Addressing Digital Divide and Knowledge Gap in Africa

Sharing Knowledge Across the Mediterranean (9)

Lisbon, 15 – 17 May 2014

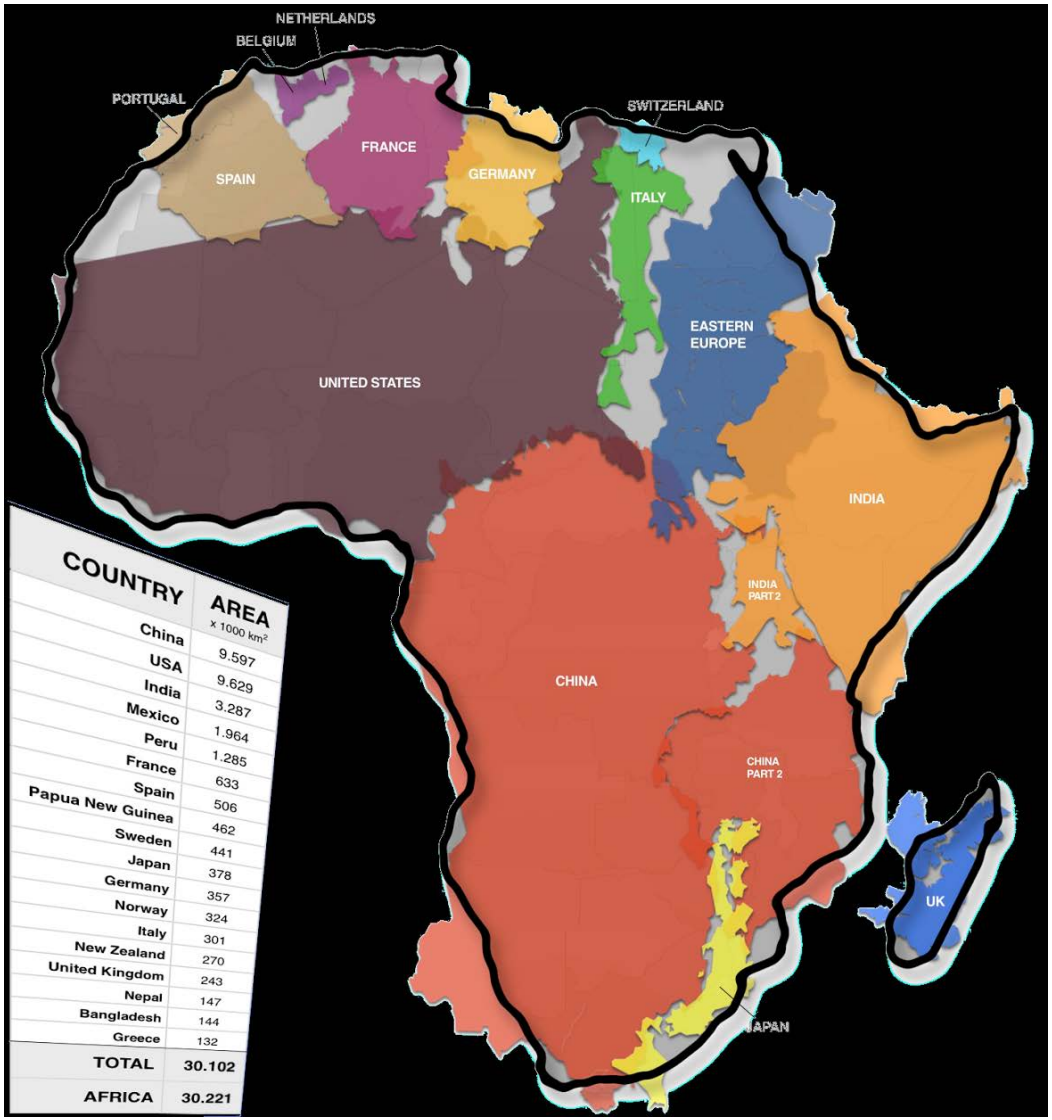
Boubakar Barry

Boubakar.Barry@wacren.net

Agenda

- Some facts
- Why R&E networks
- RENs in Africa
- WACREN and NRENs in W&C Africa
- Recent developments
- WACREN activities
- Current and short-term focus
- Opportunities
- Partnerships

Africa is not … a country!

