



The ICT Development Index (IDI)

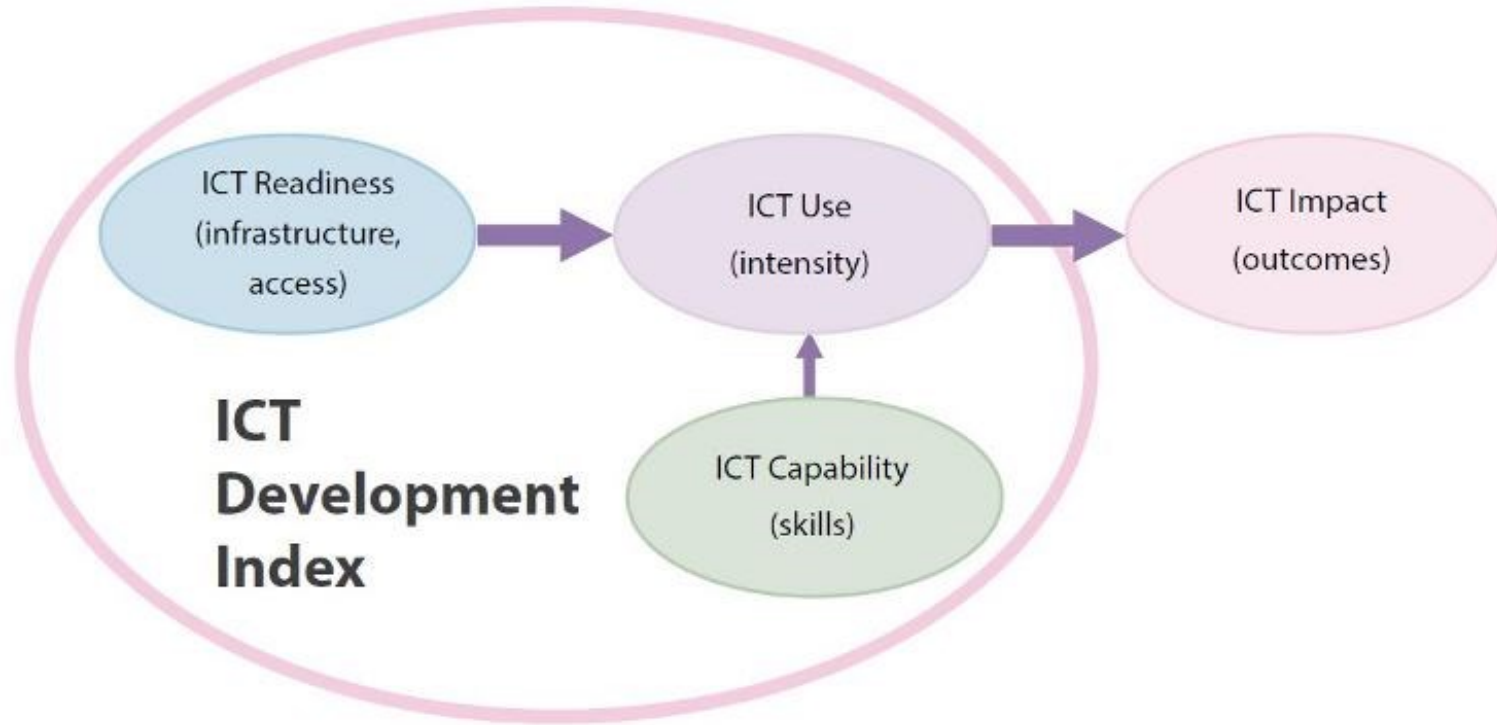
Methodology, indicators and definitions *(as of February 2019)*

ICT Data and Statistics Division
Telecommunication Development Bureau
International Telecommunication Union



IDI METHODOLOGY

Three stages in the evolution towards an information society



The ICT Development Index (IDI)



- The IDI is a composite index that combines 14 indicators
- Designed to be global and reflect changes taking in place in countries of different levels of development
- Was developed by ITU in 2008 in response to member states' request to establish an overall ICT index
- Results first reported in the Measuring the Information Society Report (MISR) 2009



Objectives of the IDI

To measure:

- the *level and evolution over time* of ICT developments in countries and the experience of those countries relative to other countries;
- progress in ICT development in *both developed and developing countries*;
- the *digital divide*, i.e. differences between countries in terms of their levels of ICT development; and
- the *development potential* of ICTs and the extent to which countries can make use of them to enhance growth and development.



Extraordinary meeting of EGTI/EGH

- Held in Geneva, Switzerland, on 1-3 March 2017
- Meeting was open to all ITU members and experts in the field of ICT statistics and data collection
- Objective - to discuss, debate and agree on a revised set of indicators to be included in the IDI
- Two input documents prepared by the sub-group and the independent group of experts
- Adopted a total of 14 indicators to be included in the IDI compared to the previous list of 11
- <http://www.itu.int/en/ITU-D/Statistics/Pages/events/eghegti2017/default.aspx>

Previous IDI: **Indicators dropped** in 2018

Access sub-index	Use sub-index	Skills sub-index
Fixed-telephone subscriptions (/100 inhabitants)	Individuals using the internet (%)	Mean years of schooling (years)
Mobile-cellular telephone subscriptions (/100 inhabitants)	Fixed-broadband subscriptions (/100 inhabitants)	Secondary gross enrollment ratio (%)
International Internet bandwidth (bit/s/Internet user)		Tertiary gross enrollment ratio (%)
Households with a computer (%)	Active mobile-broadband subscriptions (/100 inhabitants)	
Households with Internet access (%)		

Revised IDI: **Indicators added in 2018**

Access sub-index	Use sub-index	Skills sub-index
Households with a computer (%)	Individuals using the Internet (%)	Mean years of schooling
Households with Internet access (%)	Active mobile-broadband subscriptions (per 100 inhabitants)	Secondary gross enrollment ratio (%)
International Internet bandwidth (bit/s) per Internet user		Tertiary gross enrollment ratio (%)
Population covered by 3G mobile networks <ul style="list-style-type: none"> - At least 3G (%) - At least LTE/WiMAX (%) 	Mobile-broadband Internet traffic (per mobile-broadband subscription)	Individuals with ICT skills (%)
Fixed-broadband subscriptions by speed tiers <ul style="list-style-type: none"> - 256 kbit/s to 2 Mbit/s (% of total) - 2 to 10 Mbit/s (% of total) - Equal to or above 10 Mbit/s (% of total) 	Fixed-broadband Internet traffic (per fixed-broadband subscription)	<ol style="list-style-type: none"> 1. Copying or moving a file or folder 2. Using copy and paste tools to duplicate or move information within a document 3. Sending e-mails with attached files 4. Using basic arithmetic formula in a spreadsheet 5. connecting and installing new devices 6. Creating electronic presentations with presentation software 7. Finding, downloading, installing and configuring software 8. Transferring files between a computer and other devices 9. Writing a computer program using a specialized programming language
	Mobile phone ownership (%)	

IDI aggregation methodology

ICT access	Reference value	(%)
1. % households with a computer		20
2. % households with Internet		20
3. International Internet bandwidth per Internet user		20
4. % population covered by 3G / LTE mobile network ^{1,2,3}		20
5. Fixed-broadband subscriptions by speed ^{1,2,3} as a % total fbb		20
ICT use	Reference value	(%)
1. % individuals using the Internet		20
2. Active mobile-broadband subscriptions per 100 inhab		20
3. Mobile bbroadband Internet traffic per mobile-bb subs		20
4. Fixed-broadband Internet traffic per fixed-bb subs		20
5. % individuals who own a mobile phone		20
ICT skills	Reference value	(%)
1. Mean years of schooling		25
2. Gross enrollment ratio (secondary level)		25
3. Gross enrollment ratio (tertiary level)		25
4. Proportion of individuals with ICT skills ^{1,2,3}		25



ICT
Development
Index

1, 2, 3 : indicator composed of sub-indicators



Three data sources

- Telecommunication data
 - Usually collected by the regulator from operators
 - International data collection through the ITU WTI questionnaire
- Household/individual ICT data
 - Usually collected by the NSO through a household survey
 - International data collection through the ITU household questionnaire
- Education data
 - Usually collected by the education ministry
 - International data collection by the UNESCO Institute for Statistics (UIS)
 - ITU doesn't collect data from countries, but uses data from UIS

