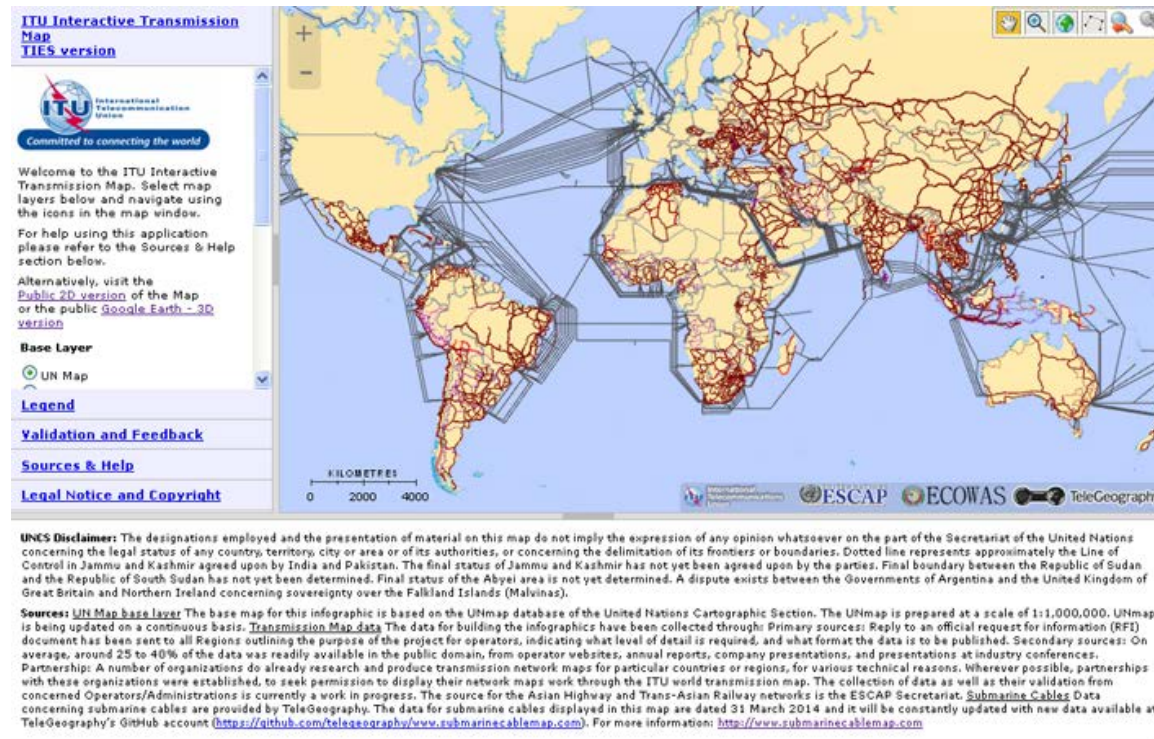


# ITU Interactive Terrestrial Transmission Map



**ITU Interactive Transmission Map**  
TIES version

**ITU** International Telecommunication Union  
Committed to connecting the world

Welcome to the ITU Interactive Transmission Map. Select map layers below and navigate using the icons in the map window.

For help using this application please refer to the Sources & Help section below.

Alternatively, visit the [Public 2D version of the Map](#) or the public [Google Earth - 3D version](#)

**Base Layer**  
UN Map

**Legend**

**Validation and Feedback**

**Sources & Help**

**Legal Notice and Copyright**

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# Introduction

- With the landing of submarine cables in many countries and the expansion of national and cross-border fiber backbone networks in addition to mobile and wireless services, **broadband connectivity is achieving significant progress**
- Creating online Interactive Terrestrial (Optical Fibers and Microwaves) Transmission Maps will serve as a **powerful tool for all concerned stakeholders for facilitating the development of the Broadband connectivity worldwide**
- Thanks to collaboration between ITU and Regional Organization as well as all related Stakeholders, **it was finalized and released an authoritative, cutting-edge ICT-data mapping platform to take stock of national backbone connectivity** as well as of other key metrics of the ICT sector
- **Data collection for building the online Interactive Terrestrial (Optical Fibers and Microwaves) Transmission Maps is performed with the contribution of concerned operators and Administrations** through a public and transparent validation process

# Project Scope

- Research + processing + creation of maps of core terrestrial transmission networks for the following ITU regions:
  - ✦ Arab region
  - ✦ CIS region
  - ✦ Asia Pacific region
  - ✦ North America region
  - ✦ Latin America and the Caribbean region
  - ✦ Africa region
- Maps will be published in various ITU documents and reports, and in 2D and 3D web map formats
- Indicators derived from the map can be published through the map itself and in various ITU publications

**Source:** Framework and Methodology for ITU World Terrestrial Transmission Map Project – 3rd March 2013

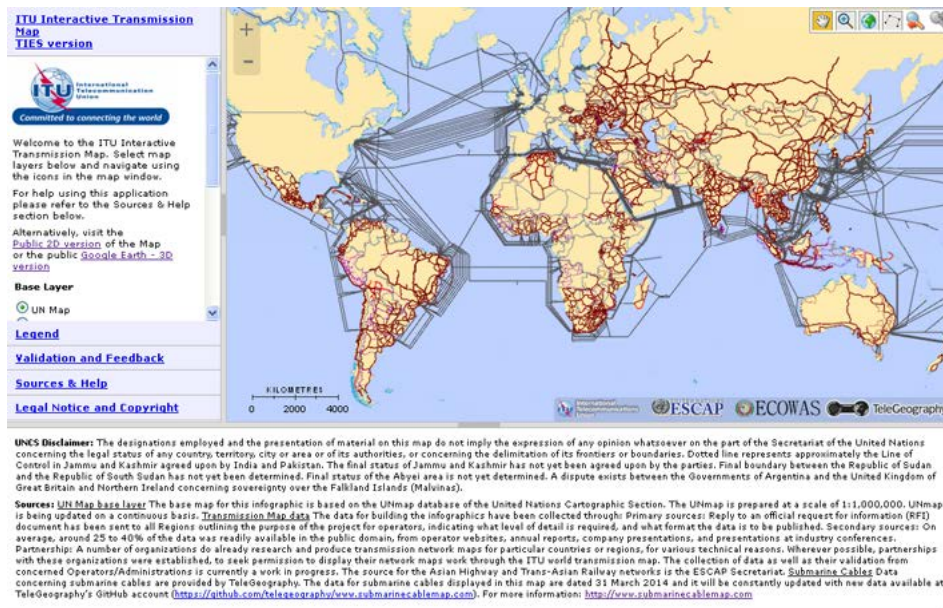
# Product Advantages (1)