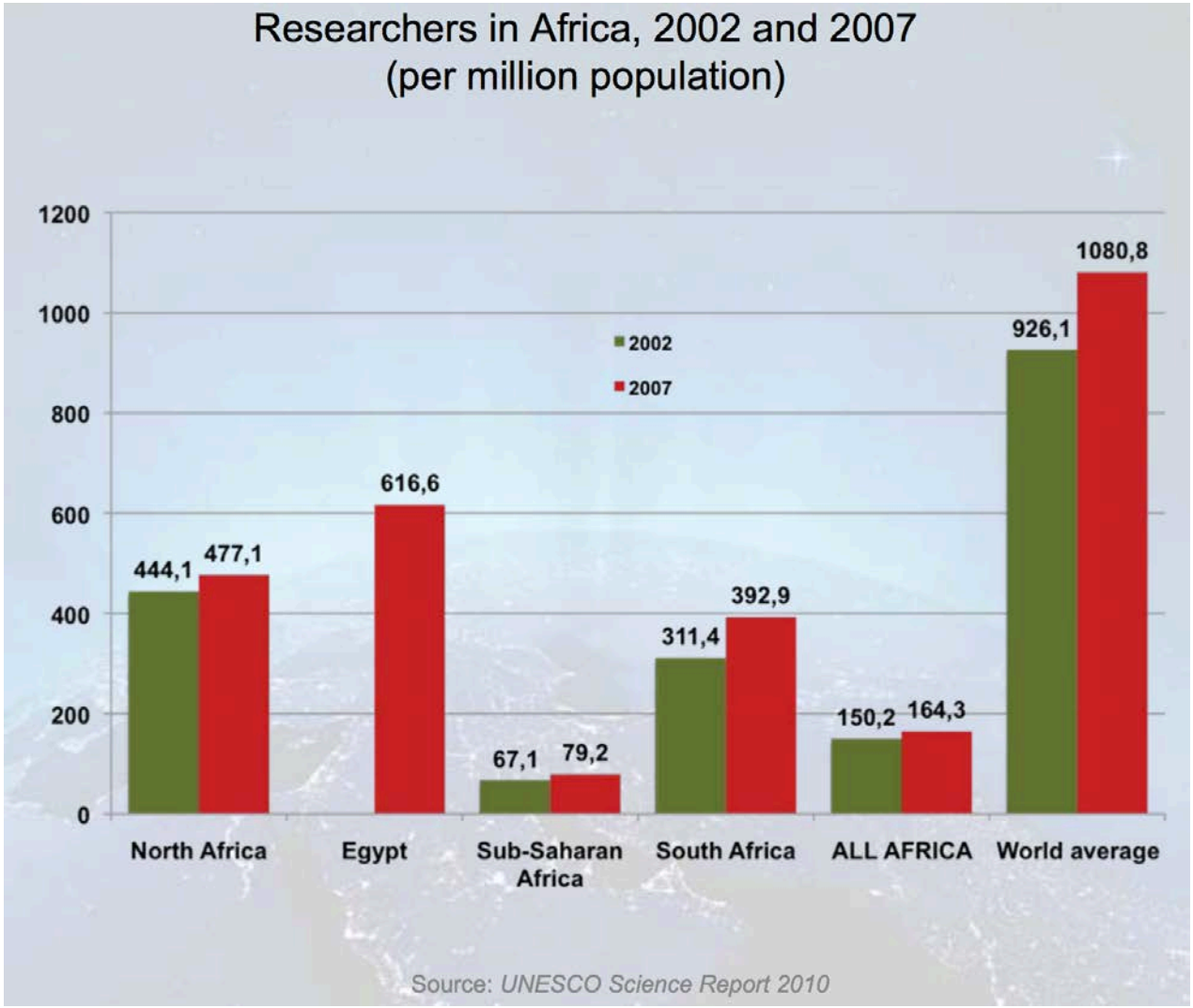


COUNTRY	AREA × 1000 km²
China	9.597
USA	9.629
India	3.287
Mexico	1.964
Peru	1.285
France	633
Spain	506
Papua New Guinea	462
Sweden	441
Japan	378
Germany	357
Norway	324
Italy	301
New Zealand	270
United Kingdom	243
Nepal	147
Bangladesh	144
Greece	132
TOTAL	30.102
AFRICA	30.221

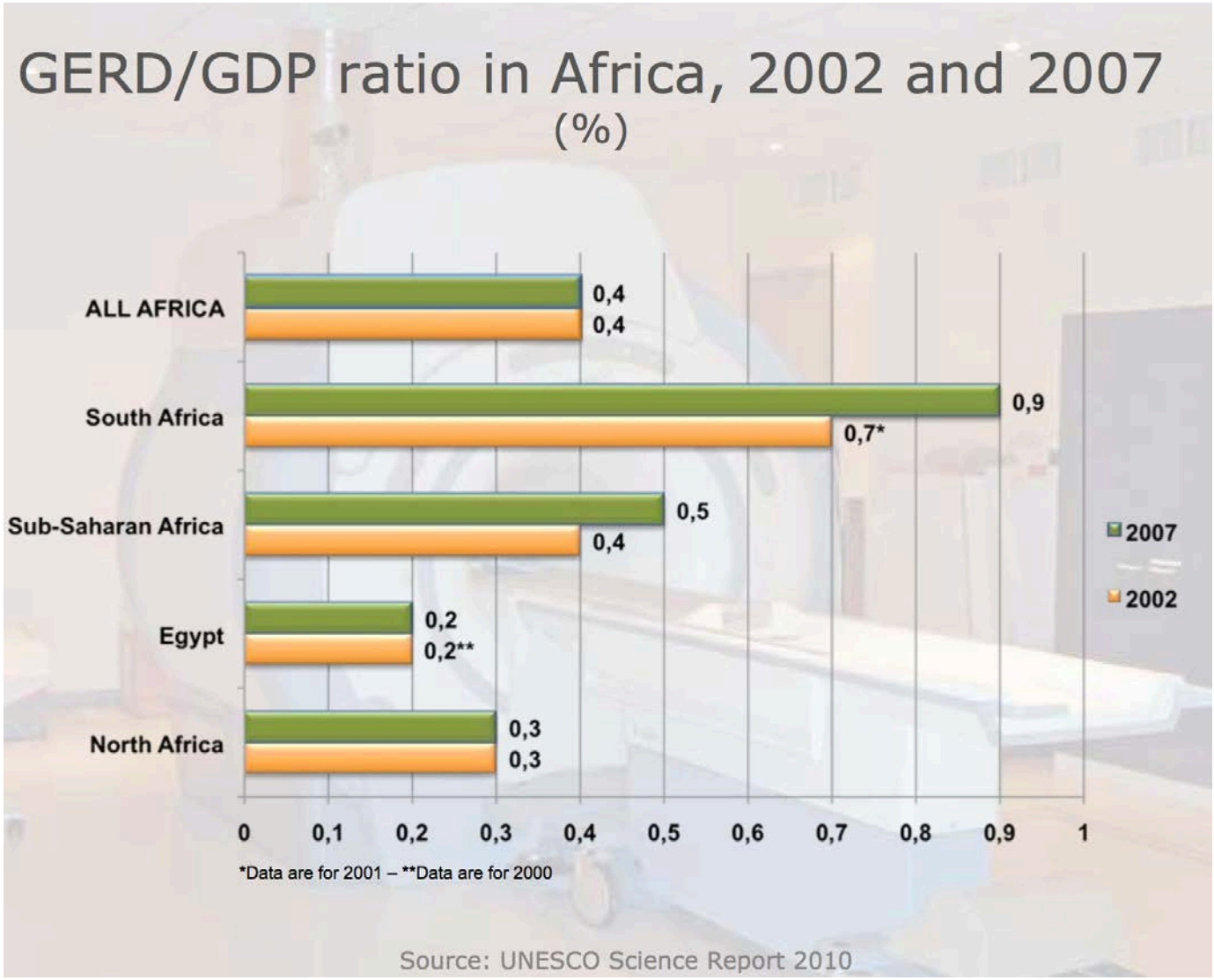
Some facts on Africa (1)

