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Telecommunication/ICT indicators
(SHORT QUESTIONNAIRE)

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Outline

- Overview - ITU Handbook

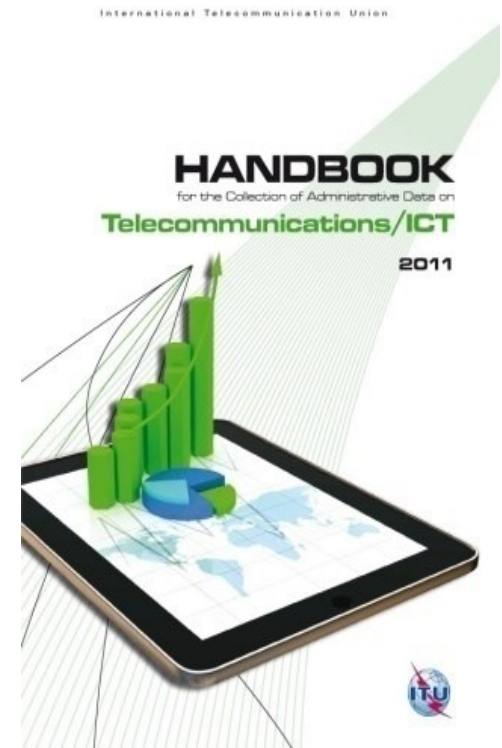
ITU Short questionnaire (6 indicators):

- Fixed telephone subscriptions
- Mobile cellular indicators
 - Subscriptions
 - Population coverage
- Broadband indicators
 - Fixed-broadband subscriptions
 - Active mobile-broadband subscriptions
- International Internet bandwidth

Overview - ITU 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
(includes updated indicators and revisions)



ITU Handbook (cont.)

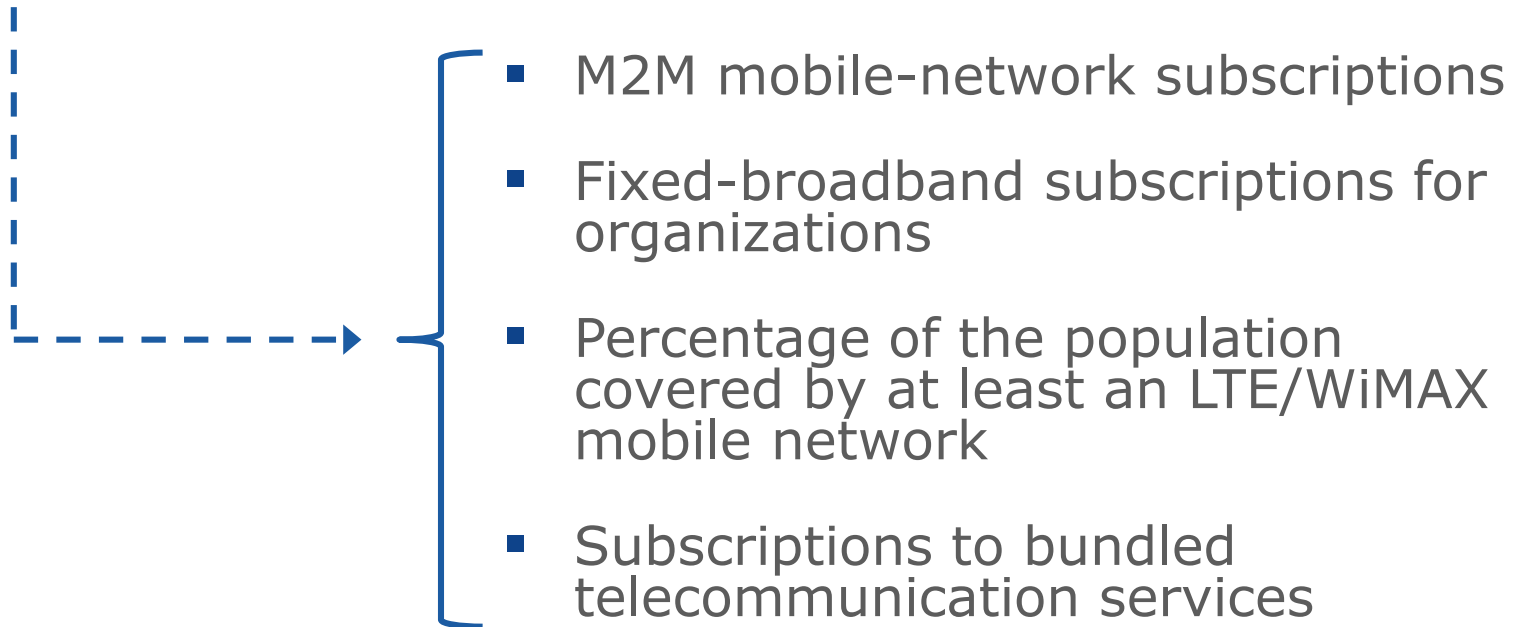
Groupings:

