



ITU Asia-Pacific Regional Workshop on ICT Indicators
Ha Noi, Viet Nam
2-4 October 2019

**Fixed-telephone network, mobile-cellular network
and international bandwidth indicators**

ICT Data and Statistics Division
Telecommunication Development Bureau
International Telecommunication Union

ITU Handbook



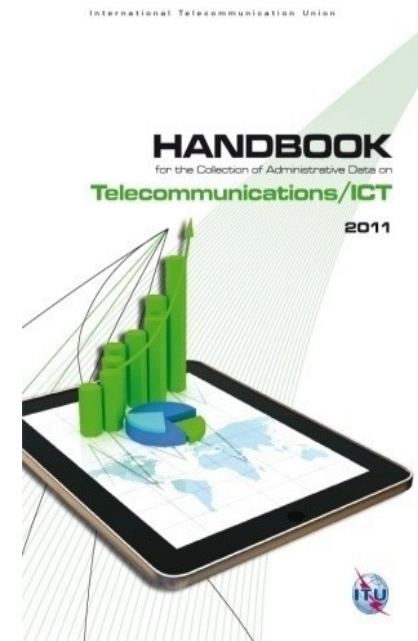
- Covers **81 indicators** on telecommunication/ICT services
- Covers data collected from **administrative sources** (e.g. telecom operators)

Available at:

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

- Undergoing revisions, discussed in the ITU Expert Group on Telecom/ICT Indicators (EGTI) 2019