- Population: ~1,000M (15% of world population)
- Telephone subscriptions: 1.3% (mobile: 69%)
  - World average: 16% (95.5%); Europe: 39% (125%)
- Internet penetration: 19%
  - World average: 40%; Europe: 75%
- Mobile broadband subscriptions: 19%
  - World average: 32%; Europe: 64%
- 7% HigherEd gross enrollment rate (world average: 29%)
  - Huge demand, but access challenges
  - Massification
  - High student/faculty ratio: 40:1 and more
  - Brain drain

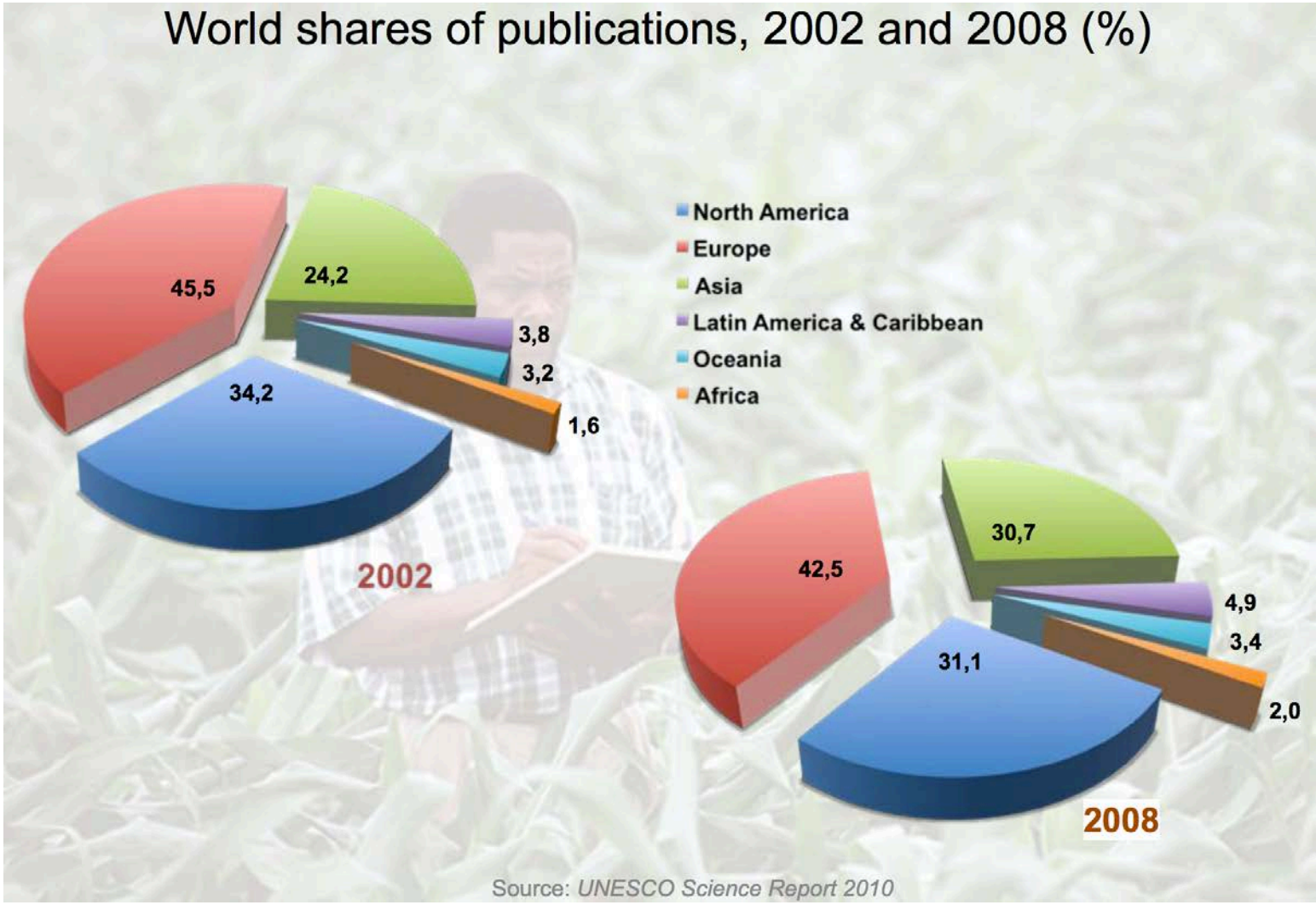
Research


Researchers in Africa, 2002 and 2007
(per million population)
1200
1000
800
600
400
200
0
2002
2007
444,1
477,1
616,6
67,1
79,2
311,4
392,9
150,2
164,3
926,1
1080,8
North Africa
Egypt
Sub-Saharan Africa
South Africa
ALL AFRICA
World average
Source: UNESCO Science Report 2010