- 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

Latest ITU indicators

- New indicators from administrative data sources added in 2015:



- From 2016:
 - Active subscriptions to LTE/WiMAX mobile-broadband networks
 - Change in mobile-bb sub-categories

WTI Short questionnaire indicators



i112 - Fixed-telephone subscriptions

The sum of (active) number of:

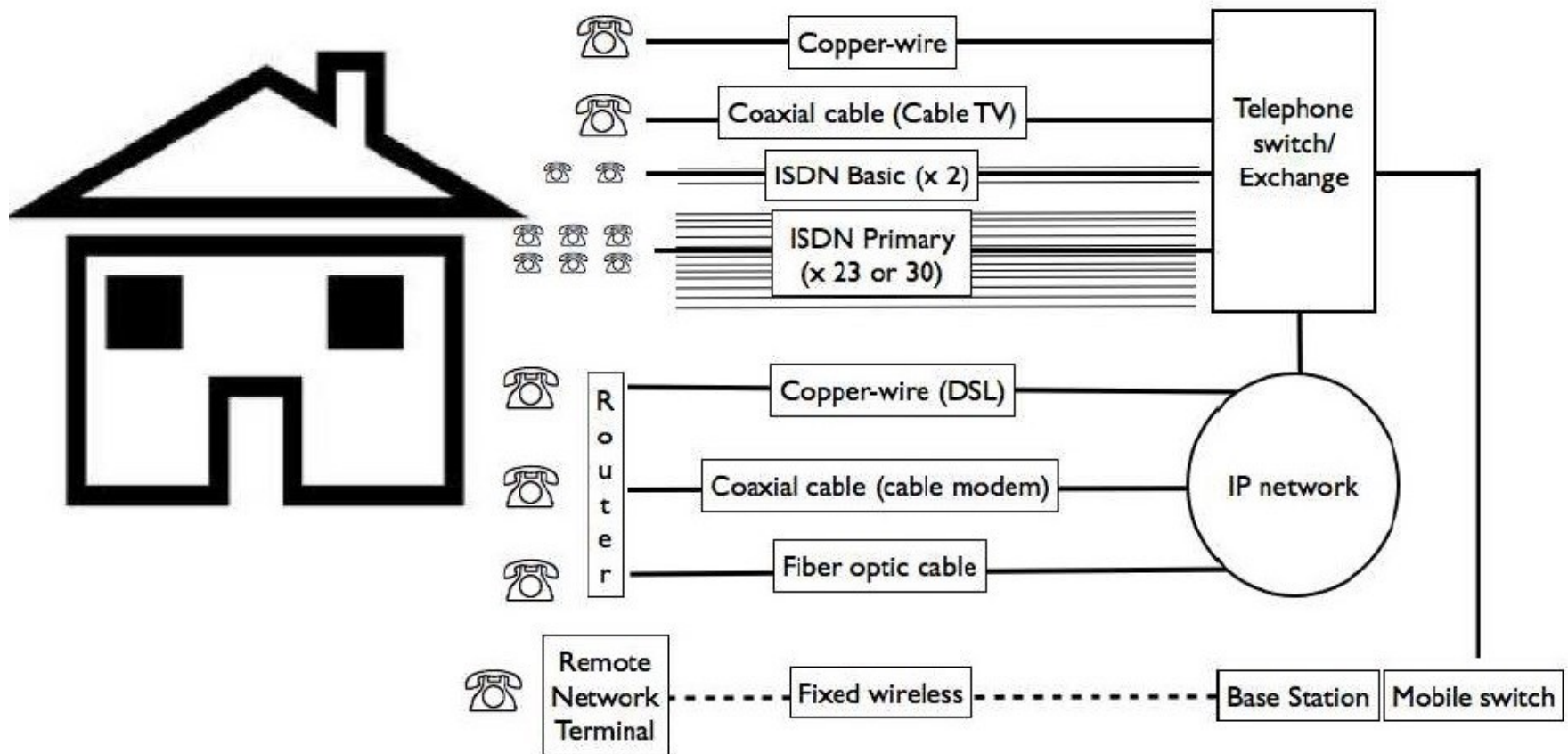
- (i)analogue fixed-telephone** lines
- (ii)Voice-over-IP (**VoIP**) subscriptions
- (iii) fixed wireless local loop (**WLL**) subscriptions
- (iv) integrated services digital network (**ISDN**) voice channel equivalents
- (v)fixed **public payphones**