- **Demonstrating ICT connectivity current status around the globe** + monitoring their evolution over time
- **Providing accessible multi-criteria analysis** based on robust and reliable evidence
- **Empowering network planners, policy makers and regulators from developing countries with tools to assess the status of national connectivity and to identify gaps**
  - ➔ possibility to design targeted strategies and implementation programs that expand the reach and increase the use of broadband

## Product Advantages (2)

- **Providing industry with a powerful tool to assess market opportunities** = management tool for :
  - making investment decisions
  - promoting broadband
  - achieving universal connectivity
- **Offering an informed insight to abundant, current data on global ICT connectivity** to all interested stakeholders

# Introduction



## Broadband Transmission Capacity Indicators

Underneath the map is a database, containing records of each individual link. The following indicators are either compiled or calculated from this database:

**Indicator 1: Transmission network length (Route kilometres)**

**Indicator 2: Node locations**

**Indicator 3: Equipment type of terrestrial transmission network**

**Indicator 4: Network capacity (bit rate)**

**Indicator 5: Number of optical fibres within the cable**

**Indicator 6: Operational status of the transmission network**

**Indicator 7a: Percentage of population within reach of transmission networks**

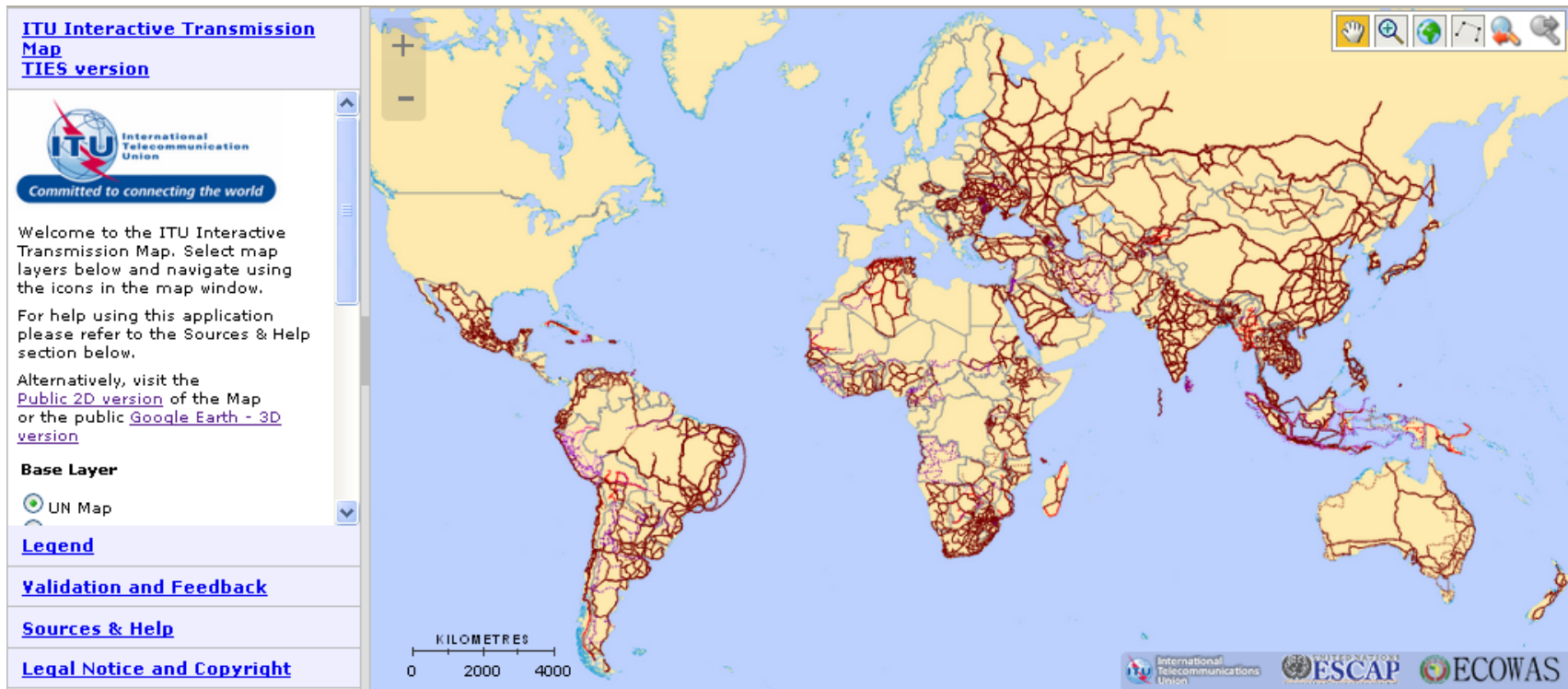
**Indicator 7b: Percentage of area within reach of transmission networks**

**1) Purpose:** To quantify supply-side indicators for the reach of broadband networks.

**2) Research:** Desk research, primary research in conjunction with ITU Regional Offices, and working with partner organisations.

**3) Validation:** The map is validated by network operators and administrations through the ITU Regional Offices and recorded in the Validation Framework.

**4) Outputs:** Broadband Capacity Indicators.



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**ITU Interactive Transmission Map Research Status: March 2014**

Region	CIS	ARB	AFR	ASP	LAC	EUR	Total
<b>Operators</b>	21	17	21	41	54	20	<b>174</b>
<b>Links</b>	1,524	726	1,642	3,288	2,870	877	<b>10,927</b>
<b>Nodes</b>	970	591	1,442	2,528	2,294	596	<b>8,421</b>
<b>Broadband Capacity Indicators</b>							
<b>Countries</b>	11	12	17	30	31	n.a.	<b>101</b>
<b>Total</b>	12	21	44	38	33	43	<b>191</b>
<b>Route Kms</b>	331,299	94,286	145,931	407,609	260,315	45,157	<b>1,284,597</b>
<b>Total Kms</b>	464,551	197,272	358,721	10,248,028	712,984	45,157	<b>12,026,713</b>
<b>Population within range of operational fibre node (millions)</b>							
<b>10-km</b>	85.5	61.1	76.4	488.6	168.7	n.a.	<b>880.1</b>
<b>25-km</b>	170.3	144.2	163.1	1,338.6	344.2	n.a.	<b>2,160.2</b>
<b>50-km</b>	218.0	203.9	237.0	2,349.6	437.9	n.a.	<b>3,446.3</b>

Partnership: A number of organizations do already research and produce transmission network maps for particular countries or regions, for various technical reasons. Wherever possible, partnerships with these organizations were established, to seek permission to display their network maps work through the ITU world transmission map. The collection of data as well as their validation from concerned Operators/Administrations is currently a work in progress. The source for the Asian Highway and Trans-Asian Railway networks is the ESCAP Secretariat. [Submarine Cables](#) Data concerning submarine cables are provided by TeleGeography. The data for submarine cables displayed in this map are dated 31 March 2014 and it will be constantly updated with new data available at TeleGeography's GitHub account (<https://github.com/telegeography/www.submarinecablemap.com>). For more information: <http://www.submarinecablemap.com>



**ITU Interactive Transmission Map**



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Alternatively, visit the [Google Earth version](#) - 3D version

**Base Layer**

- UN Map
- Natural Earth
- Population density

**Overlays**

- Range to Nodes
- Asian Highway
- Trans-Asian Railway
- World Transmission Links
- Transmission Labels


**Line data**

Measure distances on the map using the ruler icon in the top-right hand corner of the map window.