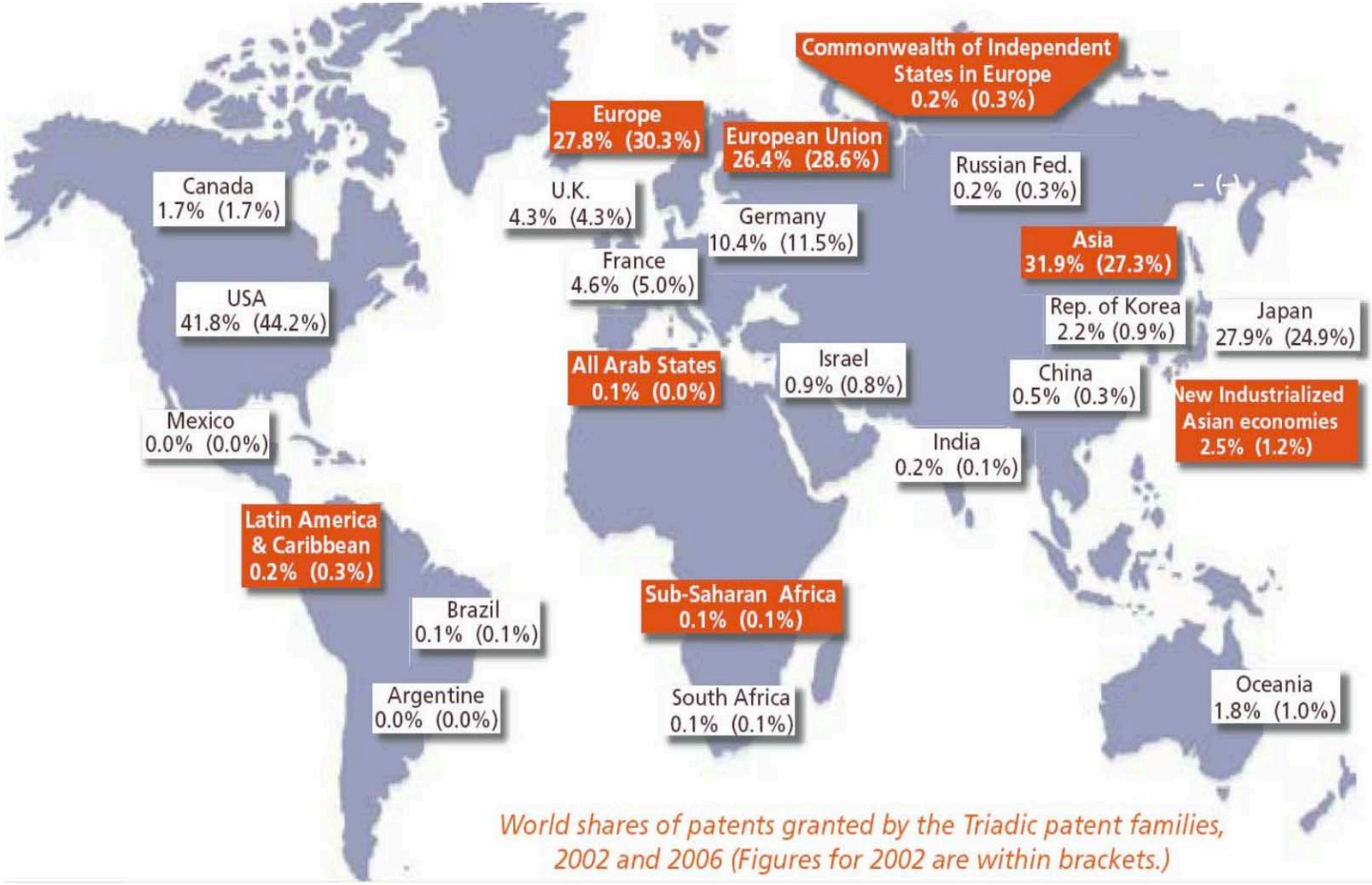
Research (2)


GERD/GDP ratio in Africa, 2002 and 2007
(%)
ALL AFRICA
0,4
0,4
South Africa
0,9
0,7*
Sub-Saharan Africa
0,5
0,4
Egypt
0,2
0,2**
North Africa
0,3
0,3
2007
2002
0
0,1
0,2
0,3
0,4
0,5
0,6
0,7
0,8
0,9
1
*Data are for 2001 – **Data are for 2000
Source: UNESCO Science Report 2010

Publication of African research output



African share on patents



World shares of patents granted by the Triadic patent families, 2002 and 2006 (Figures for 2002 are within brackets.)

ICTs, Research and Education Networks as catalyzers

Role of HE, research and ICT

- It is proved and generally accepted that HE critical for socio-economic development
- Sector neglected for more than 20 years in SSA
  - IMF and WB policies
  - Emphasis on basic and secondary education
- Results:
  - Poor infrastructure
  - Massification
  - High Students/Staff ratio
  - Aging faculty
  - Inappropriate qualification of large segment of faculty
- Recent shift in policies
  - Important role of ICTs to achieve objectives (access, quality, …)

Role of HE, research and ICT (cont'd)

- Access to adequate infrastructure crucial to be part of the cyberspace
- However: bandwidth in Africa still most expensive in the world (up to US$3,000 per Mbps/month and more)
  - But improving in some countries ($200 or less)
- Role of IT infrastructure, especially RENs, in African context:
  - Sharing of scarce resources
  - Improvement of access through blended learning
  - Reduction of researchers isolation and creation of critical masses
  - Participation in global research projects
  - Promotion of participation of Diaspora