This indicator measures the total number of physical lines available in the PSTN.

i112 - Fixed-telephone subscriptions - clarification

- Accesses over fixed infrastructure that provide voice telephony, including telephone lines using copper wire and voice services using IP delivered over fixed (wired)-broadband infrastructure, for example digital subscriber line (DSL), fibre optic and coaxial cable television networks (cable modem).
- Fixed WLL connections, which are defined as services provided by licensed fixed-line telephone operators that provide last-mile access to the subscriber using radio technology (the call being subsequently routed over a fixed-line telephone network and not a mobile-cellular network): both postpaid and prepaid subscriptions. If prepaid, the fixed-telephone subscription should be active, i.e. used at least once in the last three months.
- Should include data from all licensed fixed-telephone line providers. In the case of VoIP, it should include all operators that have been licensed to provide IP telephony, provided that the service includes a subscriber telephone number, allows the ability to place and receive calls at any time and does not require a computer. Both residential and business subscriptions should be included.

Fixed-telephone subscriptions



Mobile cellular indicators



i271 - Mobile-cellular telephone subscriptions

Number of subscriptions to a public mobile telephone service that provide **access to the PSTN using cellular technology**.

The indicator includes:


















(i) postpaid subscriptions; and
(ii) prepaid accounts that are active, i.e. used during the last three months.

The indicator applies to all mobile-cellular subscriptions that offer voice communications.

It excludes subscriptions via data cards or USB modems, subscriptions to public mobile data services, private trunked mobile radio, telepoint, radio paging and **M2M**.

What do we actually measure?

Mobile-cellular...

- Subscriptions    operator data
- Users    household survey data
- Owners    household survey data
- Handsets   
- Subscribers     



Other mobile-cellular indicators

Percentage of the population covered by a mobile network, broken down by technology:

- mobile-cellular telephone network
- at least a 3G mobile network
- at least an LTE/WiMAX mobile network



i271pop - Percentage of the population covered by a mobile-cellular network

Percentage of the population covered by a mobile-cellular network refers to the **percentage of inhabitants within range of a mobile-cellular signal**, irrespective of whether or not they are subscribers or users.

This is calculated by dividing the number of inhabitants within range of a mobile-cellular signal by the total population and multiplying by 100.

Broadband indicators

Definition of broadband

- International agreement to keep minimum speed at 256 kbit/s

 Importance of **breakdown by speed** (for fixed)

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

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 broadband

Fixed (wired)-broadband subscriptions

Main features:

- advertised ≥ 256 kbit/s



- wired



Breakdowns:

- by speed



- ≥ 10 Mbit/s
- 2 – 10 Mbit/s
- 0.256 – 2 Mbit/s

- by tech

- DSL
- cable
- FTTH/B
- other



i4213tfbb - Fixed-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**.

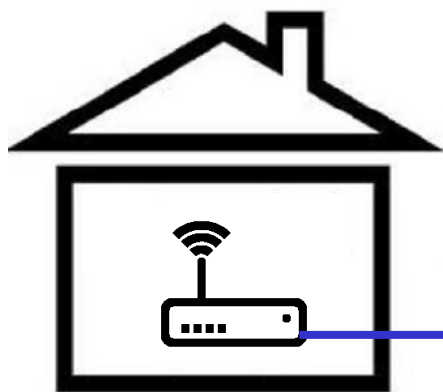
This total is measured irrespective of the method of payment.