[Legend](#)

[Sources & Help](#)

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Click this link to launch the 3D version of the map, using the Google Earth plugin

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## ITU Interactive Transmission Map 3D version



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For help using this application please refer to the Sources & Help section below.

Return to the [2D version](#)  
[TIES users](#) may log in using the [TIES version](#)

- ITU Transmission Map
- Range to Nodes
- Population Density
- Submarine Cables

### Legend

### Sources & Help


### Legal Notice and Copyright



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ITU Transmission Map  
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# Indicators generation

- Indicators are produced at the country or regional level, and in annual intervals
  - ➔ track changes in terrestrial transmission networks deployment of over time
- List of indicators
  - ➔ fiber optic cable length (Route kilometers)
  - ➔ Node locations
  - ➔ Equipment type of terrestrial transmission network
  - ➔ Network capacity per channel (bit rate)
  - ➔ Number of optical fibers within the cable
  - ➔ Operational status of transmission network
  - ➔ Percentage of population within reach of transmission networks

**Source:** Framework and Methodology for ITU World Terrestrial Transmission Map Project – 3rd March 2013

# Data Collection (1)



## ■ **Primary sources: Operators**

An official request for information (RFI) document is drafted outlining the purpose of the project for operators and indicating:

- Required details level
- format of data to be published in

## ■ **Secondary sources**

- On average around 25 – 40% of the data is readily available in the public domain (operator websites, annual reports, company presentations, presentations at industry conferences...)
- Presentations made at ITU workshops and events, some of which may not be publicly available (restricted to TIES users)

**Source:** Framework and Methodology for ITU World Terrestrial Transmission Map Project – 3rd March 2013

# Data Collection (2)

## ■ **Partnership**

- It is beneficial to seek partnership with organizations having already do research and produce transmission network maps for particular countries or regions, for various technical reasons
- Seeking permission to display organizations network maps work through the ITU world transmission map

## ■ **Feedback Loop**

- Gathering information when operators provide feedback on maps which have been published
- Both positive and negative feedback is useful



**Source:** Framework and Methodology for ITU World Terrestrial Transmission Map Project – 3rd March 2013

# Maps Validation



- Operators are the only organizations which are capable of validating (or invalidating) maps of their own network infrastructure
- In the case of non-response from a network operator regarding information which is readily available in the public domain, it may be possible that regulatory authorities are able to validate or invalidate the information
- **Validation process** : ITU Regional Office is asked to :
  - ◆ notify the operators that the map of their network has been added to the regional map
  - ◆ invite them to log in to TIES to check and validate the network, and send a confirmation that they have no objection for this information to be included

**Source:** Framework and Methodology for ITU World Terrestrial Transmission Map Project – 3rd March 2013

# Validation – TIES Password Protected Map and Validation Framework

**ITU Interactive Transmission Map**  
**TIES version**

UN Map  
 Natural Earth  
 Population Density

**Overlays**

Range to Nodes  
 Asian Highway  
 Trans-Asian Railway  
 Validation Status  
 World Transmission Links  
 Transmission Labels  
 Submarine Cables  
 Submarine Cable Data

**Line data**

**Legend**

**Validation and Feedback**

**Sources & Help**

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# Validation – TIES Password Protected Map and Validation Framework

**ITU Interactive Transmission Map**  
TIES version

**Legend**

**Validation and Feedback**

**Validation**

We use a simple traffic light system to show the status of each piece of network infrastructure. To display the current status of a particular network link, enable the 'Validity' layer checkbox. For a detailed description of the traffic light symbology, please refer to the [validation framework](#).

**Feedback**

If you notice that a line needs to be added or corrected, or other edits made to the map, please use the line sketch tool in the toolbar to add new lines on to the map. Then print screen, paste into an email and [send to the ITU](#) to be corrected in the map. Additions which are sketched on to the map in this way are only temporarily stored in your browser.

**Sources & Help**

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Click this link here to open the Validation Framework, or go to <https://www.itu.int/itu-d/tnd-map/validation/>

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# Validation – TIES Password Protected Map and Validation Framework

## ITU Interactive Transmission Map – Validation

VALIDATION HOME TRANSMISSION MAP LATEST ACTIVITY USER GUIDE INDICATORS RESEARCH STATUS

### Validation Procedure

A simple traffic light system is used to indicate the validation status of each piece of network infrastructure shown in the map. In order to see the current status of any line on the map, select the 'Validation Status' checkbox in the map layers panel. Each transmission line falls under one of the four categories: RED, AMBER, GREEN or PUBLIC. The objective of the validation exercise is to engage network operators and administrations to verify the accuracy and integrity of the data, whilst it remains visible (albeit protected) behind TIES. As the status will progress from either RED, AMBER or GREEN through to light green, for a detailed description of this classification, please scroll to the bottom

Type the name of operator or country into the search box

 Search

### COUNTRIES

- [Afghanistan](#) [Algeria](#) [Angola](#) [Antigua & Barbuda](#) [Argentina](#) [Armenia](#)
- [Australia](#) [Azerbaijan](#) [Bahamas](#)
- [Bahrain](#) [Bangladesh](#) [Barbados](#) [Belarus](#)
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- [French Guiana \(France\)](#) [Gambia \(the\)](#)
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- [Nigeria](#) [Oman](#) [Pakistan](#) [Palau](#)

Navigate by country

### To change validation status

**1. Check your network on the map.** Go to the [ITU Interactive Transmission Map](#) and check the information shown for your network. The map layer called Validation Status indicates whether this network is classified as RED, AMBER, GREEN or PUBLIC (see below). If you hover your mouse over any line, a small image of the source material used to draw the map appears in the left hand side. Click this image to go through to the homepage for that network operator.