- Draft available for comments in the EGTI online forum until 15 December 2019





Main ITU indicators from administrative sources

Fixed-telephone network

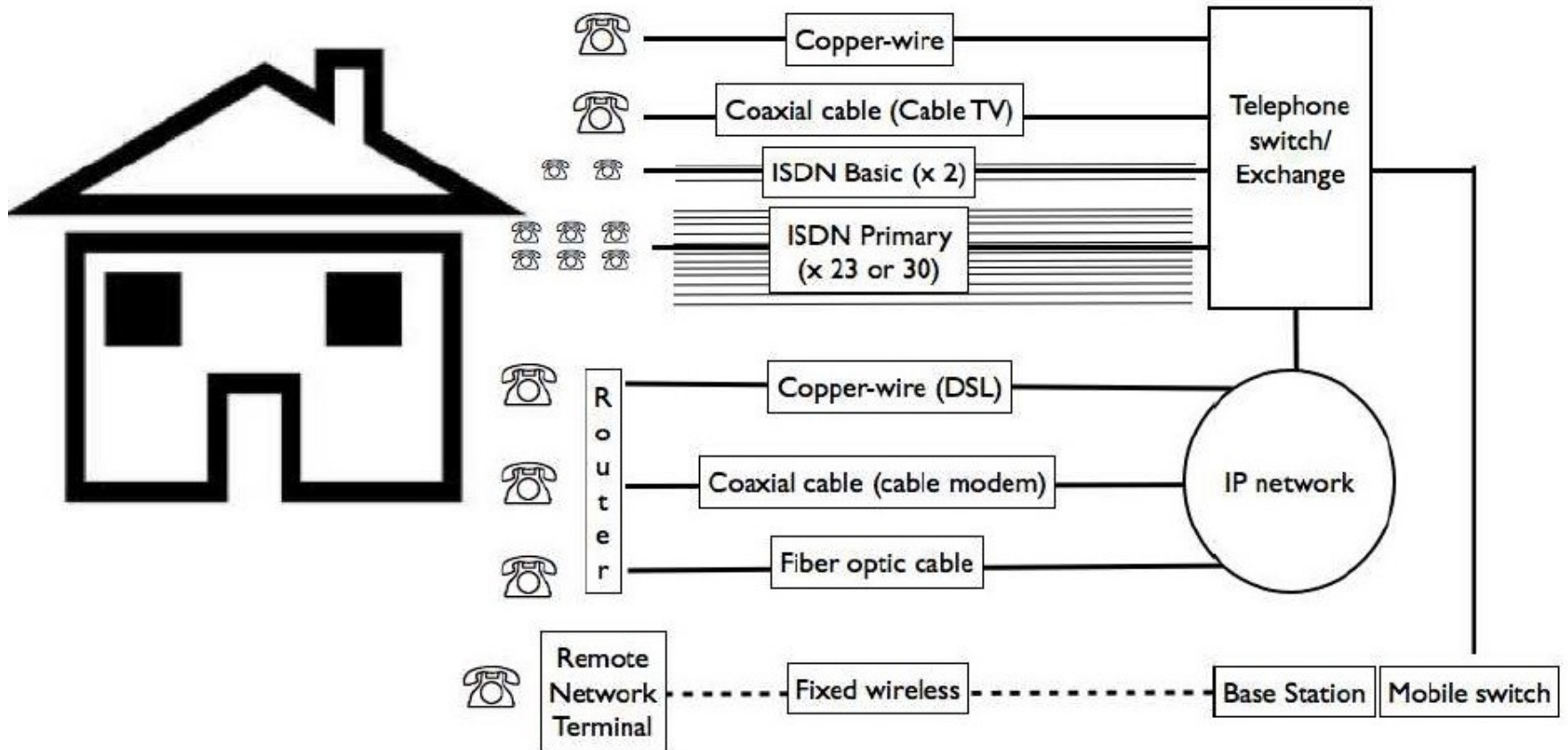
i112: Fixed-telephone subscriptions

The sum of (active) number of:

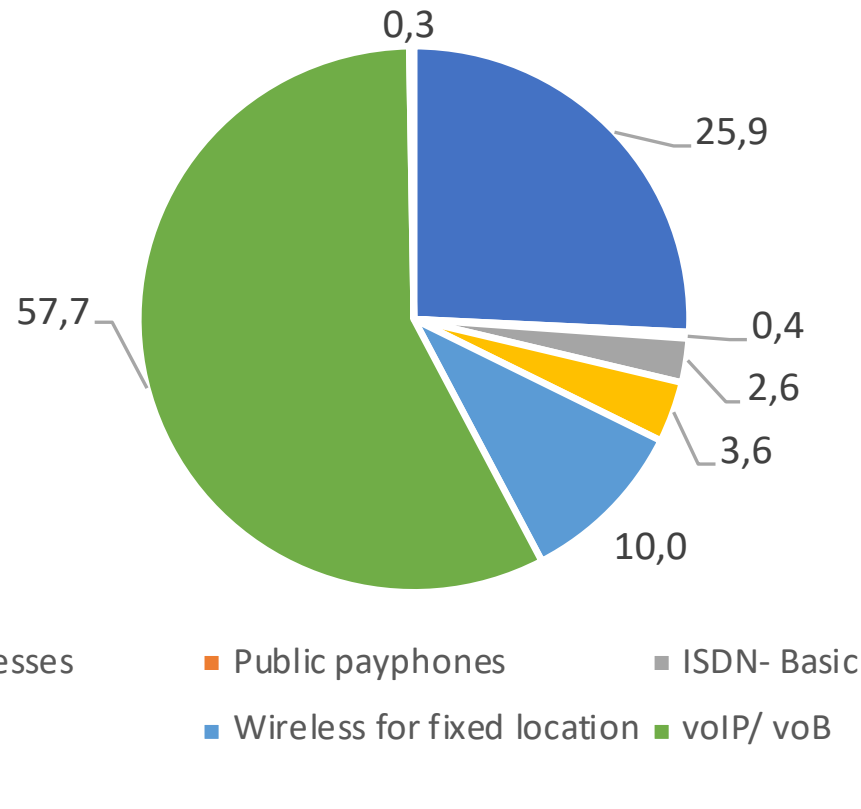
- (i)analogue fixed-telephone** lines
- (ii)Voice-over-IP (**VoIP**) subscriptions
- (iii) fixed wireless local loop (**WLL**) subscriptions
- (iv) integrated services digital network (**ISDN**) voice channel equivalents
- (v)fixed **public payphones**

This indicator was previously called Main telephone lines in operation.

Fixed-telephone subscriptions



Fixed telephone lines by technology (%), Portugal, First Half 2018





Main ITU indicators from administrative sources

Mobile-cellular network

i1271: 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.