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.

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

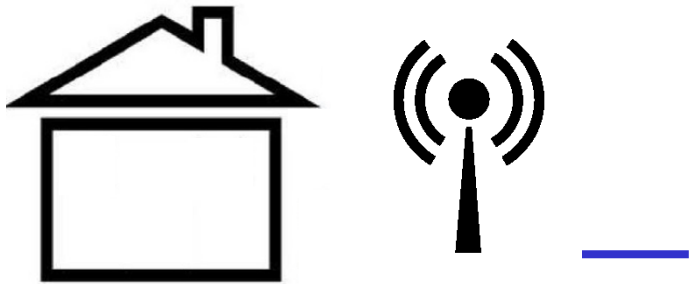


fixed broadband connection
(ADSL, cable, fiber, etc.)

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

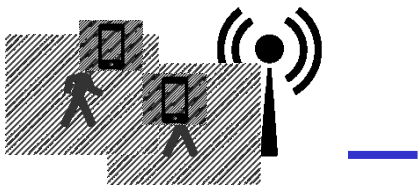
Clarifications on WiFi networks

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



Fixed broadband by speed



i4213_256to2 - 256 kbit/s to less than 2 Mbit/s subscriptions

Refers to all fixed-broadband Internet subscriptions with advertised downstream speeds equal to, or greater than, **256 kbit/s and less than 2 Mbit/s**.



i4213_2to10 - 2 Mbit/s to less than 10 Mbit/s subscriptions

Refers to all fixed-broadband Internet subscriptions with advertised downstream speeds equal to, or greater than, **2 Mbit/s and less than 10 Mbit/s**.



i4213_G10 - Equal to or above 10 Mbit/s subscriptions

Refers to all fixed-broadband Internet subscriptions with advertised downstream speeds equal to, or **greater than, 10 Mbit/s.**

Which data does ITU collect:

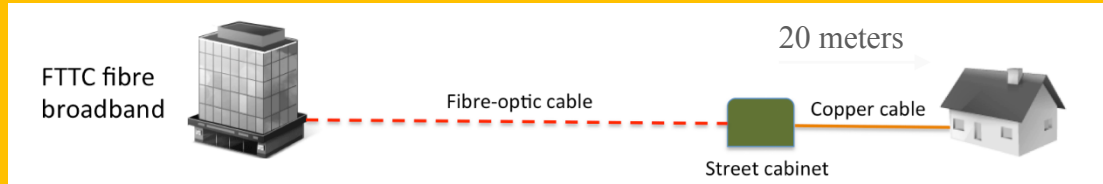
- A) Mobile-cellular subscribers
- B) Mobile-phone ownership
- C) Mobile-phone users
- D) Mobile-cellular subscriptions
- E) Mobile phones

How does ITU collect these data?

How does ITU define broadband?

- A) For fixed-broadband
- B) For mobile-broadband

Why is ITU not changing its definition although speeds and technologies are changing?



The above subscription is counted under:

- A) DSL (i4213dsl)
- B) Fibre to the home/building (i4213ftth/b)
- C) Fixed-broadband subscriptions (i4213tfbb)
- D) A & C
- E) B & C
- F) C only

Mobile broadband


Active mobile-broadband subscriptions

Main features:

- advertised ≥ 256 kbit/s

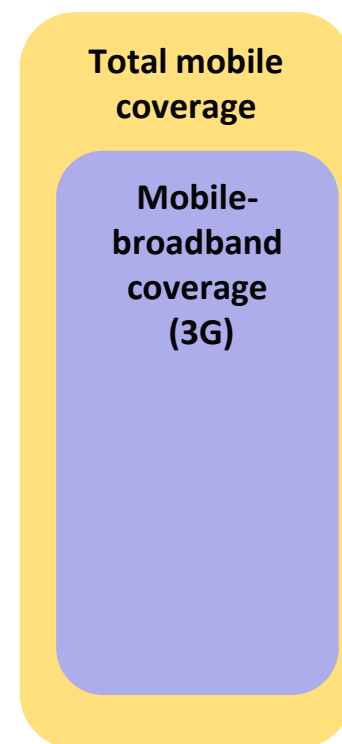


 GPRS and EDGE **excluded**

- active 
 1. Monthly fee paid only for Internet accessOR
 2. Accessed the Internet in the previous three months
- allows access to the open Internet

% of the population covered by at least an 3G network (i271G)

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.