**Overlays**

- Population density
- Range to Nodes
- Validation Status
- World Transmission
- Labels
- Operator Data



Navigate by Validation Status

Or navigate by Region

# Validation – TIES Password Protected Map and Validation Framework

**ITU Interactive Transmission Map TIES version**

- Transmission Labels
- Submarine Cables
- Submarine Cable Data

**Line data**  
 Operator: Telkom  
 From: Semarang  
 To: Surabaya  
 Distance: 243.59 km

**Legend**

**Validation and Feedback**

**Sources & Help**

**Legal Notice and Copyright**

Click the small image of the source material which appears in order to go directly to the homepage for this network operator in the validation framework

Alternatively, hover your mouse over a link, and the technical details of that link appear in the toolbar on the left

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**Sources:** UN Map base layer The base map for this infographic is based on the UNmap database of the United Nations Cartographic Section. The UNmap is prepared at a scale of 1:1,000,000. UNmap is being updated on a continuous basis. Transmission Map data The data for building the infographics have been collected through: Primary sources: Reply to an official request for information (RFI) document has been sent to all Regions outlining the purpose of the project for operators, indicating what level of detail is required, and what format the data is to be published. Secondary sources: On average, around 25 to 40% of the data was readily available in the public domain, from operator websites, annual reports, company presentations, and presentations at industry conferences. Partnership: A number of organizations do already research and produce transmission network maps for particular countries or regions, for various technical reasons. Wherever possible, partnerships with these organizations were established, to seek permission to display their network maps work through the ITU world transmission map. The collection of data as well as their validation from concerned Operators/Administrations is currently a work in progress. The source for the Asian Highway and Trans-Asian Railway networks is the ESCAP Secretariat. Submarine Cables Data concerning submarine cables are provided by TeleGeography. The data for submarine cables displayed in this map are dated 31 March 2014 and it will be constantly updated with new data available at TeleGeography's GitHub account (<https://github.com/telegeography/www.submarinecablemap.com>). For more information: <http://www.submarinecablemap.com>

# Validation – TIES Password Protected Map and Validation Framework

## ITU Interactive Transmission Map – Validation

VALIDATION HOME TRANSMISSION MAP LATEST ACTIVITY USER GUIDE INDICATORS RESEARCH STATUS

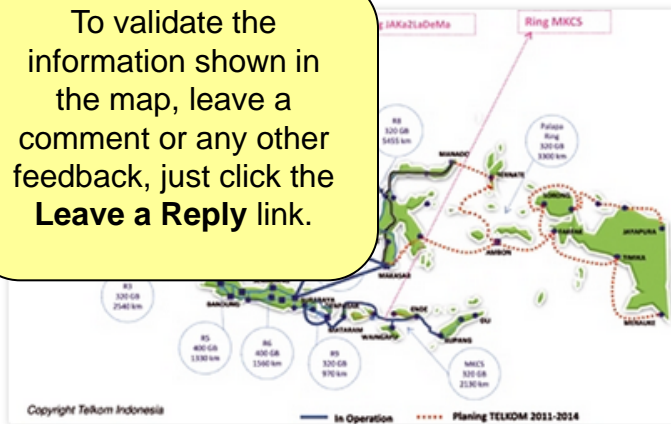
Indonesia: Telkom Indonesia

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Source: [Telekomunikasi Indonesia \(Telkom\)](http://www.telkom.co.id/download/File/2011/20111005/Presentasi/Investor_Summit_2011_20111005_final.pdf), 2011. [http://www.telkom.co.id/download/File/2011/20111005/Presentasi/Investor\\_Summit\\_2011\\_20111005\\_final.pdf](http://www.telkom.co.id/download/File/2011/20111005/Presentasi/Investor_Summit_2011_20111005_final.pdf)

To validate the information shown in the map, leave a comment or any other feedback, just click the **Leave a Reply** link.



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# Validation – TIES Password Protected Map and Validation Framework

Each link in the map is given a validation status.

We use a simple traffic light system:

**ITU Interactive Transmission Map**

**Legend**

**UN map**

- International Boundary
- Other Lines of Separation
- Capital City
- Other Major City

**Transmission Networks**

- Fibre Optic Cable - Operational
- Fibre Optic Cable - Under Constr.
- Fibre Optic Cable - Planned
- Fibre Optic Cable - Proposed
- Microwave - Operational
- Microwave - Planned

**Validation Status**

- Validation - Red Traffic Light
- Validation - Amber Traffic Light
- Validation - Green Traffic Light
- Validation - Public

**Range from Fibre Node**

- 10-km
- 25-km
- 50-km

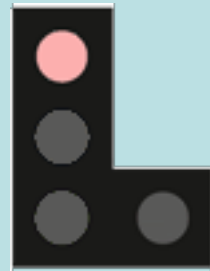
**Population Density**

- 0 persons per sqkm
- > 1000

**Validation and Feedback**

**Sources & Help**

**Legal Notice and Copyright**



**Red:** Information was sourced from a restricted document (for example on TIES), a potentially unreliable publicly available source (such as a third party), may contain information which is confidential or regarded as sensitive by the network operator, and/or is very old and could be out of date (if it is more than 3-5 years old). Information must be validated by network operator or stakeholder to provide clearance that the information is correct, up-to-date, and is not confidential.



**Amber:** Information was not taken from a publicly available source, may be unreliable because of difficulties reading or interpreting the source material, and/or may be old and out of date. Operator is asked to provide clearance that the information is correct, up-to-date, and is not confidential.



**Green:** Information was sourced from an authentic, reliable publicly available source (such as a company website, annual report, presentation, or other publication), and has been deliberately put into the public domain by the network operator or administration (it is therefore not confidential). The information is current and correct, and there is no reason why a public version could not be put into the public domain.



**Public:** Information has been actively checked and validated by stakeholder through the TIES interactive web map platform, specifically granting permission for this information to be put into the public domain.

# Indicators

## ITU Interactive Transmission Map – Validation

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### Indicators



#### Broadband Capacity Indicators

[Indicator 1: Transmission network length \(Route kilometres\)](#)

[Indicator 7a: Population within reach of transmission networks](#)

[Indicator 7b: Area within reach of transmission networks](#)

#### Indicator Definitions

Indicator 1: **Transmission network length (Route kilometers)**

**Definition:** *Transmission network length* refers to the physical length of fibre optic cable in a network irrespective of the number of optical fibres contained within the constituent cables of that network (see Indicator 5: Cable structure), and can also be applied to microwave terrestrial networks. It is expressed in route kilometres (route-kms).

**Clarifications and scope:** Transmission network length (Route kilometers) can also be applied to microwave terrestrial transmission networks in order to enable comparison on a like-for-like basis, even though the number of microwave 'hops' is also used (a 'hop' is the point-to-point link between one microwave radio antenna and the next, for example there are four 'hops' between five microwave radio antenna sites deployed in series).