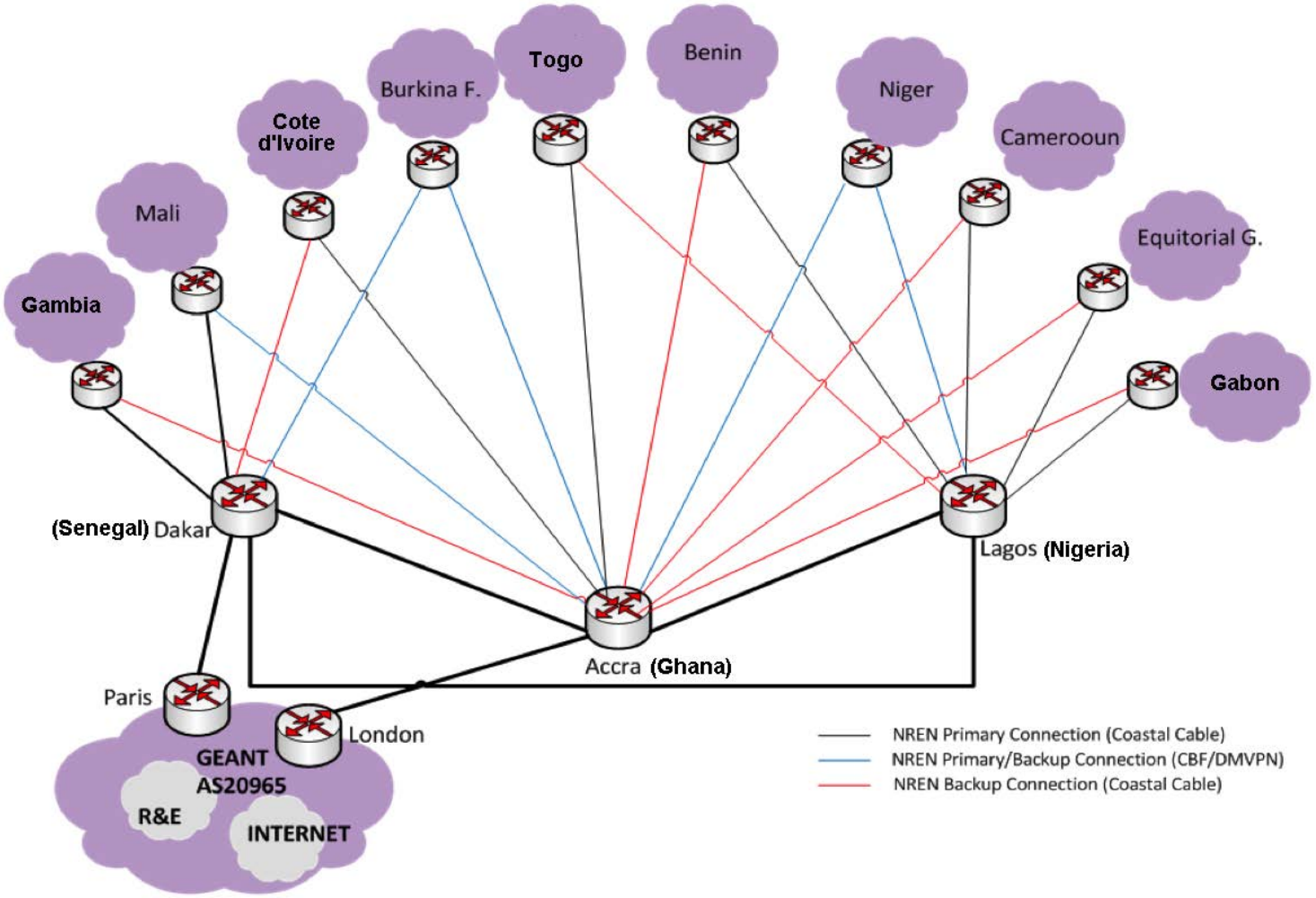
Role of RENs: Example of WACREN

WACREN in a nutshell

- Incorporated in 2010 after long process facilitated by the AAU (from 2006)
- Currently 8 formally established NRENs
  - GARNET – Ghana
  - snRER – Senegal
  - MaliREN – Mali
  - Niger-REN – Niger
  - GabonREN – Gabon
  - NgREN – Nigeria
  - TogoRER – Togo
  - RerBenin – Benin
- NREN embryo in Cameroon
- Recent initiatives in Chad, Guinea and Cape Verde
- Potential NREN membership: 22

WACREN in a nutshell (cont'd)

Network topology



Network topology (cont'd)

- Core + Access
  - 10G+ Core
  - 1G+ Access
- 3 main hubs: Accra, Dakar and Lagos (+ Douala/Libreville)
- Redundant links from hubs to NRENs
- At least 2 intl. links: to Paris and London
- Multiple Submarine Cable Access
- Long term IRU's where possible

Recent developments

- 1st AGM in July 2013 in Abuja, Nigeria
  - New Chair of the Board of Directors
  - Appointment of CEO (effective 1 October 2013)
  - Search process for other Board members
- New Board of Directors in September 2013
- 1st Annual Conference and 2nd AGM in March 2014 in Lomé, Togo
  - Good participation from community, friends and partners
  - New membership structure
  - Fundraising campaign
- Some countries very close to having their NRENs operational
  - Expectation that at least 2-3 NRENs will be operational by the end of Q2 2014

Status of NRENs in the region

- RITER (Côte d'Ivoire)
  - 3 universities interconnected
  - 2 in the process of being connected by end of Q2 2014
  - 10 lecture halls equipped for videoconferencing
- GARNET (Ghana)
  - The 17 members agreed on network topology
  - Contract with operator signed
  - Implementation by June 2014
- Niger-REN (Niger)
  - Interconnection of 9 institutions to start this month (04/14)
  - Collaboration with SokREN (Nigerian REN cluster)