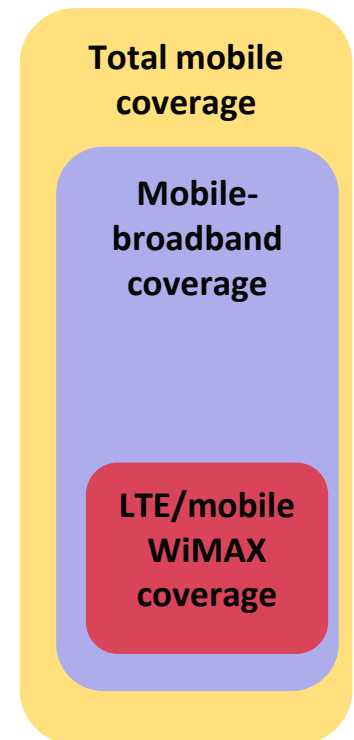


% of the population covered by at least an LTE/WiMAX mobile network (i271GA)

New indicator, collected from this year:

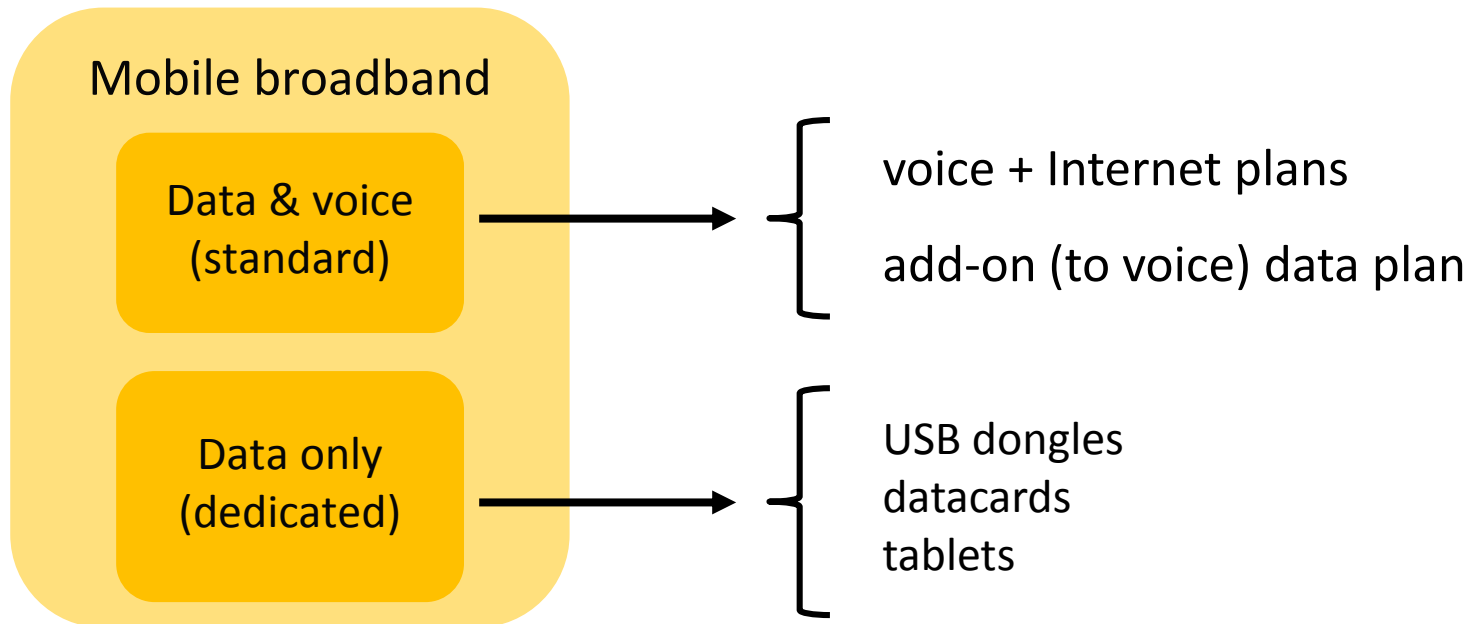
percentage of inhabitants that live within range of LTE/LTE-Advanced, mobile WiMAX/WirelessMAN or other more advanced mobile-cellular networks, irrespective of whether or not they are subscribers.