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# Indicators

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### Indicator 1: Route Kilometres

 Search

#### Indicator 1: Transmission network length (Route kilometres)

Show 25 entries

Search:

COUNTRY	REGION	ROUTE KMS	OPERATORS
Angola	AFR	7,000	Angola Cables
Benin	AFR	1,694	Benin Telecom SA, Phase 3 Telecom
Botswana	AFR	5,000	Botswana Telecom
Burkina Faso	AFR	1,300	ONATEL
Burundi	AFR	417	Burundi Backbone System
Cameroon	AFR	5,141	CAMTEL
Cape Verde	AFR	1,500	Cape Verde Telecom
Central African Rep.	AFR	287	Socatel
Chad	AFR	830	SITCOM-CHAD

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### Indicator 7a: Population within reach of transmission networks

Show  entries

Search:

COUNTRY	REGION	10-KM	25-KM	50-KM	10-KM	25-KM	50-KM
Honduras	AMS	1.43	3.8	20.46	115,703	307,447	1,657,067
Jamaica	AMS	46.88	98.94	100	1,305,141	2,754,459	2,783,888
Mexico	AMS	42.11	87.56	96.62	51,514,216	107,111,682	118,201,654
Nicaragua	AMS	36.51	67.54	82.31	2,220,022	4,106,596	5,005,044
Panama	AMS	16.32	39.6	53.76	630,700	1,530,232	2,077,326
Paraguay	AMS	45.66	72.79	86.73	3,105,673	4,951,254	5,899,691
Peru	AMS	36.71	56.51	64.29	11,152,145	17,164,099	19,527,857
St. Kitts and Nevis	AMS	47.55	95.33	100	25,767	51,659	54,191
St. Lucia	AMS	38.12	89.63	100	69,477	163,370	182,273

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# Indicators

## ITU Interactive Transmission Map - Validation

- VALIDATION HOME
- TRANSMISSION MAP
- LATEST ACTIVITY
- USER GUIDE
- INDICATORS
- RESEARCH STATUS**

### Research Status

This table shows the research, production and validation status of each network operator. Filter the map by clicking on the up and down arrows to sort by research, production or validation status. This table is updated at the end of each month. Last Updated: **8 November 2013**.

The Research Status table is updated at the end of each month

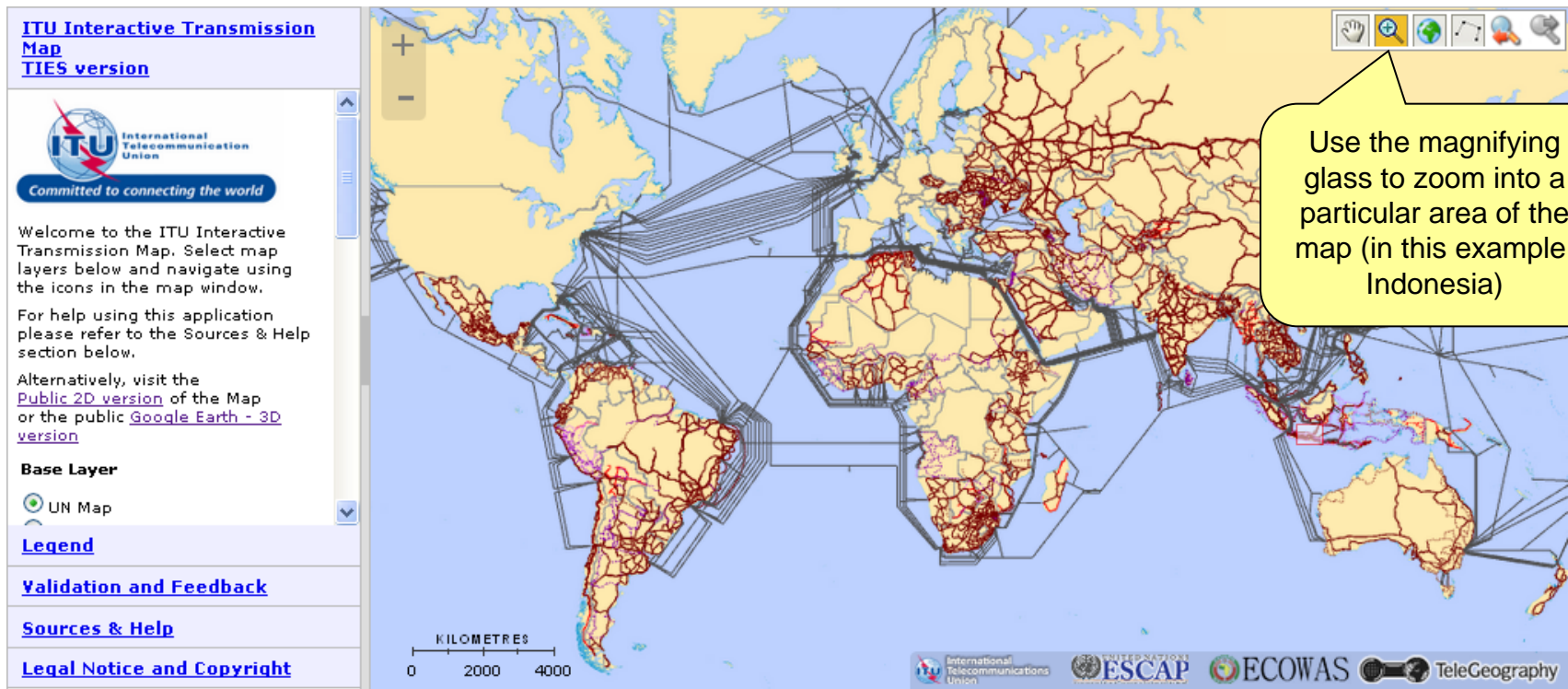
Show  entries

Search:

COUNTRY	REGION	OPERATOR	DATA	PUBLIC	RFI	ADDED	MAP	STATUS	VALID
Russia	CIS	<a href="#">Synterra</a>	Y	Y	0	Y	Y	Public	Y
Tajikistan	CIS	<a href="#">Tajik Telecom</a>	Y	Y	0	Y	Y	Public	Y
Turkmenistan	CIS	<a href="#">Turkmentelecom</a>	Y	Y	0	Y	Y	Public	Y
		<a href="#">Atracom</a>	Y	Y	0	Y	Y	Public	Y
		<a href="#">UkrTelecom</a>	Y	Y	0	Y	Y	Public	Y
		<a href="#">Uztelekom</a>	Y	Y	0	Y	Y	Public	Y