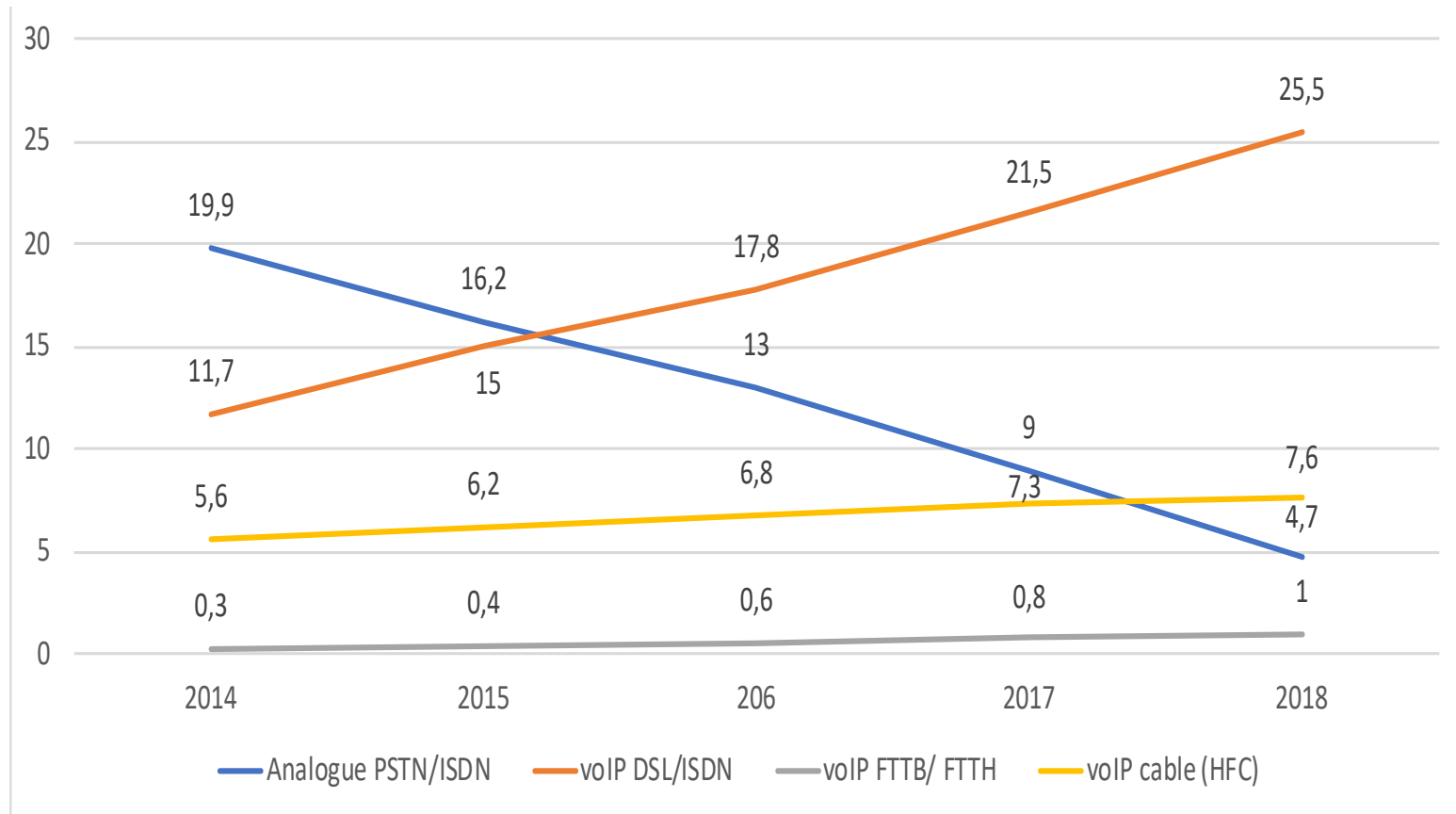
It excludes subscriptions via data cards or USB modems, subscriptions to public mobile data services, private trunked mobile radio, telepoint, radio paging, **M2M** and telemetry services.

What do we actually measure?

Mobile-cellular...

- Subscriptions →  ✓ operator data
- Users →  household survey data
- Handsets →  ✗
- Subscribers →  ✗

Evolution of fixed telephone lines by technology (millions), Germany



i1271pop: Percentage of a population covered by a mobile-cellular network

Percentage of inhabitants within range of a mobile-cellular network, **irrespective** of whether or not they are subscribers or users.

Calculation: Divide number of inhabitants within range of a mobile-cellular signal by the total population and multiply by 100.