The ICT Development Index Sources

Access	Source	Use	Source	Skills	Source
1.1. Households with a computer (%)	HH	2.1 Individuals using the Internet (%)	HH	3.1 Mean years of schooling (years)	UIS
1.2 Households with Internet access (%)	HH	2.2 Active mobile-broadband subscriptions (/100 inhabitants)	WTI	3.2 Secondary gross enrollment ratio (%)	UIS
1.3 International Internet bandwidth (bit/s/Internet user)	WTI	2.3 Mobile-broadband Internet traffic (/subscription)	WTI	3.3 Tertiary gross enrollment ratio (%)	UIS
1.4 Population covered by mobile networks (%)	WTI	2.4 Fixed-broadband Internet traffic (/subscription)	WTI	3.4 Individuals with ICT skills (%)	HH
1.5 Fixed-broadband subscriptions by speed tiers (% of total)	WTI	2.5 Individuals who own a mobile phone (%)	HH		

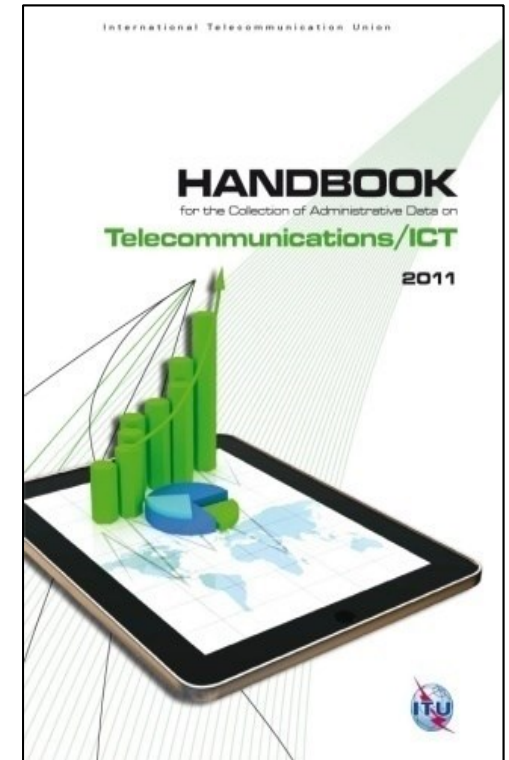


WTI HANDBOOK

ITU Handbook

- Covers **81 indicators** on telecommunication/ICT services
- Covers data collected from **administrative sources** (e.g. telecom operators)
- Discussed in the ITU Expert Group on Telecom/ICT Indicators (**EGTI**)
- **Available at:**

http://www.itu.int/pub/D-IND-ITC_IND_HBK-2011



ITU Handbook (cont.)

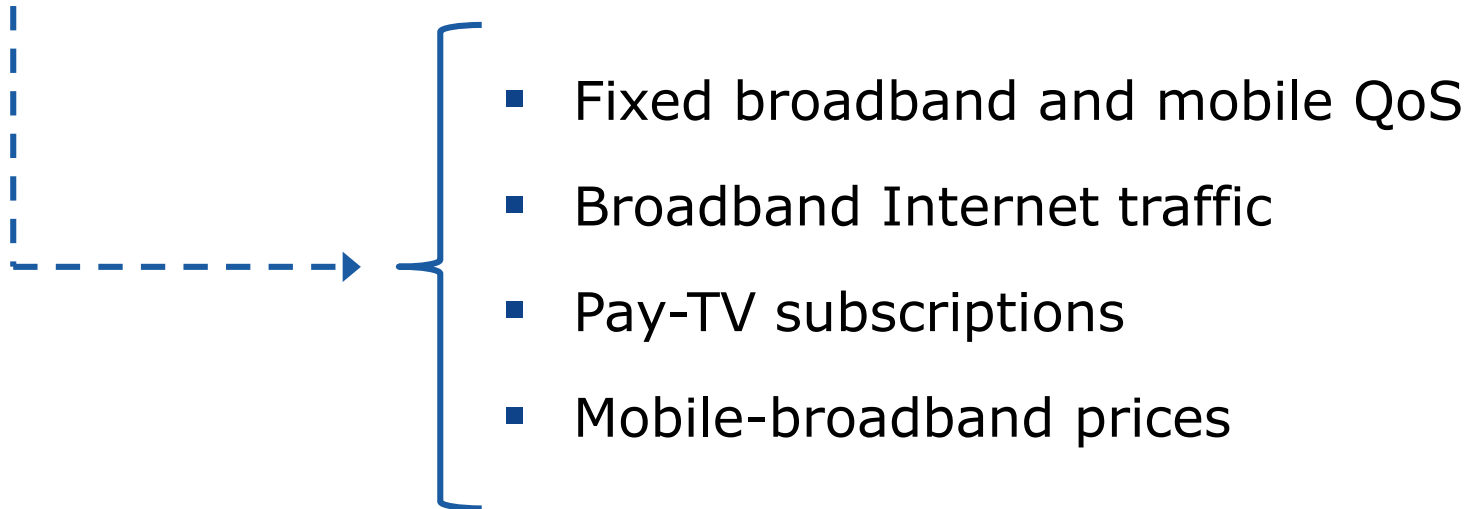
Groupings:

- Fixed-telephone networks
- Mobile-cellular networks
- Internet
- Traffic
- Tariffs
- Quality of service
- Persons employed
- Revenue
- Investment
- Public access
- Broadcasting and other indicators

- Definition
- Clarifications and scope
- Method of collection
- Relationship with other indicators
- Methodological issues
- Examples

ITU Handbook – additions

- Revision of revenue and investment indicators
- New indicators from administrative sources 2011-2013





ITU Handbook – additions (ii)

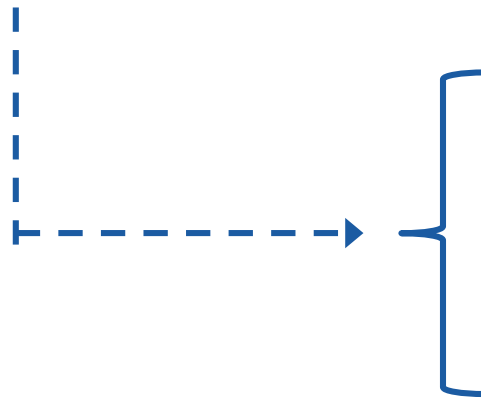
- New indicators from administrative data sources added in 2015:

-
- M2M mobile-network subscriptions
 - Fixed-broadband subscriptions for organizations
 - Percentage of the population covered by at least an LTE/WiMAX mobile network
 - Subscriptions to bundled telecommunication services

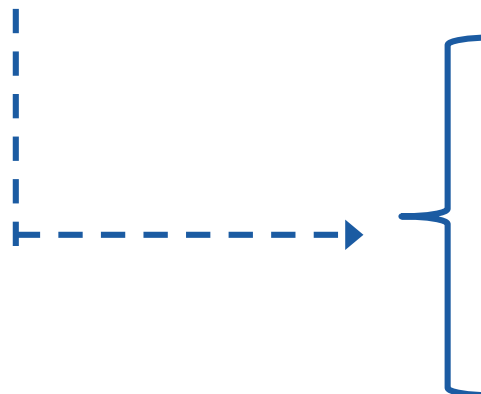
ITU Handbook – additions (iii)



■ New indicators from 2016:

- 
- Active subscriptions to LTE/WiMAX mobile-broadband networks
 - Change in mobile-bb sub-categories

■ New indicators from 2017:

- 
- Fixed wired network coverage
 - Extension fixed-broadband speed tiers
 - Modification price baskets



ITU Handbook – additions (iv)

- Methodological note on the indicator “Fixed-broadband Internet traffic”

The screenshot shows the ITU website's 'Handbook' page. At the top, the ITU logo and tagline 'Committed to connecting the world' are visible, along with a search bar and the hashtag #ICT4SDG. A navigation menu includes 'Home', 'General Secretariat', 'Radiocommunication', 'Standardization', 'Development', 'ITU Telecom', 'Members' Zone', and 'Join ITU'. Below this, a secondary menu lists 'About', 'Accessibility', 'Join ITU-D', 'Partners', 'Projects', 'Publications', 'Regional Presence', 'TDAG', 'WTDC', and 'Study Groups'. The main heading is 'Handbook' with a URL: <https://www.itu.int/en/ITU-D/Statistics/Pages/publications/handbook.aspx>. The breadcrumb trail reads 'YOU ARE HERE HOME > ITU-D > ICT STATISTICS > HANDBOOK'. The page title is 'ITU Handbook for the Collection of Administrative Data on Telecommunications/ICT, 2011'. A red arrow points to the text 'New March 2018' on the left. The main text describes the handbook as a key reference document for the collection of internationally comparable indicators on telecommunications/ICT based on administrative sources. It mentions that the handbook was released at the 9th ITU World Telecommunication/ICT Indicators Meeting in December 2011. A section titled 'Download the ITU Handbook, its additions and revisions in Arabic, Chinese, English, French, Russian and Spanish (pdf format)' is highlighted with a red box. Below this, another red box highlights the link 'Methodological note on the indicator "Fixed-broadband Internet traffic"'. On the right side, there are sections for 'ABOUT US', 'FAQs', 'CONTACT', and 'QUICK LINKS'.