Click link here to go through to the operators homepage

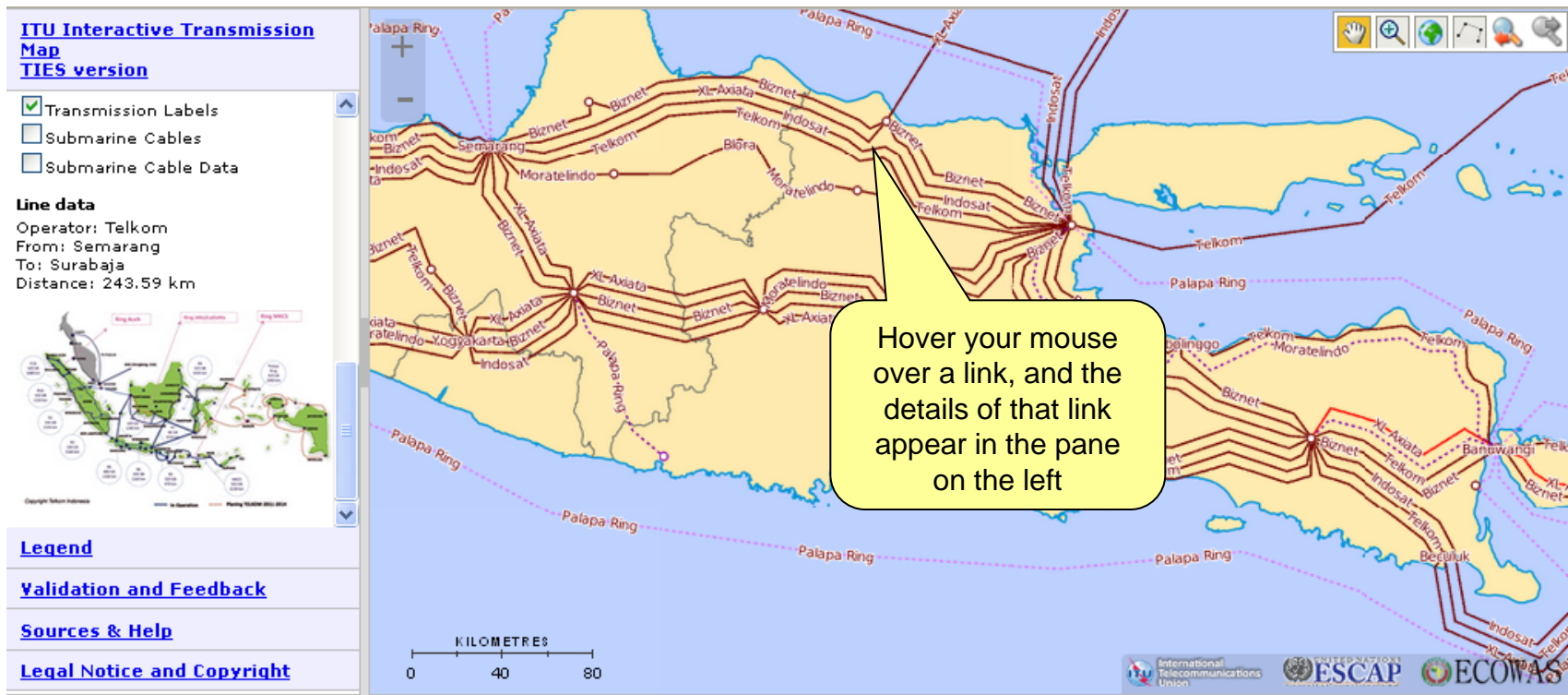
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Use the magnifying glass to zoom into a particular area of the map (in this example, Indonesia)

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Hover your mouse over a link, and the details of that link appear in the pane on the left

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# ITU Interactive Transmission Map – Validation