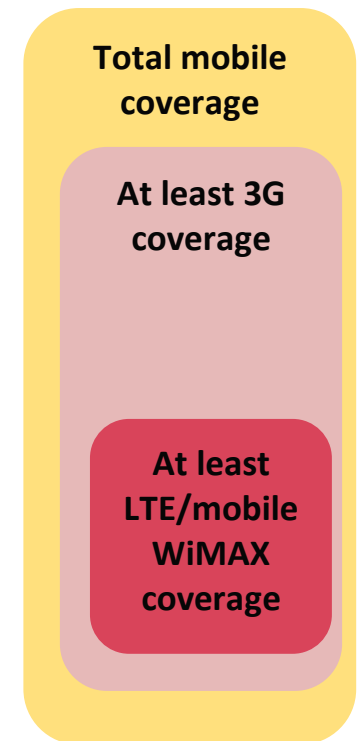
- **Percentage of the population covered by mobile networks**
 - **any mobile network**
 - **at least 3G**
 - **at least LTE/WiMAX**
- **Source: WTI**

Mobile coverage indicators



*irrespective of whether or not they are subscribers,
% of inhabitants that live within range of:*

1. Any mobile-cellular signal
2. At least a 3G mobile network
(excl. EDGE, GPRS, CDMA 1xRTT)
3. At least an LTE/WiMAX mobile network
(excl. HSPA, UMTS, EV-DO)



% 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

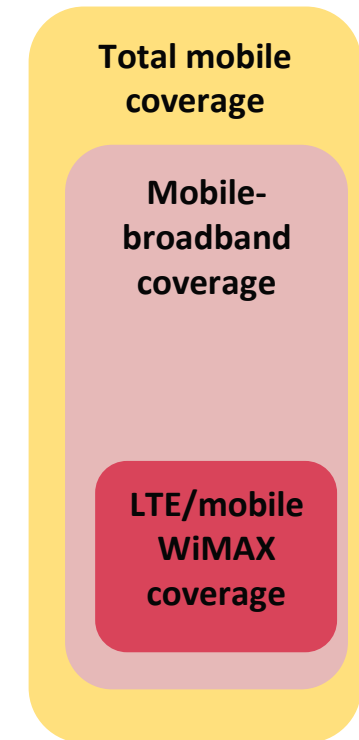
Mobile-
broadband
coverage
(3G)



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

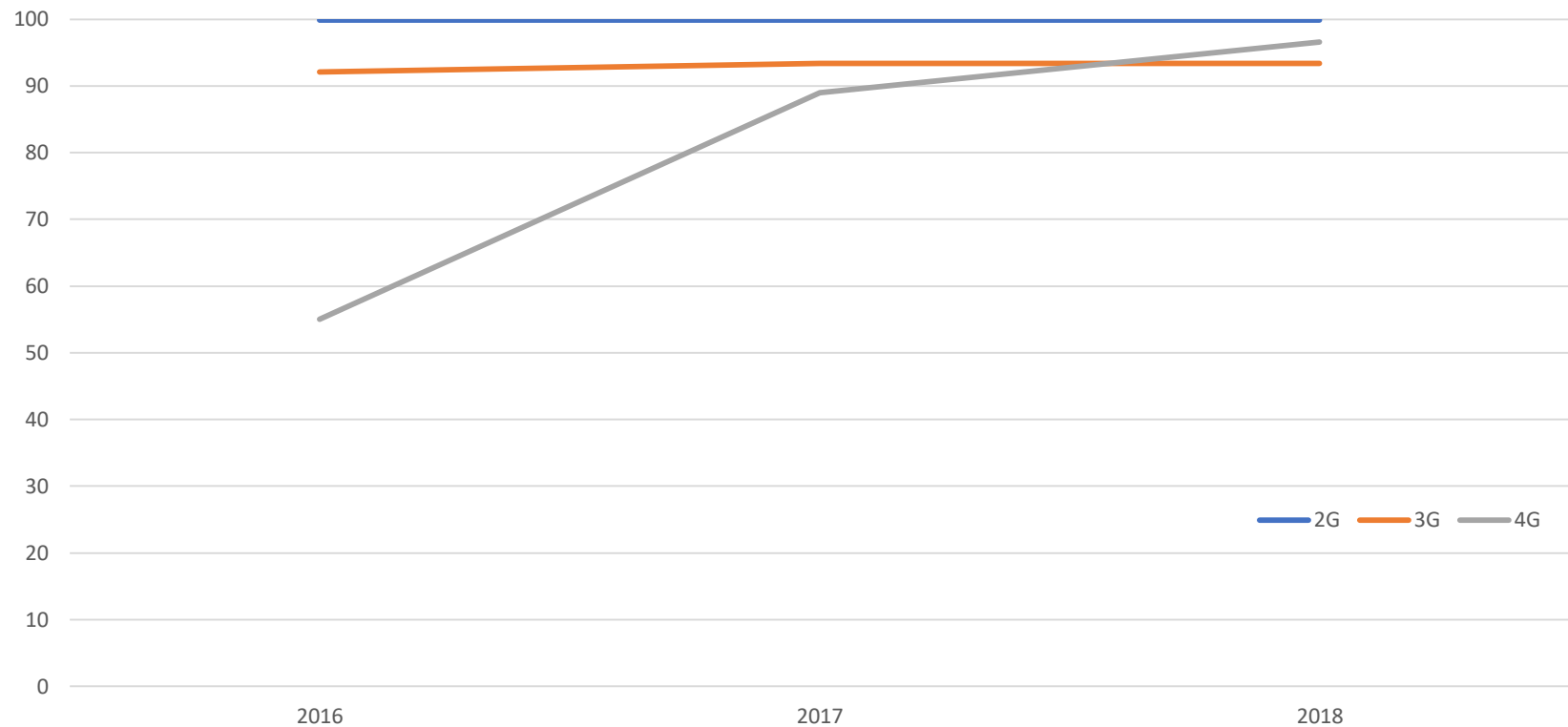
Percentage of inhabitants that live within range of **LTE/LTE-Advanced, mobile WiMAX/WirelessMAN** or other more advanced mobile-cellular networks, **irrespective of whether or not they are subscribers.**