Handbook <https://www.itu.int/en/ITU-D/Statistics/Pages/publications/handbook.aspx>

YOU ARE HERE HOME > ITU-D > ICT STATISTICS > HANDBOOK

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ABOUT US | **FAQs** | **CONTACT**

As the UN specialized agency for ICTs, ITU is the official source for global ICT statistics. Find out more about how we produce and disseminate data, our main events and products. [More>](#)

QUICK LINKS

- ▶ [ICT Statistics Home Page](#)
- ▶ [Statistics](#)
- ▶ [Publications](#)
- ▶ [Definitions & standards](#)
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- ▶ [Big Data for Measuring the Information Society](#)

ITU Handbook for the Collection of Administrative Data on Telecommunications/ICT, 2011

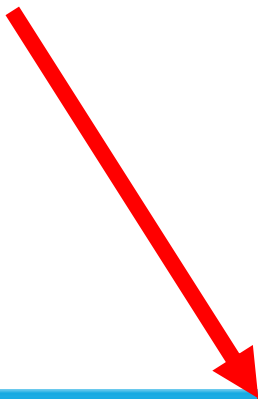
The ITU Handbook for the Collection of Administrative Data on Telecommunications/ICT (2011) is a key reference document for the collection of internationally comparable indicators on telecommunications/ICT based on administrative sources (i.e. supply-side data mainly from operators). The Handbook includes definitions and methodological clarifications for 81 internationally agreed indicators and corresponding sub-indicators, discussed by the [Expert Group on Telecommunication/ICT Indicators \(EGTI\)](#). The Handbook was released at the [9th ITU World Telecommunication/ICT Indicators Meeting](#), in December 2011.

Since the publication of the Handbook in 2011, there have been some additions and revisions to the indicators included in the Handbook. These modifications reflect the outcomes of the Expert Group on Telecommunication/ICT Indicators (EGTI), as endorsed by the World Telecommunication/ICT Indicators Symposium. The new ITU indicators from administrative data sources developed between 2011 and 2013 are available in a separate document that complements the Handbook. In addition, specific guidelines were developed to update the methodology for the collection of revenue and investment data on telecommunications.

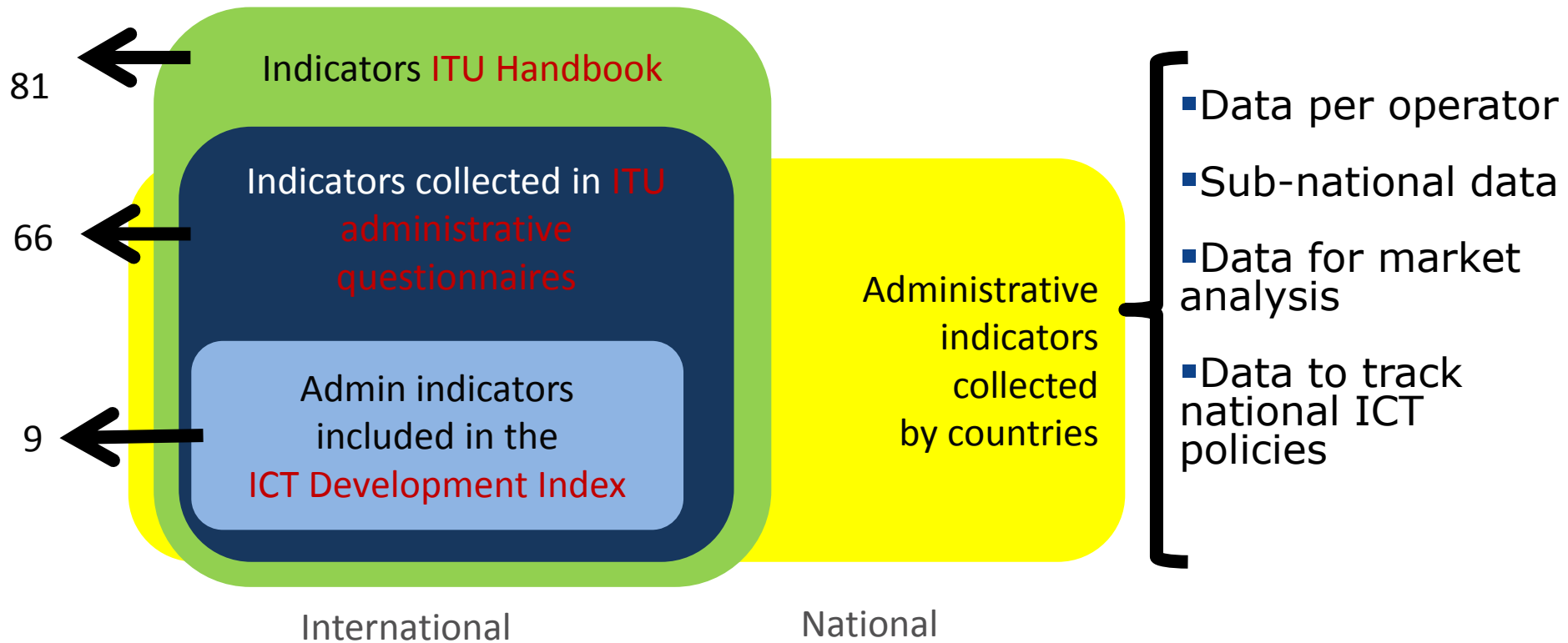
Download the ITU Handbook, its additions and revisions in [Arabic](#), [Chinese](#), [English](#), [French](#), [Russian](#) and [Spanish](#) (pdf format).

[Methodological note on the indicator "Fixed-broadband Internet traffic"](#)

New March 2018



Context: indicators from administrative sources



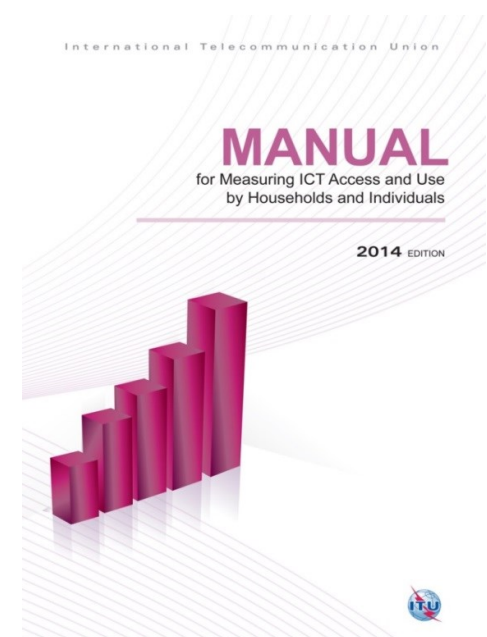


HOUSEHOLD MANUAL



ITU Manual (2014)

- Chapter 1. Introduction
- Chapter 2. **Coordination** among national stakeholders in ICT measurement
- Chapter 3. **Planning and preparation** for ICT household surveys
- Chapter 4. **Statistical standards** and measurement topics for ICT household statistics
- Chapter 5. **Data sources** and **collection techniques** for ICT household statistics
- Chapter 6. Question and **questionnaire** design for ICT household surveys
- Chapter 7. **Designing** ICT household surveys
- Chapter 8. **Data processing** for ICT household statistics
- Chapter 9. **Data quality and evaluation** for ICT household statistics
- Chapter 10. **Dissemination** of ICT household data and metadata





Preparation and revision process

- First release in 2009
- 2012-13: two rounds of complete revisions
- Comments from Expert Group on Household Indicators (EGH) forum
- Version 2 launched at WTIS 2013 (December 2013, Mexico)
- Revision of indicators in 2014-2015:
 - added HH16
 - HH17, HH18, HH19 on the website, but **not yet in the Manual**



ITU statistical standards: ICT household statistics

- Statistical standards associated with the **core ICT indicators** for household access to, and individual use of, ICT:
 - concepts
 - definitions of terms
 - model questions
 - classificatory variables (breakdowns)
 - scope
 - units (households and individuals)
- Formula of calculation
- Use (policy relevance)



Core household indicators, main concepts

- The indicators consist of those:
 - Referring to household access to ICT equipment and services
 - Referring to individuals' use/ownership of ICT equipment and services



Concept of access

- ICT device/service should be available for use of any member of the household at any time
- Device can be owned or not by the household
- Applies to all indicators referring to household ICT access
- Device should be in a working condition



Age scope

- Countries should report ICT usage information for the three main core indicators on individuals' use of ICTs (computer, mobile phone and Internet) for the entire population of the country, i.e. there is no minimum age scope any more for these indicators



Reference period

- Information on ICT usage should be collected and reported with a reference period of the last 3 months



Conducting household surveys

- Much more in the separate presentation *“Getting ICT data through surveys”* with information on:
 - Collaborating and coordinating for household ICT statistics
 - Getting ICT data through surveys: good practices
 - The ITU Manual
 - Data disaggregations



IDI INDICATORS - DEFINITIONS



IDI indicator 1.1

- Percentage of households with a computer
- Access sub-index
- Source: Household survey

Indicator HH4: Proportion of households with a computer

Definitions:

This is the proportion of households that have a computer.