Status of NRENs in the region (cont'd)

- NgREN (Nigeria)
  - 27 institutions connected to NOC
  - Ready for commissioning
  - 102 others universities and 17 teaching hospitals to be to be connected by next year
- snRER (Senegal)
  - Interconnection of the 5 public universities by the end of Q2 2014
  - Videoconferencing equipment already installed in all these instititions
- TogoRER (Togo)
  - 5 member institutions
  - Objective: NREN operational in 2014

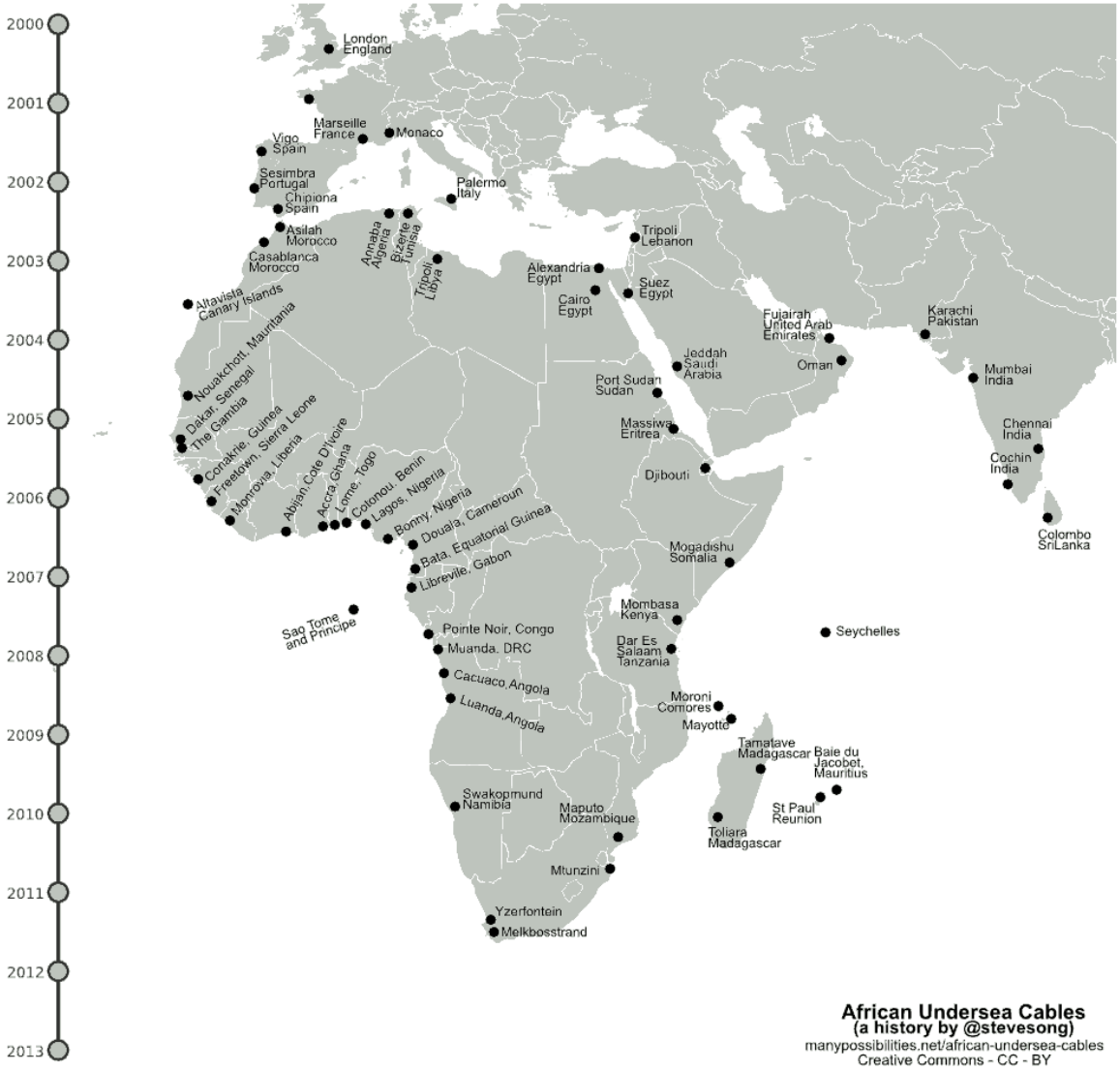