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



Mobile broadband subcategories

Following the agreement in the 6th EGTI Meeting (September 2015, Geneva) mobile broadband subcategories were adjusted as follows:





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

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.

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.

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.

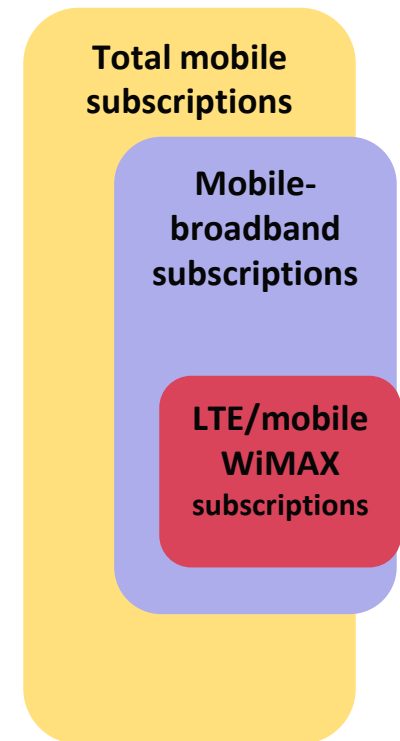


Active subscriptions to LTE/WiMAX mobile-broadband networks (i271mwa)

New indicator, collected from 2016:

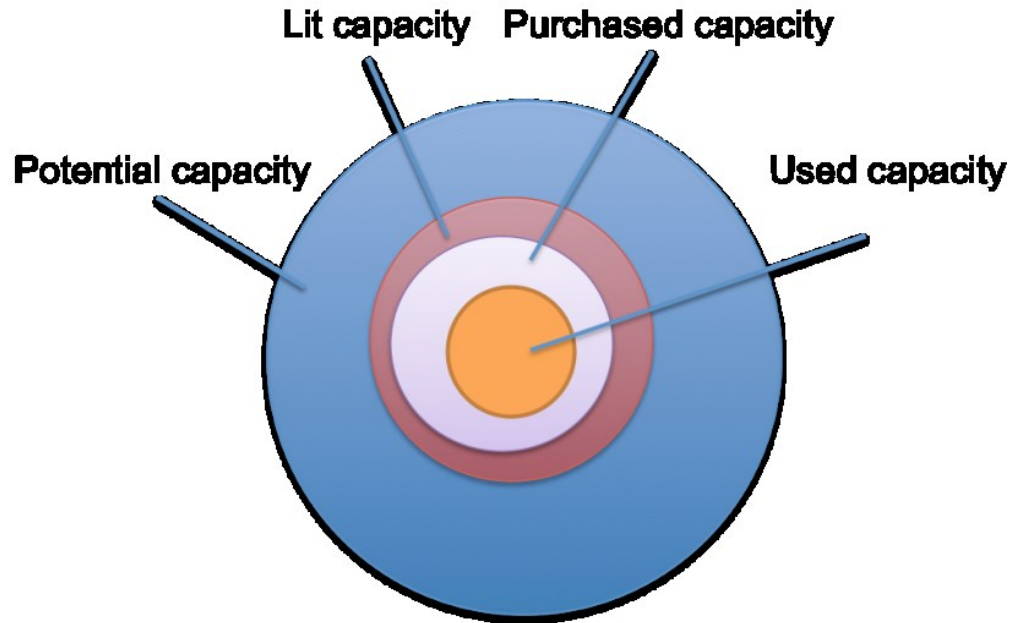
subscriptions that have generated Internet traffic in the last 90 days in LTE/mobile WiMAX and other advanced mobile-broadband networks, such as LTE-Advanced and WirelessMAN.