A *computer* refers to a desktop computer, a laptop (portable) computer or a tablet (or similar handheld computer).

- Desktop: a computer that usually remains fixed in one place; normally the user is placed in front of it, behind the keyboard.
- Laptop (portable) computer: a computer that is small enough to carry and usually enables the same tasks as a desktop computer; it includes notebooks and netbooks but does not include tablets and similar handheld computers.
- Tablet (or similar handheld computer): a tablet is a computer that is integrated into a flat touch screen, operated by touching the screen rather than (or as well as) using a physical keyboard.

It does not include equipment with some embedded computing abilities, such as smart TV sets, and devices with telephony as their primary function, such as smartphones.



IDI indicator 1.2

- Percentage of households with Internet access
- Access sub-index
- Source: Household survey

Indicator HH6: Proportion of households with Internet

Definitions:

This is the proportion of households with Internet access at home.

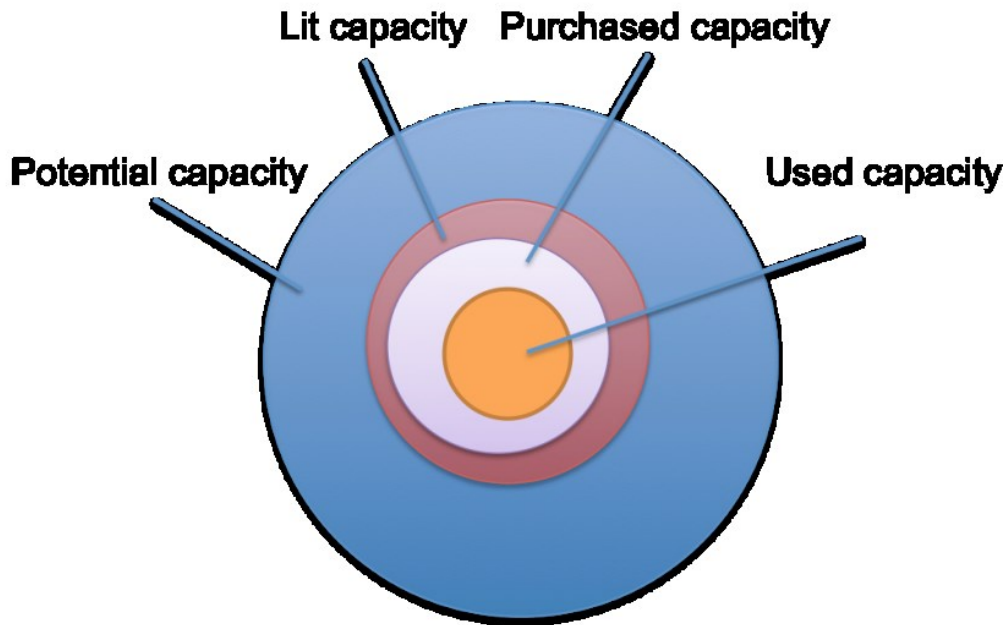
The *Internet* is a worldwide public computer network. It provides access to a number of communication services including the World Wide Web and carries e-mail, news, entertainment and data files, irrespective of the device used (not assumed to be only via a computer – it may also be by mobile telephone, tablet, PDA, games machine, digital TV etc.). Access can be via a fixed or mobile network.



IDI indicator 1.3

- International Internet bandwidth (bit/s) per Internet user
- Access sub-index
- Source: WTI

International Internet bandwidth



ITU collects data on two indicators:

1. Lit/equipped capacity

2. Used capacity



i4214u: Used international bandwidth (traffic), in Mbit/s

Average usage of all international links including fiber-optic cables, radio links and traffic processed by satellite ground stations and teleports to orbital satellites (expressed in Mbit/s).

All international links used by all types of operators, namely fixed, mobile and satellite operators should be taken into account. The average should be calculated over the 12-month period of the reference year.

For each individual international link, **if the traffic is asymmetric, i.e. incoming traffic is not equal to outgoing traffic, then the higher value out of the two should be provided.** The combined average usage of all international links can be reported as the sum of the average usage of each individual link.

What is counted as usage?

- Self-supply and leased international links.



- Clients, subsidiaries and own usage.



- Transit and Peering agreements.



- Content providers or OTT's.



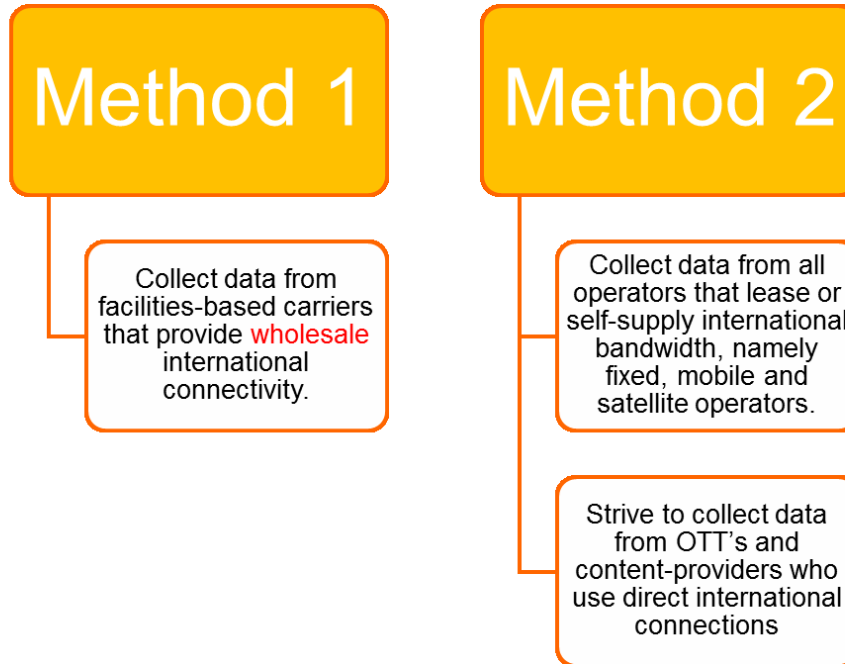
- All IP based services (IPLC, IPVPN, VoIP, ...)



- National traffic not included !