Current and short-term focus

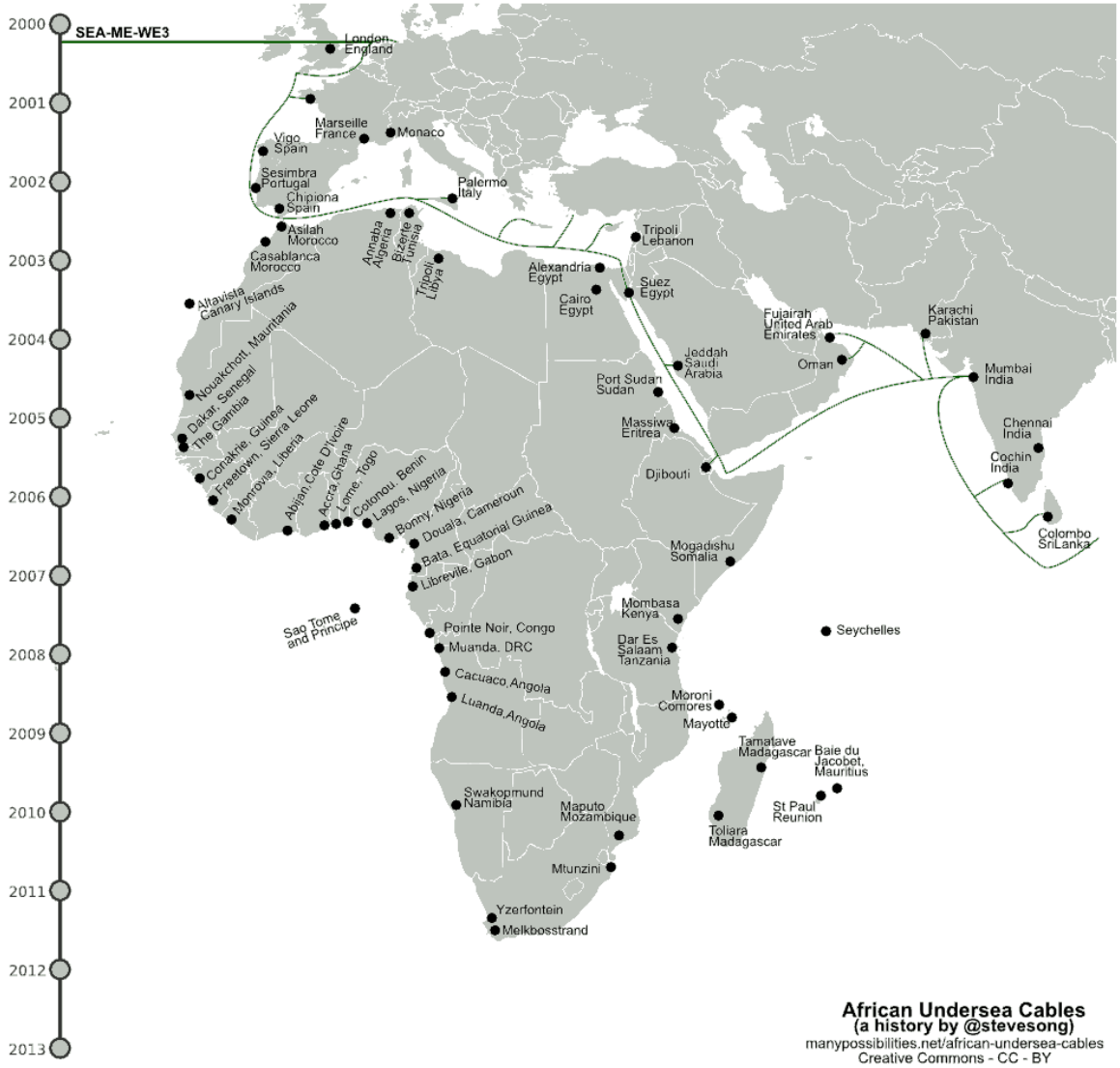
- One-year project under current phase of AfricaConnect Project
  - Securing counter-part funding
  - Successful implementation
- Conclusion of negotiations with operators and provision of affordable connectivity and services to members
- Capacity building
  - Training needs assessment
  - Organisation of training workshops
- Provision of services to members
- Readiness for second phase of AfricaConnect
  - NREN readiness
  - Securing counter-part funding