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





Percentage of the population covered by a mobile cellular network, Rwanda





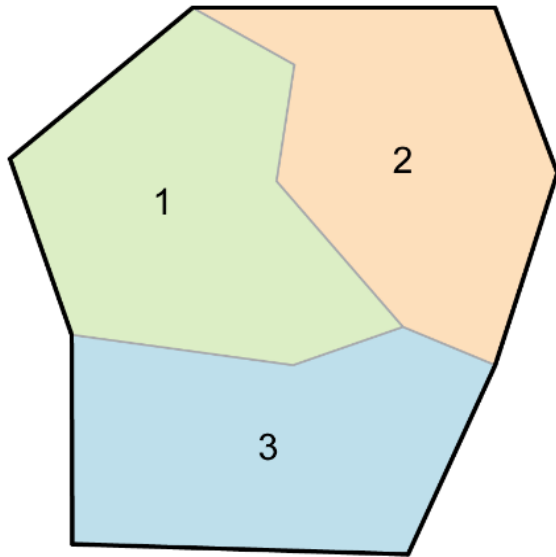
Mobile coverage – *methodology*

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: *aggregation*



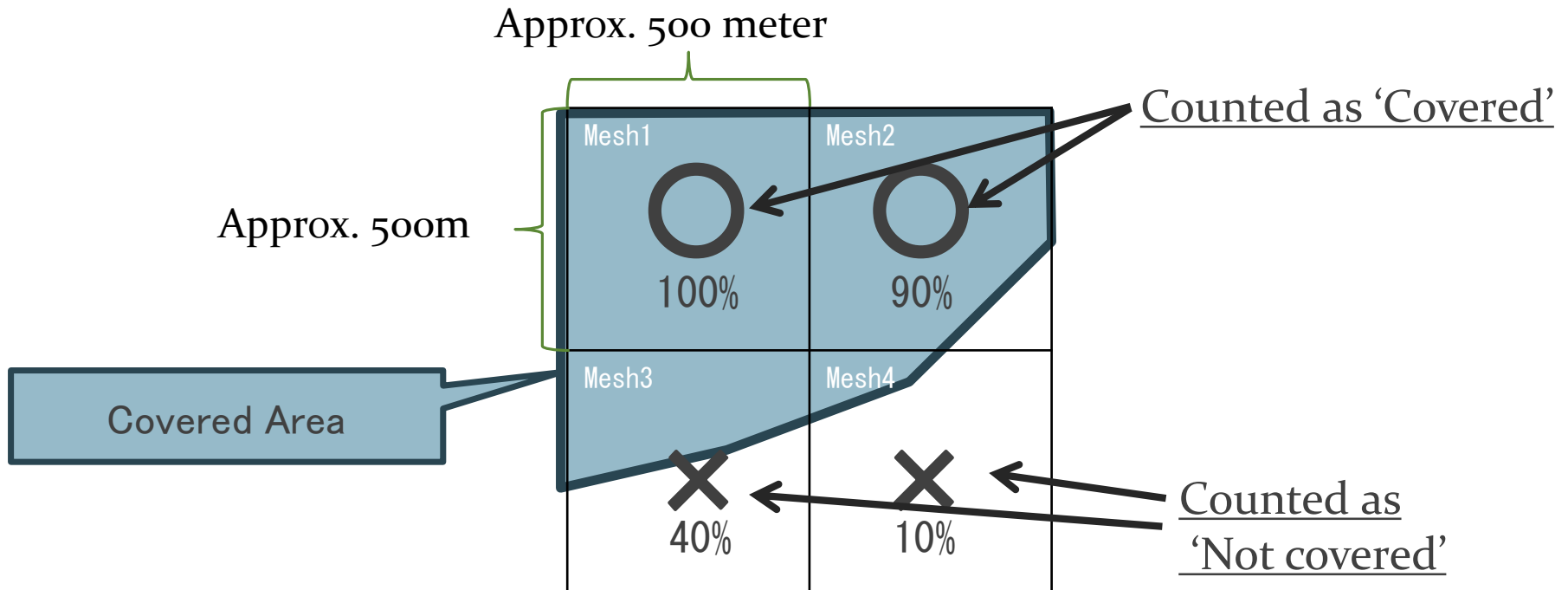
	Op 1	Op 2	Op 3
Region 1 (75% pop)	80%	80%	80%
Region 2 (25% pop)	50%	60%	70%
Region 3 (0% pop)	80%	80%	80%