Methods of data collection

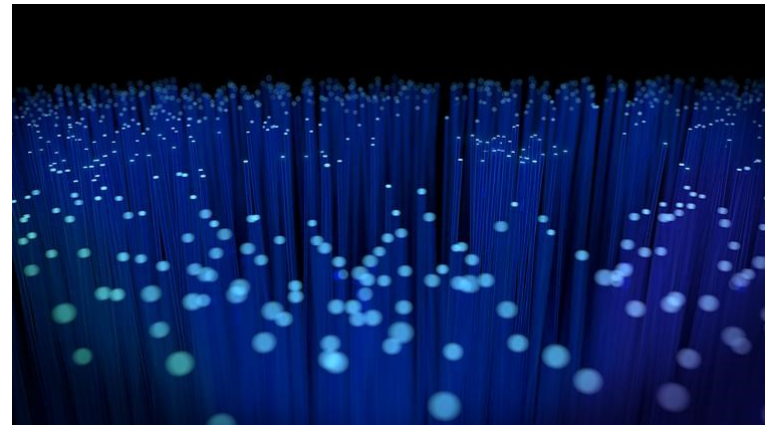


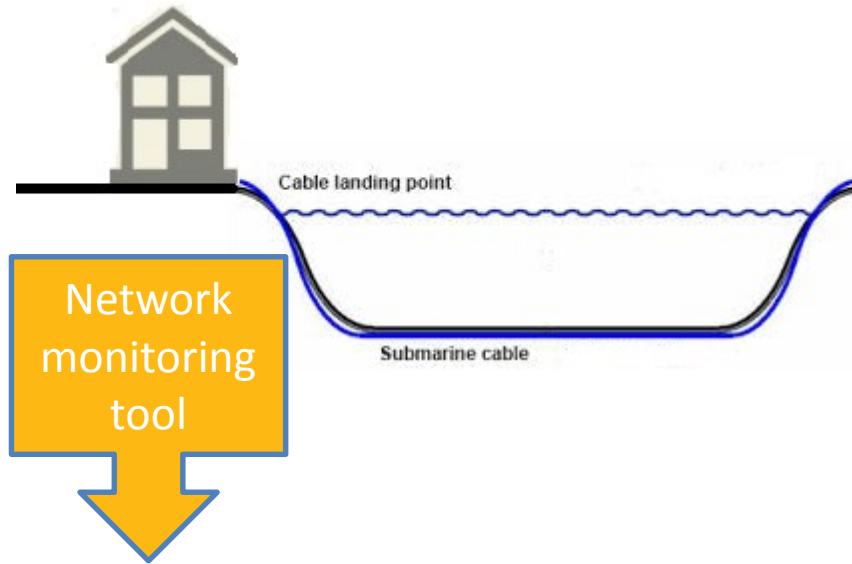
BEWARE OF DOUBLE COUNTING

Double counting can occur if data are collected from both service providers and facilities-based carriers.

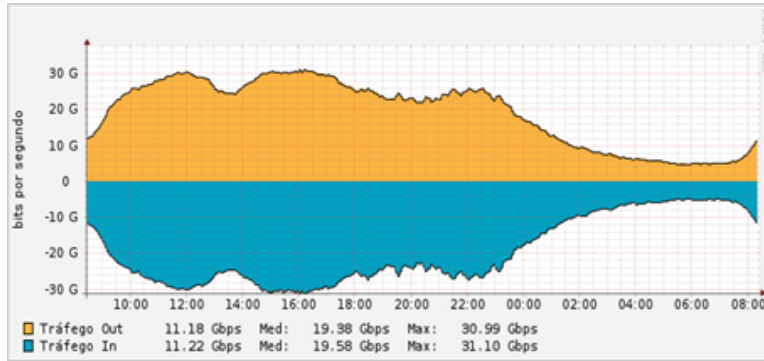
Lit/equipped international Internet bandwidth, in Mbit/s

Total lit/equipped international bandwidth capacity refers to the **total lit/equipped capacity of international links**, namely fiber-optic cables, international radio links and satellite uplinks to orbital satellites in the end of the reference year (expressed in Mbit/s). **If the traffic is asymmetric (i.e. incoming traffic and outgoing traffic is not equal), then the higher value out of the two should be provided.**





Bandwidth usage in Gbps



Source: Gigapix

Examples of network monitoring tools

- MRTG-Multi Router Traffic Grapher
- PRTG
- Cacti (www.cacti.net)
- OpenNMS (www.opennms.com)

Source: ANACOM Portugal & EGTI sub-group on international Internet Bandwidth



IDI indicator 1.4

- Percentage of the population covered by mobile networks
 - At least 3G
 - At least LTE/WiMAX
- Access sub-index
- Source: WTI



% of the population covered by at least an 3G network

Percentage of the population covered by at least a 3G mobile network refers to the percentage of inhabitants that are within range of at least a 3G mobile-cellular signal, **irrespective of whether or not they are subscribers**. This is calculated by dividing the number of inhabitants that are covered by at least a 3G mobile-cellular signal by the total population and multiplying by 100. It excludes people covered only by GPRS, EDGE or CDMA 1xRTT.

Total mobile
coverage

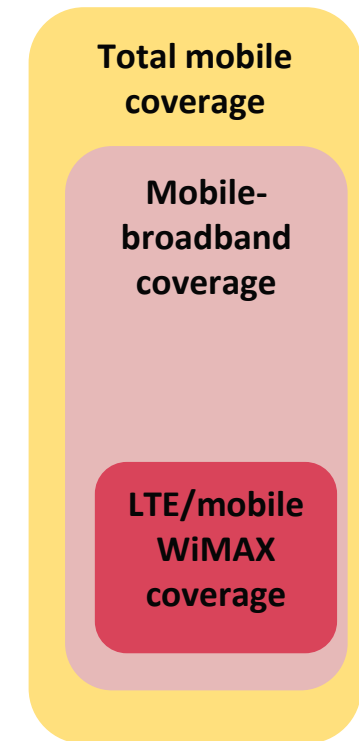
Mobile-
broadband
coverage
(3G)



% of the population covered by at least an LTE/WiMAX mobile network

Percentage of inhabitants that live within range of LTE/LTE-Advanced, mobile WiMAX/WirelessMAN or other more advanced mobile-cellular networks, irrespective of whether or not they are subscribers.

It excludes people covered only by HSPA, UMTS, EV-DO and previous 3G technologies, and also excludes fixed WiMAX coverage.





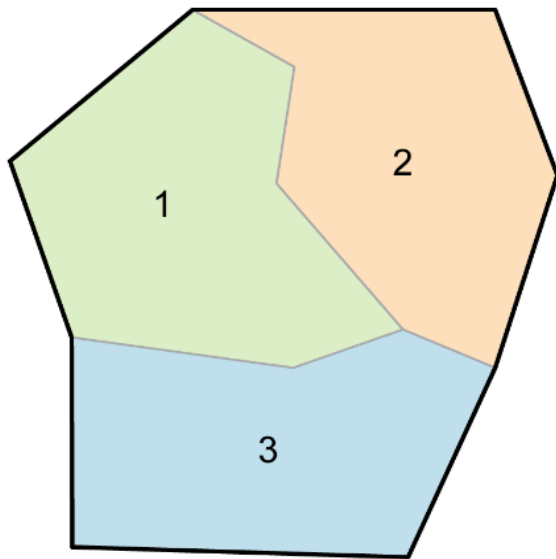
Mobile coverage – methodology

Possible ways of collecting the data:

1. Each operator reports total country coverage
⇒ Max value of all reported
2. Each operator reports total per admin unit
⇒ Max value of all reported per admin unit
⇒ Aggregation according to population/admin unit

Mobile coverage – methodology

Example:



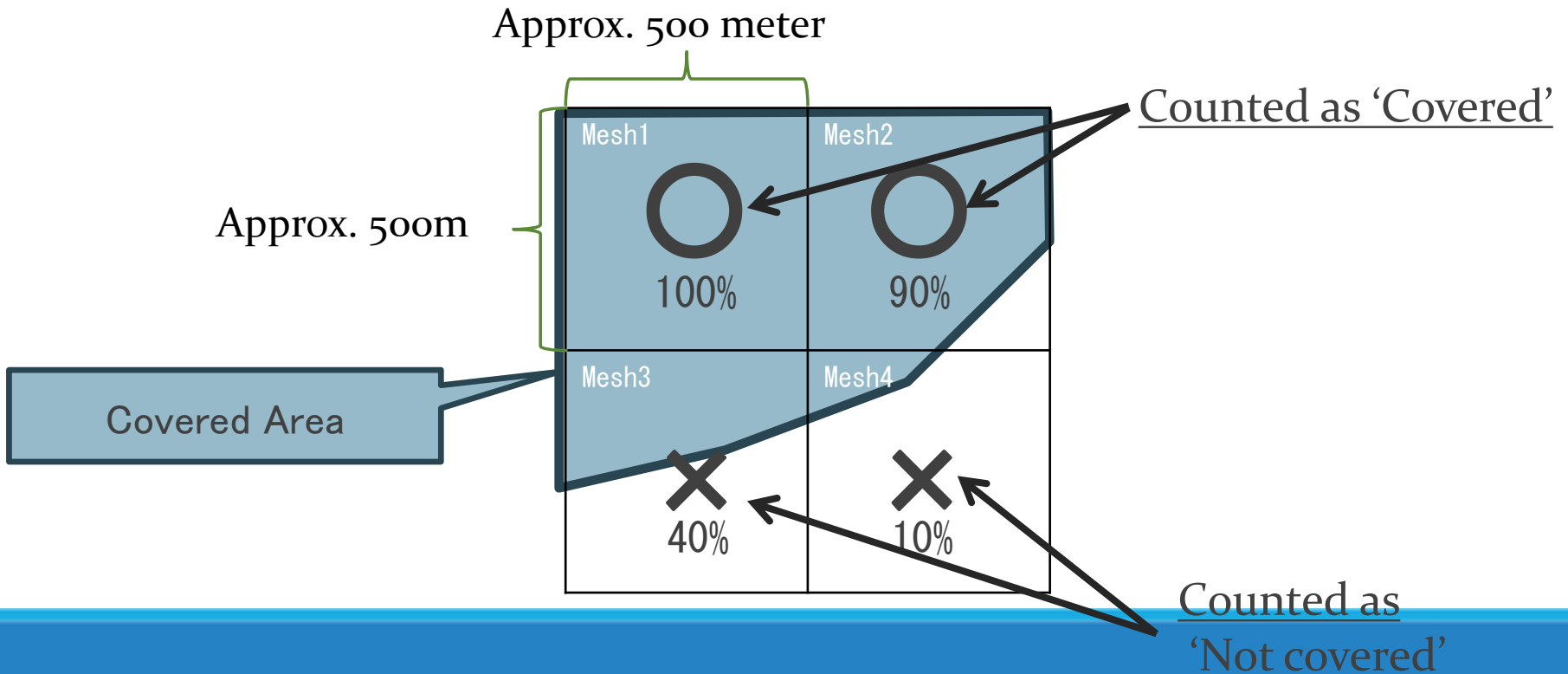
	Op 1	Op 2	Op 3
Region 1 (50% pop)	80%	80%	80%
Region 2 (25% pop)	50%	60%	70%
Region 3 (25% pop)	80%	80%	80%