VALIDATION HOME TRANSMISSION MAP LATEST ACTIVITY USER GUIDE INDICATORS RESEARCH STATUS

## Indonesia: Telkom Indonesia

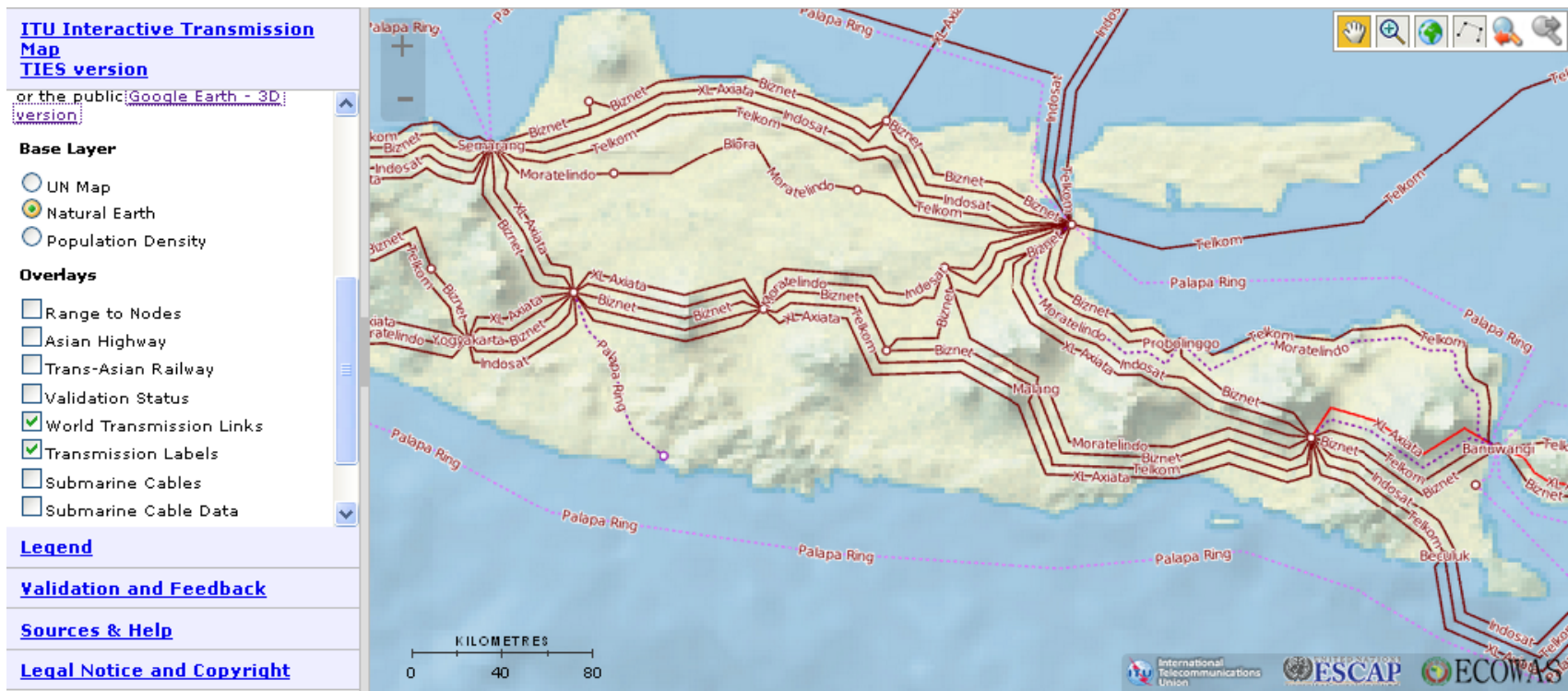
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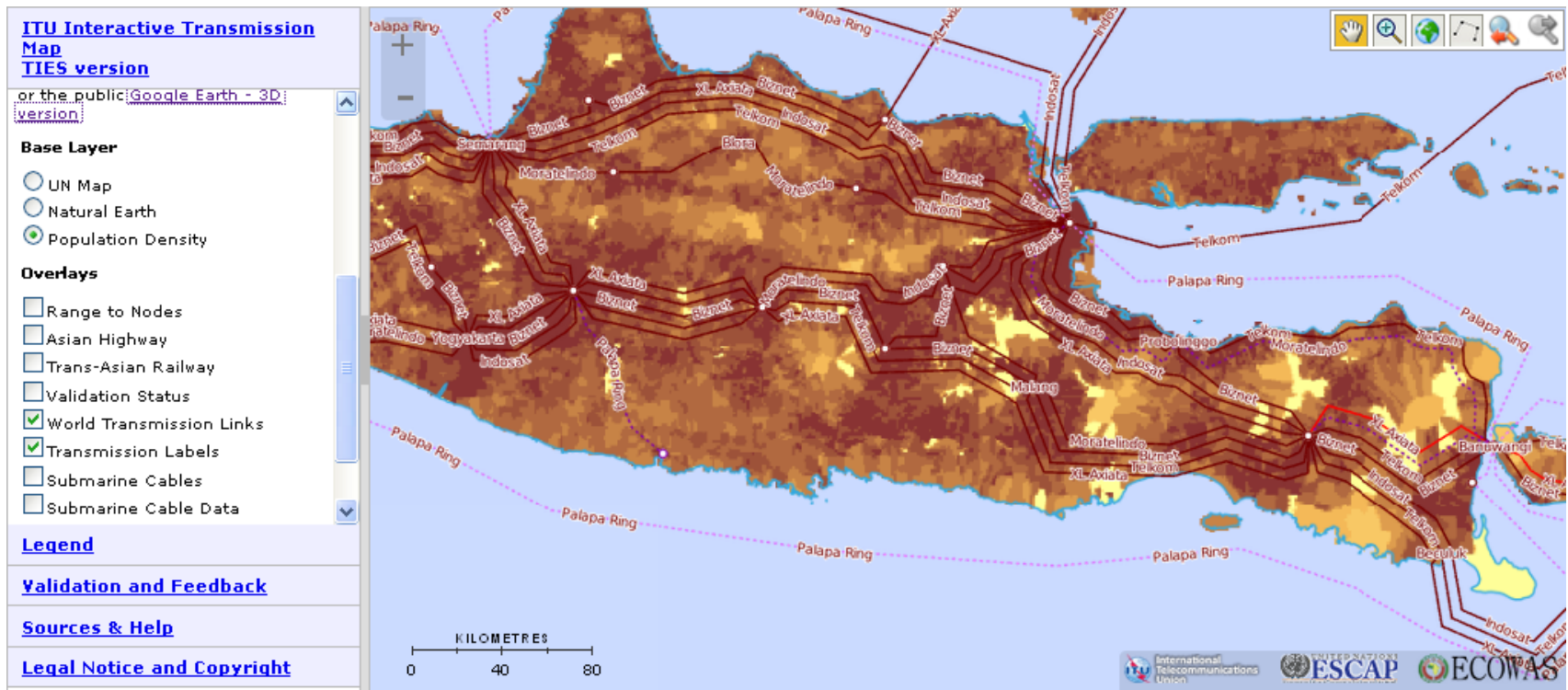
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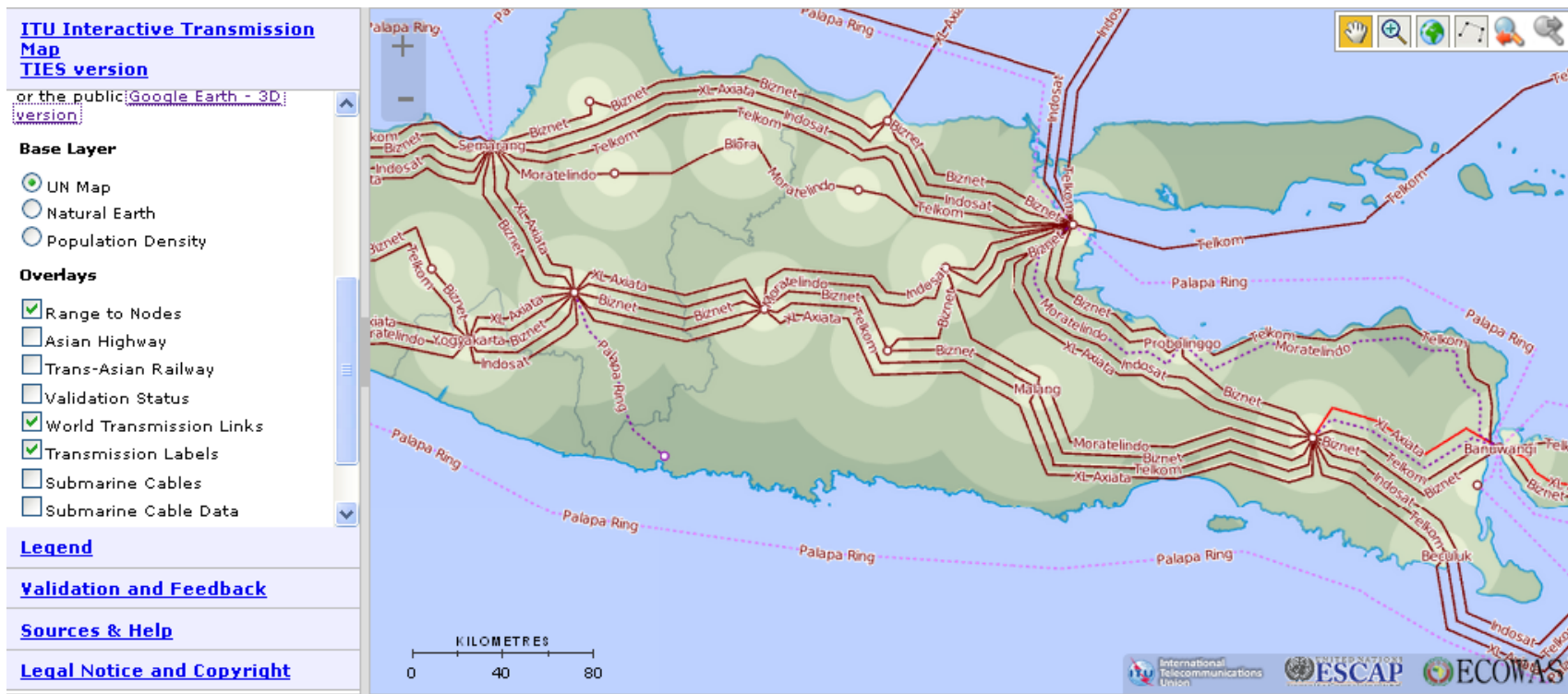
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**Sources:** [UN Map base layer](#) The base map for this infographic is based on the UNmap database of the United Nations Cartographic Section. The UNmap is prepared at a scale of 1:1,000,000. UNmap is being updated on a continuous basis. [Transmission Map data](#) The data for building the infographics have been collected through: Primary sources: Reply to an official request for information (RFI) document has been sent to all Regions outlining the purpose of the project for operators, indicating what level of detail is required, and what format the data is to be published. Secondary sources: On average, around 25 to 40% of the data was readily available in the public domain, from operator websites, annual reports, company presentations, and presentations at industry conferences. Partnership: A number of organizations do already research and produce transmission network maps for particular countries or regions, for various technical reasons. Wherever possible, partnerships with these organizations were established, to seek permission to display their network maps work through the ITU world transmission map. The collection of data as well as their validation from concerned Operators/Administrations is currently a work in progress. The source for the Asian Highway and Trans-Asian Railway networks is the ESCAP Secretariat. [Submarine Cables](#) Data concerning submarine cables are provided by TeleGeography. The data for submarine cables displayed in this map are dated 31 March 2014 and it will be constantly updated with new data available at TeleGeography's GitHub account (<https://github.com/telegeography/www.submarinecablemap.com>). For more information: <http://www.submarinecablemap.com>