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

Mobile coverage – methodology

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

Example of Japan:



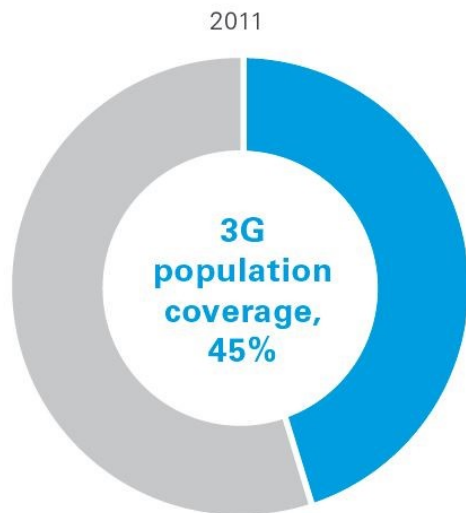
SDG indicator

SDG Goal	SDG Target	ICT indicator
 <p>Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation</p>	<p><u>Target 9.c:</u> Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020</p>	<p>Percentage of the population covered by a mobile network, broken down by technology (ITU)</p>

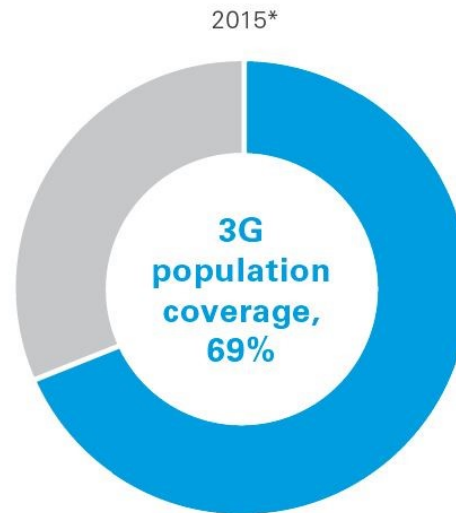
SDG indicator

Population covered by a 3G mobile network Target 9.c (universal access to ICT)

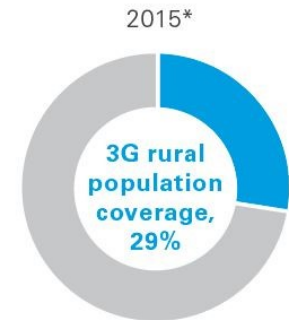
3G mobile-broadband coverage is extending rapidly and into the rural areas