Total coverage: $80\% * 25\% + 70\% * 25\% + 80\% * 50\% = \mathbf{77.5\%}$

Mobile coverage – methodology

3. Ask each operator to report coverage according to a given division of the land area

Example of Japan:





IDI indicator 1.5

- Fixed-broadband subscriptions by speed (as % of total broadband subscriptions):
 - 256 kbit/s to 2 Mbit/s
 - 2 to 10 Mbit/s
 - Equal to or above 10 Mbit/s
- Access sub-index
- Source: WTI

Definition of broadband

- For statistical purposes: *Minimum download speed of **256 kbit/s***

➔ Importance of **breakdown by speed**

➔ **Breakdown by technology** gives additional information on infrastructure

2017 EGTI
discussion
item

“transmission capacity that is faster than primary rate Integrated Services Digital Network (ISDN) at 1.5 or 2.0 Megabits per second (Mbits)”

– ITU-T Definition

Classification of broadband subscriptions

Fixed
broadband

- (1) xDSL
- (2) Cable modem
- (3) FTTH/FTTB
- (4) Other fixed wired

-
- (5) Satellite broadband
 - (6) Fixed wireless broadband

Fixed
wired



Fixed
wireless

Active mobile
broadband

- (1) Data and voice
- (2) Data only



Fixed (wired)-broadband subscriptions

Fixed-broadband subscriptions refers to fixed subscriptions to high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, **256 kbit/s**. This includes **cable modem, DSL, fibre-to-the-home/building, other fixed (wired)-broadband subscriptions, satellite broadband** and **terrestrial fixed wireless broadband**.

This total is measured irrespective of the method of payment. It **excludes** subscriptions that have access to data communications (including the Internet) **via mobile-cellular networks**. It should **include fixed WiMAX** and any other **fixed wireless technologies**. It includes both residential subscriptions and subscriptions for organizations.

Fixed (wired)-broadband subscriptions by speed tiers



Main features:

- advertised ≥ 256 kbit/s



- wired



Breakdowns:

- by speed

- 256 kbit/s – <2 Mbit/s
- 2 – <10 Mbit/s
- ≥ 10 Mbit/s

- by tech

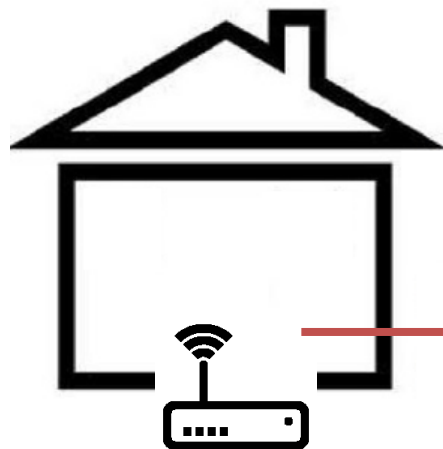
- DSL
- cable
- FTTH/B
- Satellite/fixed wireless/other

Clarifications on WiFi networks



- The 2016 EGTI meeting clarified the following use cases of WiFi networks:

1) WiFi used on top of other fixed-broadband subscriptions to distribute the signal at home



fixed broadband connection
(ADSL, cable, fiber, etc.)

These connections are already counted as “**Fixed broadband subscriptions**” and should not be reported separately

Clarifications on WiFi networks



2) WiFi used as a last mile technology and associated with a specific monthly fixed-broadband contract



these connections should be reported as “**Fixed wireless broadband subscriptions**”

3) WiFi hotspots (public, private, free, paid)



Individual country experiences, but in most cases out of the scope of regulators’ data collections.
Will not be reflected in ITU supply-side indicators



IDI indicator 2.1

- Percentage of individuals using the Internet
- Use sub-index
- Source: Household survey

Indicator HH7: Proportion of individuals using the Internet

Definitions:

This is the proportion of individuals who used the Internet from any location in the last three months.

The *Internet* is a worldwide public computer network. It provides access to a number of communication services including the World Wide Web and carries e-mail, news, entertainment and data files, irrespective of the device used (not assumed to be only via a computer – it may also be by mobile telephone, tablet, PDA, games machine, digital TV etc.). Access can be via a fixed or mobile network.



IDI indicator 2.2

- Active mobile-broadband subscriptions per 100 inhabitants
- Use sub-index
- Source: WTI



Active mobile broadband subscriptions

Active mobile-broadband subscriptions refers to the sum of **active handset-based** and **computer-based** (USB/dongles) mobile-broadband subscriptions to the public Internet.

It covers actual subscribers, not potential subscribers, even though the latter may have broadband-enabled handsets. Subscriptions must include a recurring subscription fee or pass a usage requirement – **users must have accessed the Internet in the last three months.**

It includes subscriptions to mobile-broadband networks that provide download speeds of at least 256 kbit/s (e.g. WCDMA, HSPA, CDMA2000 1x EV-DO, WiMAX IEEE 802.16e and LTE), and excludes subscriptions that only have access to GPRS, EDGE and CDMA 1xRTT.

Active mobile-broadband subscriptions

Main features:

- advertised ≥ 256 kbit/s



 GPRS and EDGE **excluded**

- active

{	1. Monthly fee paid for Internet access
	OR
2. Accessed the Internet in the previous three months	
- allows access to the open Internet



Mobile broadband subcategories

i271mb_active - Data and voice mobile-broadband subscriptions (i271mw = i271mb_active+ i271md)

Data and voice mobile-broadband subscriptions refers to subscriptions to mobile-broadband services that allow access to the open Internet via HTTP and in which data services are contracted together with voice services (mobile voice and data plans) or as an add-on package to a voice plan. These are typically smartphone-based subscriptions with voice and data services used in the same terminal. Data and voice mobile-broadband subscriptions with specific recurring subscription fees for Internet access are included regardless of actual use. Prepaid and pay-per-use data and voice mobile-broadband subscriptions should only be counted if they have been used to access the Internet in the last three months. M2M subscriptions should be excluded.



Mobile broadband subcategories

i271md - Data-only mobile-broadband subscriptions **(i271mw = i271mb_active+ i271md)**

Data-only mobile-broadband subscriptions refers to subscriptions to mobile broadband services that allow access to the open Internet via HTTP and that **do not include voice services**, i.e. subscriptions that **offer mobile broadband as a standalone service**, such as mobile-broadband subscriptions for datacards, USB modem/dongle and tablets. Data-only mobile-broadband subscriptions with recurring subscription fees are included regardless of actual use. Prepaid and pay-per-use data-only mobile-broadband subscriptions should only be counted if they have been used to access the Internet in the last three months. M2M subscriptions should be excluded. It excludes data subscriptions that are contracted together with mobile voice services.

