost wireless 11Mbps WiFi as well as low cost Linux based system specially the one running on Linux Terminal Server Program (LTSP) as it provides a significant low cost solution for Internet café, school network as well as neighborhood Point of Presence. In addition, Internet telephony would likely be a threat to Indonesian Telco.

Having a high speed transparent media to transport information and knowledge among Indonesian people, it is hoped to see the evolution of Indonesian civil society as well as knowledge based society as more and more Indonesian having Internet access. Unfortunately, it will take several Indonesian generations to reach 80-90% Internet penetration in Indonesian.

Some of the challenges and obstacles identified, namely, youth would be the agent of change in the Indonesian knowledge based society evolution process. Thus, education processes would be the crucial success factor. Accountable leaders would be the key catalyst of the evolution process. Unfortunately, it is not an easy job to find accountable Indonesian leaders.

ANNEXES

SELECT BIBLIOGRAPHY ON THE COUNTRY/TERRITORY:

- | | |
|----------------------------------------------------------------------------------|------------------------------------------------------|
| www.bps.go.id | - Indonesian government statistical bureau |
| groups.yahoo.com | - Most Indonesian mailing lists hosted at this site. |
| www.yellowpages.co.id | - Indonesian Yellowpages. |
| www.indopage.com | - Indonesia Directory Service. |
| www.kadin.net.id/businessnet/ | - Indonesian Chamber of Commerce. |
| www.hukumonline.com | - Online Indonesian law & legal matters |
| www.internews.or.id | - non-profit organization on news & media |
| www.linux.or.id | - Indonesian Linux community portal. |
| www.apjii.or.id | - Indonesian ISP association. |
| www.iix.net.id | - Indonesian Internet Exchange. |
| www.mastel.or.id | - Indonesian Telecommunication Society. |
| www.natnit.net/warnet/ | - Indonesian Internet Café |
| www.postel.go.id | - Directorate general of post and telecommunication |
| www.dikti.org | - Directorate general of higher education |
| www.ristek.go.id | - Ministry of research and technology |
| www.indonesia.go.id | - Indonesian government portal |
| www.dprin.go.id | - Ministry of Industry and Trade |
| www.kompas.com | - KOMPAS, Indonesian main news source |
| www.detik.com | - Detikcom, Indonesian leading online media |
| www.bogor.net/idkf | - large Indonesian ICT knowledge site |
| www.pandu.org | - large Linux articles and book site |
| bebas.vlsm.org | - large ICT knowledge site |

CHART OF KEY FACTS:

Total population	228,437,870 (2001) (a)
Rural population as a percentage of total population	-
Literacy in national language(s)	89.92% (pop. >10 years) (a)
Literacy in English	-
Computer ownership per 100 inhabitants	1.01 (2001) (b)
Telephone lines per 100 inhabitants	3.11 (2001) (c)
Internet hosts per 10,000 inhabitants	1.27 (2000) (c)
Internet café/telecentre per 10,000 inhabitants.	0.073 (2002) (d)
Internet users per 100 inhabitants	1.82 (2002) (e)
Cell phone subscribers per 100 inhabitants	1.73 (2001) (c)
Number of websites in the national language	too many (f)
Number of websites in English and other languages	too many (f)
National bandwidth within the country/territory	255.4MBps (2002) (g)
National bandwidth to and from the country/territory	1 Gbps (2002 est.) (g)
Ratio of in-coming and out-going Internet traffic volume	1:10 (2002 est.) (g)
Where possible, include data to reflect women users and women subscribers of ICT	-

References:

- (a) National Statistical Bureau www.bps.go.id
- (b) IDC
- (c) International Telecommunication Union (ITU)
- (d) NatnitNet www.natnit.net
- (e) Indonesian ISP Association, APJII www.apjii.or.id
- (f) Google Search www.google.com
- (g) Johar Alam, Administrator of Indonesia Internet Exchange (johar@the.net.id)

Key Economic Sectors (CIA – The World Fact Book)

GDP		US\$ 654 billion	(2000 est)
GDP - real growth rate		4%	(2000 est)
GDP - per capita		US\$ 2900	(2000 est)
GDP - composition	agriculture	21%	
	industry	35%	
	services	44%	(1999 est)
Population below poverty		20%	(1998 est)
Household income	lowest 10%	3.60%	
	highest 10%	30.30%	(1996 est)
inflation rate		9%	(2000 est)
labor force		99 million	(1999 est)
labor force	agriculture	45%	
	industry	16%	
	services	39%	(1999 est)
unemployment rate		15%-20%	(1998 est)
budget	revenues	US\$26 billion	
	expenditures	US\$30 billion	
industries petroleum and natural gas; textiles, apparel, and footwear; mining, cement, chemical fertilizers, plywood; rubber; food; tourism			
industrial production growth rate		7.50%	(2000 est)
export		US\$64.7 billion	(f.o.b 2000 est)
import		US\$40.4 billion	(c.I.f, 2000 est)
debt - external		US\$ 144 billion	(2000 est)

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Digital Planet 2002: The Global Information Economy, The World Information Technology and Services Alliance, February 2002.

Source: <http://www.developmentgateway.org/>

Access time: 02/08/2003