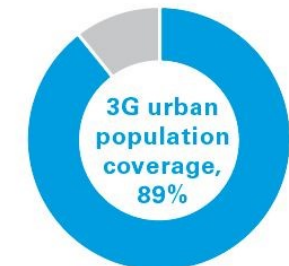
World population 7 billion



World population 7.4 billion



World rural population 3.4 billion

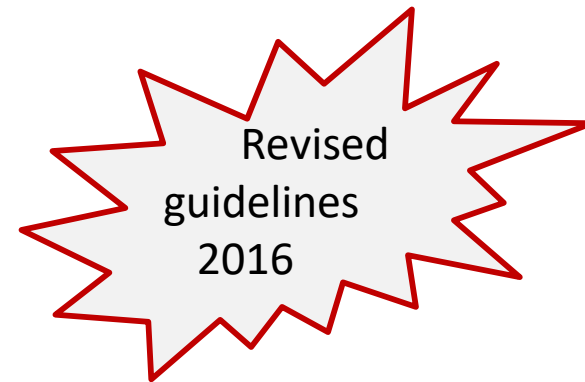


World urban population 4 billion

■ No 3G population coverage
■ 3G population coverage

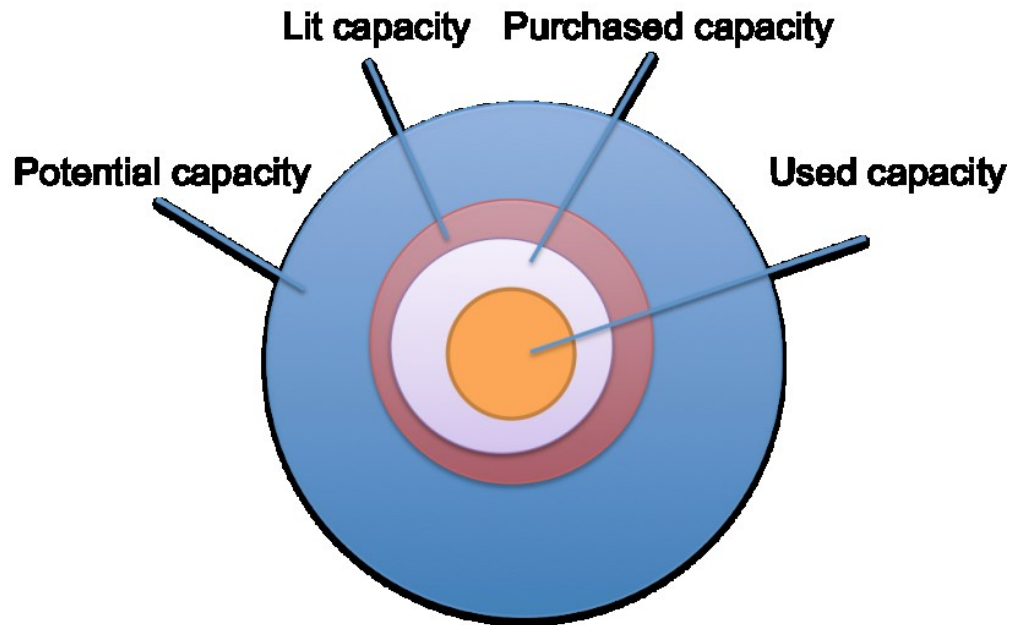
Main ITU indicators from administrative sources

International bandwidth indicators



International bandwidth

Capacity of fibre-optic networks



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, ...)

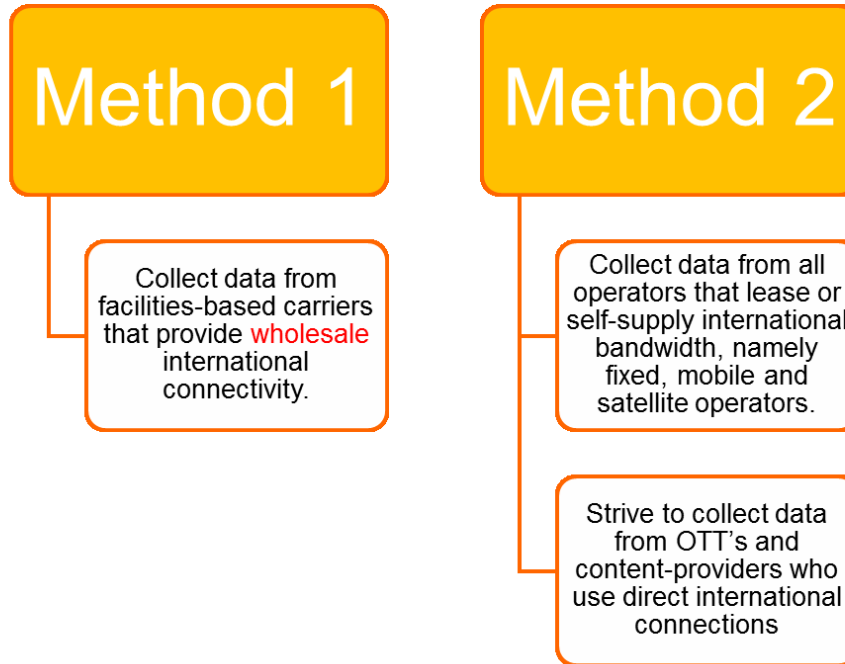


- National traffic not included !