It excludes subscriptions having generated Internet traffic only in HSPA, UMTS, EV-DO and previous 3G networks, and also excludes fixed WiMAX subscriptions.



International Internet Bandwidth

International Internet bandwidth



ITU collects data on two indicators:

1. Lit/equipped capacity
2. Used capacity



Used international Internet bandwidth (traffic), in Mbit/s

Used international Internet bandwidth refers to **the average traffic load** (expressed in Mbit/s) of **international fibre-optic cables and radio links for carrying Internet traffic**.

The average should be calculated over the **12-month period** of the reference year, and should take into consideration the traffic of all international Internet links. If the traffic is asymmetric, the higher volume (incoming or outgoing) traffic load should be provided.

The combined average traffic load of different international Internet links can be reported as the addition of the average traffic load of each 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, ...)

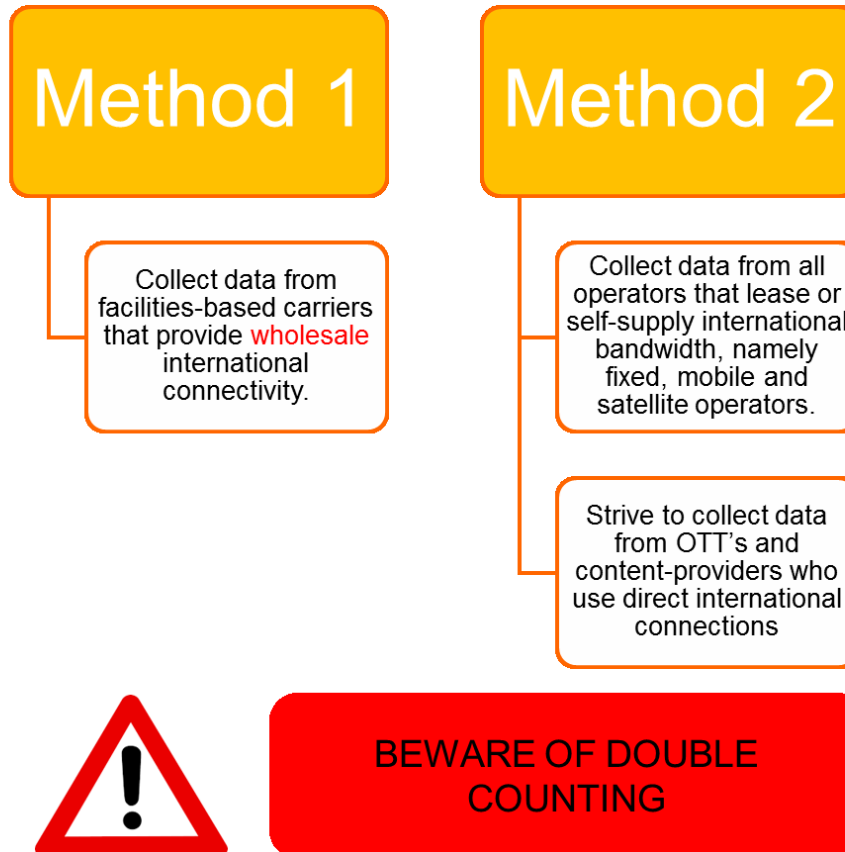


- National traffic not included !



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

Methods of data collection



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

Lit/equipped international Internet bandwidth, in Mbit/s

Lit/equipped international Internet bandwidth refers to the **total lit capacity of international fibre-optic cables provisioned to carry traffic, plus the equipped capacity of international radio links provisioned to carry traffic**. It should be expressed in Mbit/s.

Lit/equipped international Internet bandwidth of transnational operators owning and operating international links should be included, as well as lit/equipped capacity of wholesalers leasing international Internet bandwidth to national Internet service providers.

If capacity is asymmetric, then the higher capacity should be provided.