Examples of activity criteria

	Type of plan	Voice	Data	How counted
1	Standalone voice	Standard voice subscription	Pay as you go	If Internet used in the last 3 months, Standard
2	3G modem	No	Monthly subscription	Dedicated
3	Bundled voice and data	X minutes included	Y MB included	If Internet used in the last 3 months, Standard
4	Bundled voice and data	X minutes included	Unlimited	If Internet used in the last 3 months, Standard
5	Standalone voice plan + data add-on	Standard voice subscription	Data paid separately (Y MB/month)	Dedicated

Examples of activity criteria

	Type of plan	Voice	Data	How counted
6	3G modem	No	Prepaid	If Internet used in the last 3 months, Dedicated
7	Voice plan + data credits	Standard voice subscription	Pay per use once credits are filled	If Internet used in the last 3 months, Standard



IDI indicator 2.3

- Mobile-broadband Internet traffic per mobile-broadband subscription
- Use sub-index
- Source: WTI

Mobile-broadband Internet traffic (within the country)



Mobile-broadband Internet traffic (within the country) refers to broadband traffic volumes originated within the country from 3G networks or other more advanced mobile networks, including 3G upgrades, evolutions or equivalent standards in terms of data transmission speeds.

Traffic should be collected and aggregated at the country level for all 3G or more advanced mobile networks within the country. Download and upload traffic should be added up and reported together. Traffic should be measured at the end user access point. Wholesale and walled-garden traffic should be excluded. The traffic should be reported in **exabytes**.



IDI indicator 2.4

- Fixed-broadband Internet traffic per fixed-broadband subscription
- Use sub-index
- Source: WTI



Fixed (wired)- broadband Internet traffic

Fixed (wired)- broadband Internet traffic (**exabytes**) refers to traffic generated by fixed broadband subscribers measured at the end-user access point. It should be measured adding up download and upload traffic. This should exclude wholesale traffic, walled garden, IPTV and cable TV traffic.

Fixed and mobile data traffic – methodology (ii)

- Units:



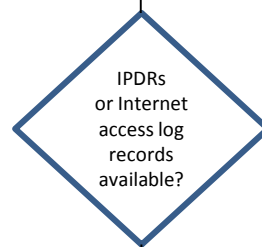
10^{12}	EB	Exabyte
10^9	PB	Petabyte
10^6	TB	Terabyte
10^3	GB	Gigabyte
1	MB	Megabyte

- References:

- Fixed: 0.05 – 30 EB
- Mobile (domestic): 0.04 – 4 EB
- Mobile (roaming): 10^{-6} – 10^{-2} EB



Telecommunication operator

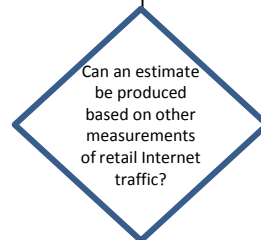


Example 1

YES

NO

Aggregate per year and report data



YES

NO

Report estimate



Example 2

Report estimate based on traffic exchanged with wholesalers

Report estimate based on load of international Internet channels

Example 3

The portion of on-net Internet traffic should be considered in the estimate

The portion of on-net Internet traffic should be considered in the estimate

Fixed and mobile data traffic – examples

- Example 1: Internet log records

ID	TYPE_COMMERCIAL_PRIVATE	TYPE_TECHNOLOGY	TYPE_SPEED	TYPE_IP_ACCESS	LAU3_CODE	DATETIME	DURATION	DATA_VOLUME
50000001	1	1	1	1	636732	1460590789	21021	
50000001	1	1	1	1	636732	1460624755	19544	
50000001	1	1	1	2	636732	1460667621	52585	
50000002	1	1	2	2	736283	1463600670	37146	
50000002	1	1	2	2	736283	1463655957	6527	
50000002	1	1	2	2	736283	1463670975	78445	
50000003	1	1	3	1	226398	1463201560	30617	
50000003	1	1	3	1	226398	1463256930	43324	
50000003	1	1	3	2	226398	1463302871	60706	
50000004	1	1	4	2	109399	1460986631	72621	
50000004	1	1	4	1	109399	1461087020	62676	
50000004	1	1	4	2	109399	1461150692	1057	
50000005	1	2	1	2	860843	1463270886	76957	
50000005	1	2	1	1	860843	1463380473	39007	
50000005	1	2	1	1	860843	1463436321	29605	
50000006	1	2	2	1	448844	1460148452	61626	
50000006	1	2	2	1	448844	1460249825	8365	
50000006	1	2	2	2	448844	1460271473	4632	

Source: ITU Big Data for Measuring the Information Society: Country Report – United Arab Emirates.

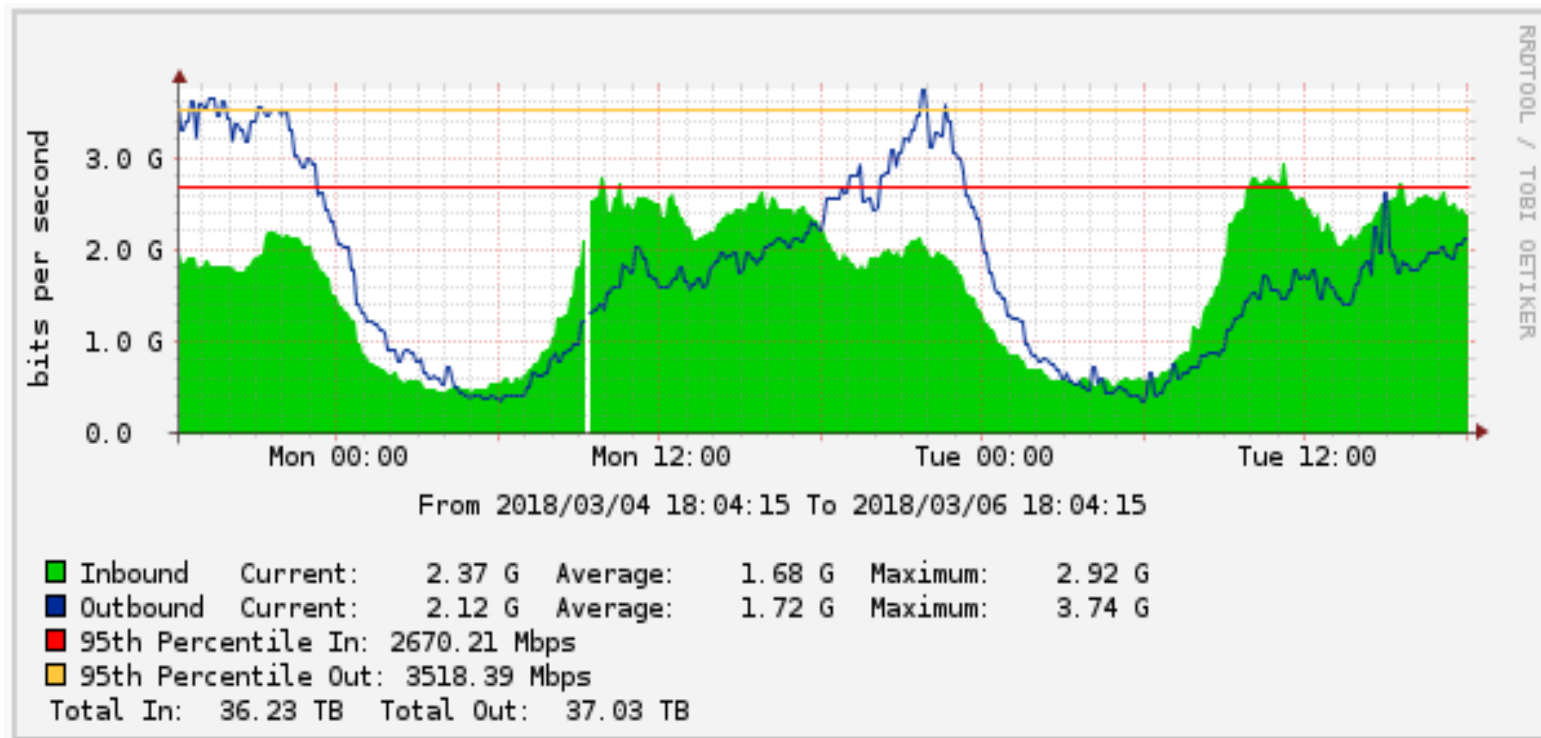
Fixed and mobile data traffic – examples