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

Methods of data collection



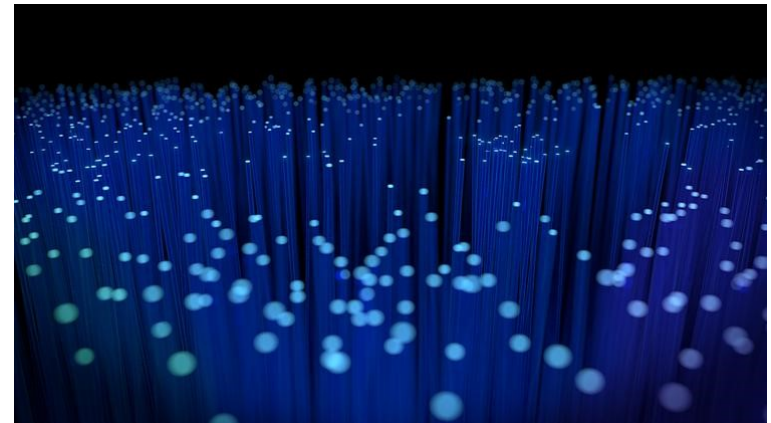
BEWARE OF DOUBLE COUNTING

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

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

Lit/equipped international Internet bandwidth, in Mbit/s

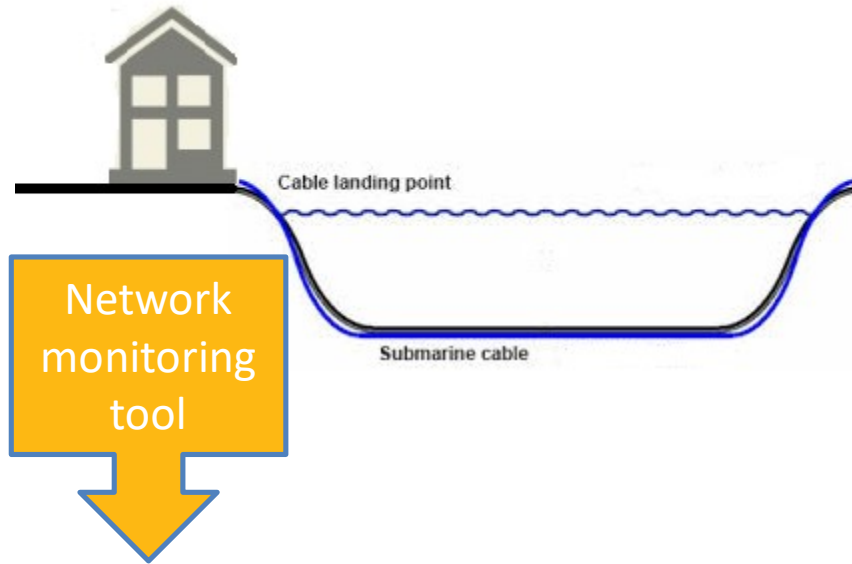
Total lit/equipped international bandwidth capacity refers to the **total lit/equipped capacity of international links**, namely fiber-optic cables, international radio links and satellite uplinks to orbital satellites in the end of the reference year (expressed in Mbit/s). **If the traffic is asymmetric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



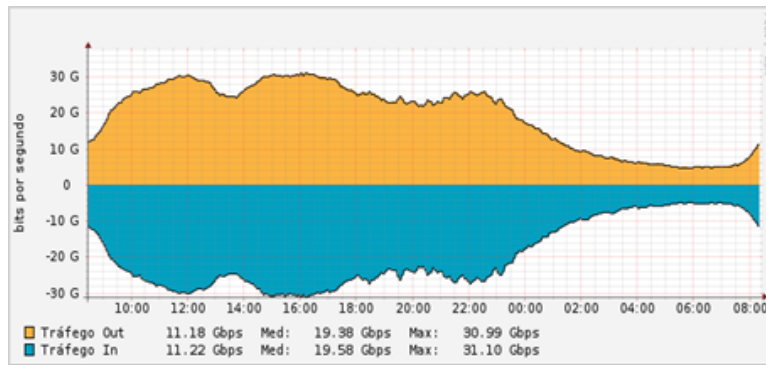
Lit/ equipped international capacity



- It excludes unused, reserve or 'design' capacity
- Lit/equipped international bandwidth of operators owning and operating international links (**self-supply**) should be included as well as international bandwidth capacity of **leased or contracted** international links by service providers.



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

Thank you



For more information
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