LTE



The above subscription is counted under:

- A) Fixed-broadband subscriptions (i4213tfbb)
- B) Satellite broadband (i271s)
- C) Other fixed (wired)-broadband (i4213ob)
- D) Terrestrial fixed-wireless broadband (i271fw)
- E) A & C
- F) A & D



Which of the following subscription is not counted under i271mw (active mobile-broadband subscriptions):

- A) M2M subscriptions
- B) Prepaid subscriptions used to access the internet in the last 3 months
- C) Subscriptions with access to data as add-on to voice
- D) Subscriptions providing access only to selected applications (e.g. WhatsApp & Facebook)
- E) A & D
- F) A, C & D





Which of the following traffic is not counted under i4214u (International bandwidth usage, in Mbit/s):

- A) Self-provisioned traffic by OTTs
- B) International private leased circuit (IPLC) traffic
- C) Traffic through international transit agreements
- D) Traffic through international peering agreements
- E) Average of incoming traffic when outgoing traffic is higher.
- F) Traffic through satellite links

Which of the following statements is NOT TRUE:

- A) Total effective (completed) international incoming telephone traffic (**i132ti**) *is equal to the sum* of incoming international traffic to mobile networks (**i1335wm**) and international incoming fixed-telephone traffic (**i132mi**).
- B) Total effective (completed) international outgoing telephone traffic (**i132t**) *includes* managed VoIP.
- C) Active mobile-broadband subscriptions *mean that* the user has accessed the Internet in the last 120 days.
- D) Revenue from all telecommunications services (**i75**) *are to be reported* in local currency at current prices

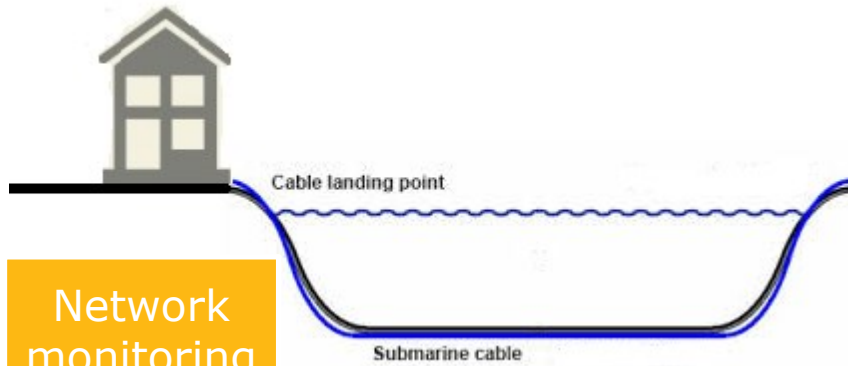
Which of the following statements is **NOT** **TRUE:**

- A) Revenue from all telecommunication services (**i75**) *includes* wholesale revenues.
- B) Active mobile-broadband subscriptions (**i271mw**) *is equal to the sum* of data and voice mobile-broadband subscriptions (**i271mb_active**) and data only mobile broadband subscriptions (**i271md**)
- C) The sum of all fixed-broadband subscriptions with advertised download speeds of at least 256 Kbps *is equal to sum* of fixed (wired)-broadband subscriptions and fixed-wireless broadband subscriptions.
- D) Data submitted that covered periods other than Jan 1 to December 31 *must include* a note stating the actual reference period used.

THANK YOU

More information

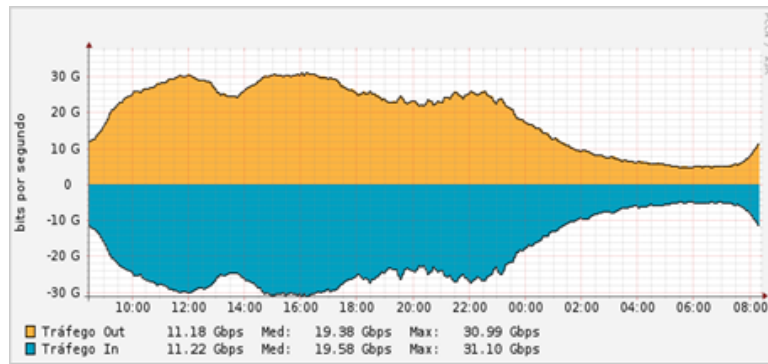
<http://www.itu.int/ict>
indicators@itu.int



Network monitoring tool



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