- Example 2: traffic data at IXPs

Nodeid	Ip Address	Operator	Downstream/Upstream traffic	Date	Daily traffic volume	Value 8 20	Max day
XXXX	XX.XX.X.XX	XXX	ifHCOctets	17.10.01	XXXXXXXXXX.XX	XXXXXXXXXX.XX	XXXX.XX
XXXX	XX.XX.X.XX	XXX	ifHCInOctets	17.10.01	XXXXXXXXXX.XX	XXXXXXXXXX.XX	XXXX.XX
XXXX	XX.XX.X.XX	XXX	ifHCOctets	17.10.02	XXXXXXXXXX.XX	XXXXXXXXXX.XX	XXXX.XX
XXXX	XX.XX.X.XX	XXX	ifHCInOctets	17.10.02	XXXXXXXXXX.XX	XXXXXXXXXX.XX	XXXX.XX
XXXX	XX.XX.X.XX	XXX	ifHCOctets	17.10.03	XXXXXXXXXX.XX	XXXXXXXXXX.XX	XXXX.XX
XXXX	XX.XX.X.XX	XXX	ifHCInOctets	17.10.03	XXXXXXXXXX.XX	XXXXXXXXXX.XX	XXXX.XX
XXXX	XX.XX.X.XX	XXX	ifHCInOctets	17.10.04	XXXXXXXXXX.XX	XXXXXXXXXX.XX	XXXX.XX
XXXX	XX.XX.X.XX	XXX	ifHCOctets	17.10.04	XXXXXXXXXX.XX	XXXXXXXXXX.XX	XXXX.XX
XXXX	XX.XX.X.XX	XXX	ifHCOctets	17.10.05	XXXXXXXXXX.XX	XXXXXXXXXX.XX	XXXX.XX
XXXX	XX.XX.X.XX	XXX	ifHCInOctets	17.10.05	XXXXXXXXXX.XX	XXXXXXXXXX.XX	XXXX.XX
XXXX	XX.XX.X.XX	XXX	ifHCOctets	17.10.06	XXXXXXXXXX.XX	XXXXXXXXXX.XX	XXXX.XX
XXXX	XX.XX.X.XX	XXX	ifHCInOctets	17.10.06	XXXXXXXXXX.XX	XXXXXXXXXX.XX	XXXX.XX
XXXX	XX.XX.X.XX	XXX	ifHCOctets	17.10.07	XXXXXXXXXX.XX	XXXXXXXXXX.XX	XXXX.XX
XXXX	XX.XX.X.XX	XXX	ifHCInOctets	17.10.07	XXXXXXXXXX.XX	XXXXXXXXXX.XX	XXXX.XX
XXXX	XX.XX.X.XX	XXX	ifHCInOctets	17.10.08	XXXXXXXXXX.XX	XXXXXXXXXX.XX	XXXX.XX
XXXX	XX.XX.X.XX	XXX	ifHCOctets	17.10.08	XXXXXXXXXX.XX	XXXXXXXXXX.XX	XXXX.XX
XXXX	XX.XX.X.XX	XXX	ifHCOctets	17.10.09	XXXXXXXXXX.XX	XXXXXXXXXX.XX	XXXX.XX
XXXX	XX.XX.X.XX	XXX	ifHCInOctets	17.10.09	XXXXXXXXXX.XX	XXXXXXXXXX.XX	XXXX.XX
XXXX	XX.XX.X.XX	XXX	ifHCInOctets	17.10.10	XXXXXXXXXX.XX	XXXXXXXXXX.XX	XXXX.XX
XXXX	XX.XX.X.XX	XXX	ifHCOctets	17.10.10	XXXXXXXXXX.XX	XXXXXXXXXX.XX	XXXX.XX
XXXX	XX.XX.X.XX	XXX	ifHCOctets	17.10.11	XXXXXXXXXX.XX	XXXXXXXXXX.XX	XXXX.XX
XXXX	XX.XX.X.XX	XXX	ifHCInOctets	17.10.11	XXXXXXXXXX.XX	XXXXXXXXXX.XX	XXXX.XX
XXXX	XX.XX.X.XX	XXX	ifHCOctets	17.10.12	XXXXXXXXXX.XX	XXXXXXXXXX.XX	XXXX.XX
XXXX	XX.XX.X.XX	XXX	ifHCInOctets	17.10.12	XXXXXXXXXX.XX	XXXXXXXXXX.XX	XXXX.XX

Fixed and mobile data traffic – examples

- Example 3: load international channels



Source: Autoridade Nacional de Comunicações (ANACOM), Portugal.



IDI indicator 2.5

- Percentage of individuals who own a mobile phone
- Use sub-index
- Source: Household survey



HH18: Proportion of individuals who own a mobile phone

This is the proportion of individuals who own a mobile phone. An individual owns a mobile cellular phone if he/she has a mobile cellular phone device with at least one active SIM card for personal use. It includes mobile cellular phones supplied by employers that can be used for personal reasons (to make personal calls, access the Internet, etc.) and those who have a mobile phone for personal use that is not registered under his/her name. It excludes individuals who have only active SIM card(s) and not a mobile phone device.

**First collected in 2015
(agreed by EGH in 2014)**



IDI indicator 3.1

- Mean years of schooling
- Skills sub-index
- Source: UNESCO Institute for Statistics

Mean years of schooling

Definition

Average number of completed years of education of a country's population aged 25 years and older, excluding years spent repeating individual grades.

Data required

Population aged 25 years and above by highest level of education attained.

Data source

Mainly national population census; household and/or labour force surveys.

Types of disaggregation

By sex.



Mean years of schooling

Sample calculation

Take a country where primary education lasts 4 years, secondary education lasts 8 years, and tertiary education lasts 4 years, and assume that these durations have remained constant over time.

Assume further that 10% of the population aged 25 years and older have no schooling, 10% have incomplete primary education, 40% completed primary education, 30% completed secondary education, and 10% completed tertiary education.

MYS estimate for the population aged 25 years and older can be computed as follows:

$$\begin{aligned} & (0.1 \times 0) + (0.1 \times 4/2) + (0.4 \times 4) + [0.3 \times (4 + 8)] + [0.1 \times (4 + 8 + 4)] \\ & = 0 + 0.2 + 1.6 + 3.6 + 1.6 \\ & = 7 \text{ years} \end{aligned}$$



IDI indicators 3.2 and 3.3

- Gross enrollment ratio (secondary level)
- Gross enrollment ratio (tertiary level)
- Skills sub-index
- Source: UNESCO Institute for Statistics

Gross enrolment ratio



Definition

Number of students enrolled in a given level of education, regardless of age, expressed as a percentage of the official school-age population corresponding to the same level of education. For the tertiary level, the population used is the 5-year age group starting from the official secondary school graduation age.

Data required

Total enrolment for a given level of education; population of the age group corresponding to the specified level.

Data source

School register, school survey or census for data on enrolment by level of education; population census or estimates for school-age population.

Types of disaggregation

By sex and by level of education.



United Nations
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GER Sample calculation

Gross enrolment ratio (GER)

Assume a country has 512,314 students of official secondary school going age.

The enrolment in all secondary schools is 490,188 of all ages including repeaters

The GER secondary = $490,188 / 712,314 \times 100 = 68.8$

For the tertiary level, the population used is the 5-year age group starting from the official secondary school graduation age.



IDI indicator 3.4

- Proportion of individuals with ICT skills
- Skills sub-index
- Source: Household survey

Indicator HH15: Individuals with ICT skills, by type of skills

Definitions:

This refers to ICT skills, defined for the purpose of this indicator as having undertaken certain computer-related activities in the last three months.

Computer-related activities to measure ICT skills are as follows:

- Copying or moving a file or folder
- Using copy and paste tools to duplicate or move information within a document
- Sending e-mails with attached files (e.g. document, picture, video)
- Using basic arithmetic formulae in a spreadsheet
- Connecting and installing new devices (e.g. a modem, camera, printer)
- Finding, downloading, installing and configuring software
- Creating electronic presentations with presentation software (including text, images, sound, video or charts)
- Transferring files between a computer and other devices
- Writing a computer program using a specialized programming language



Skills aggregation

- **Basic skills:** the highest proportion among the following four computer-based activities within a country:
 - copying or moving a file or folder,
 - using copy and paste tools to duplicate or move information within a document,
 - sending e-mails with attached files, and
 - transferring files between a computer and other devices.
- **Standard skills:** the highest proportion the highest value among the following four computer-based activities within a country:
 - using basic arithmetic formula in a spreadsheet;
 - connecting and installing new devices;
 - creating electronic presentations with presentation software; and
 - finding, downloading, installing and configuring software.
- **Advanced skills:** the value for
 - writing a computer program using a specialized programming language.

Note: ITU will do the aggregation into basic, standard and advanced

Thank you



For more information

<https://www.itu.int/en/ITU-D/Statistics/>

and

indicators@itu.int