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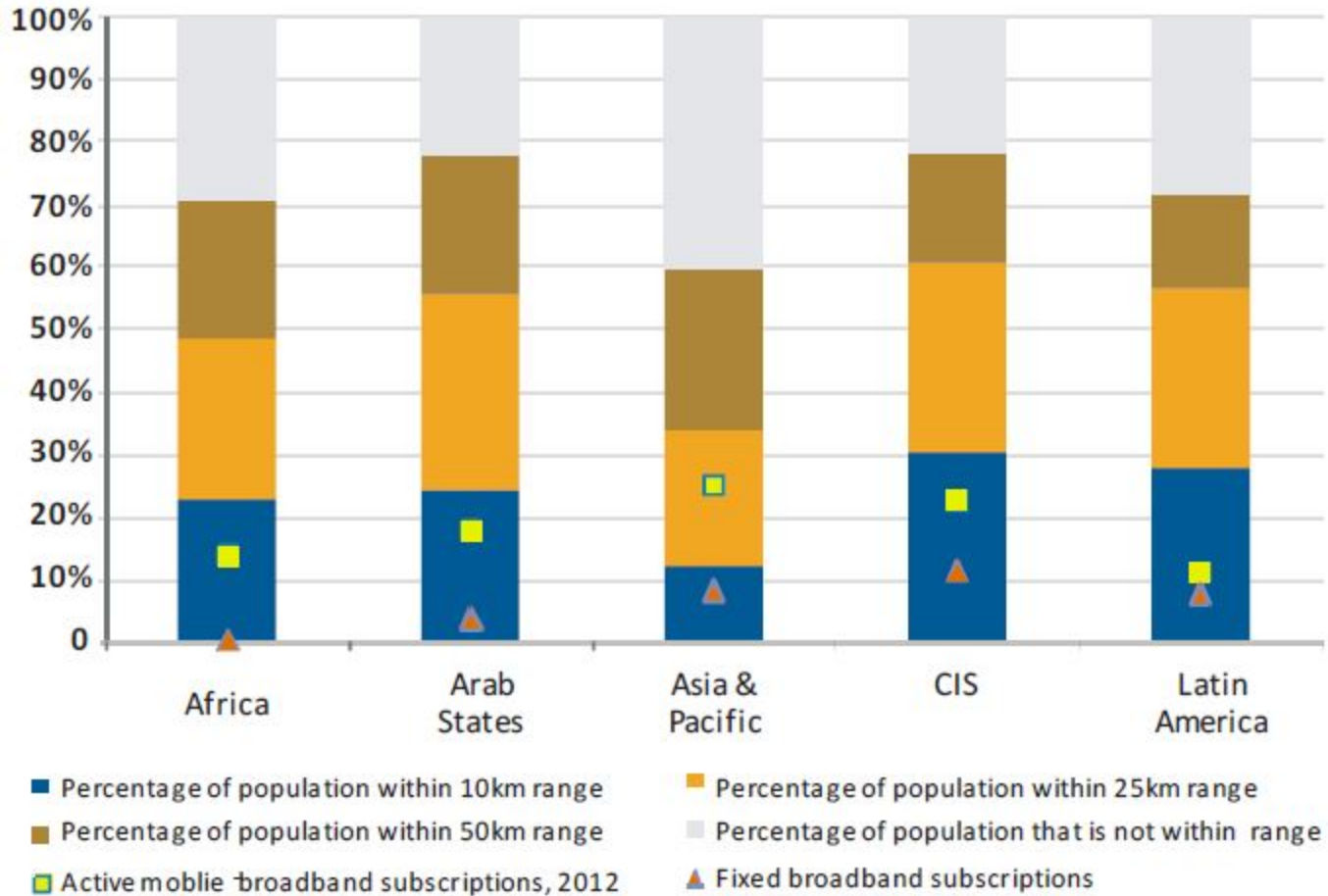
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**Chart: Status of backbone connectivity and take up of data services, selected services, 2013**





# Conclusion

- The creation of a Interactive Terrestrial (Optical fibers and Microwave) Transmission Map **would be beneficial for all broadband actors (operators, policy makers, regulators...)** especially in developing countries
- **This map will constitute an important reference work that allows the generation of useful and meaningful indicators of broadband supply**
- **The development of such map requires the contribution of operators and telecom organizations all over the world** that will be involved in the data collection and/or validation process
- For this purpose, **telecom operators within the Arab region are invited to contribute in this map development** by providing required updated data about their networks and participate in the validation process in order to benefit from the numerous map advantages
- **Data collection should be continuing for including further information** in addition to covering Europe as well as North America (starting since next year)

## Thank you

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We value your feedback and contributions. Please log in using your ITU TIES username and password, to submit comments, feedback and to validate the information shown in the map through the Validation Framework.

Project homepage

<http://www.itu.int/en/ITU-D/Technology/Pages/InteractiveTransmissionMaps.aspx>

ITU Interactive Terrestrial Transmission Map

<https://www.itu.int/itu-d/tnd-map-public/>

ITU TIES Interactive Terrestrial Transmission Map

<https://www.itu.int/itu-d/tnd-map/>

ITU TIES Validation Framework

<https://www.itu.int/itu-d/tnd-map/validation/>