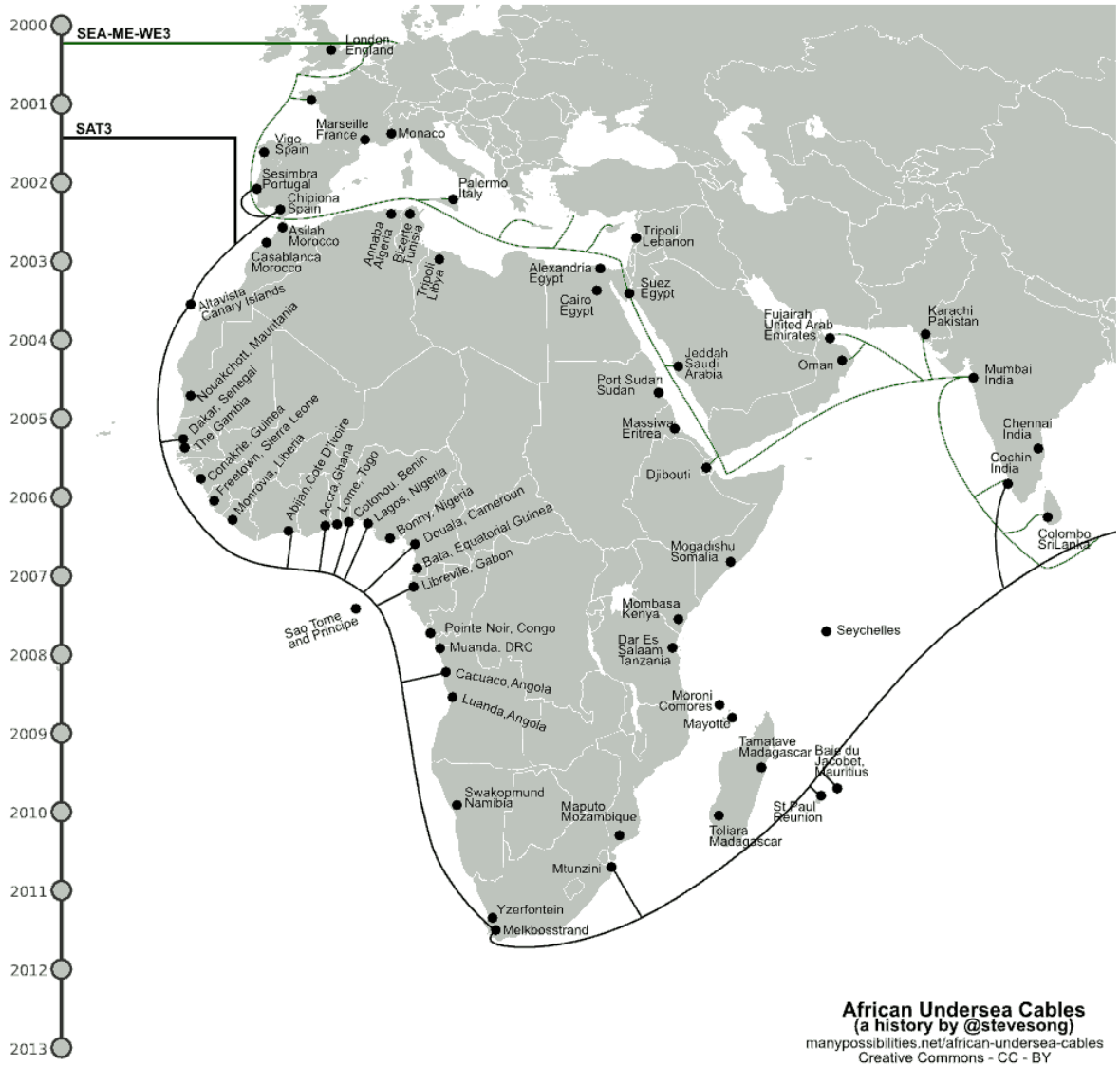
Partnerships

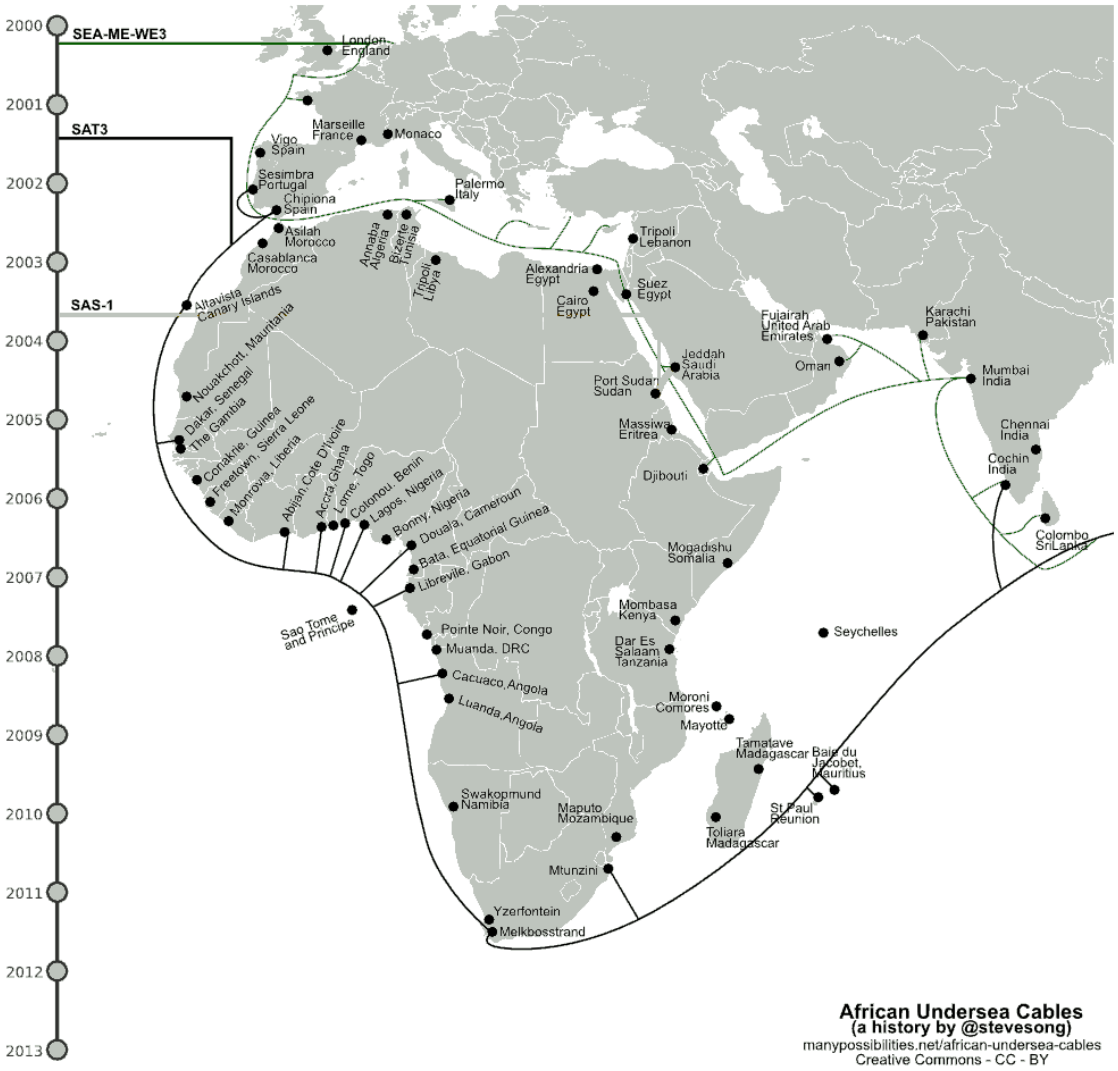
- MoUs signed with:
  - RENATER
  - UbuntuNet Alliance
  - ASREN
- Interconnection agreement with GEANT underway
  - Router already installed in London (Cisco/ISOC donation)
- Ready for cross-connect with UbuntuNet Alliance and ASREN
- MoU with Internet2 soon
- Partnership with NSRC on capacity building activities
- WACREN open to other partnerships

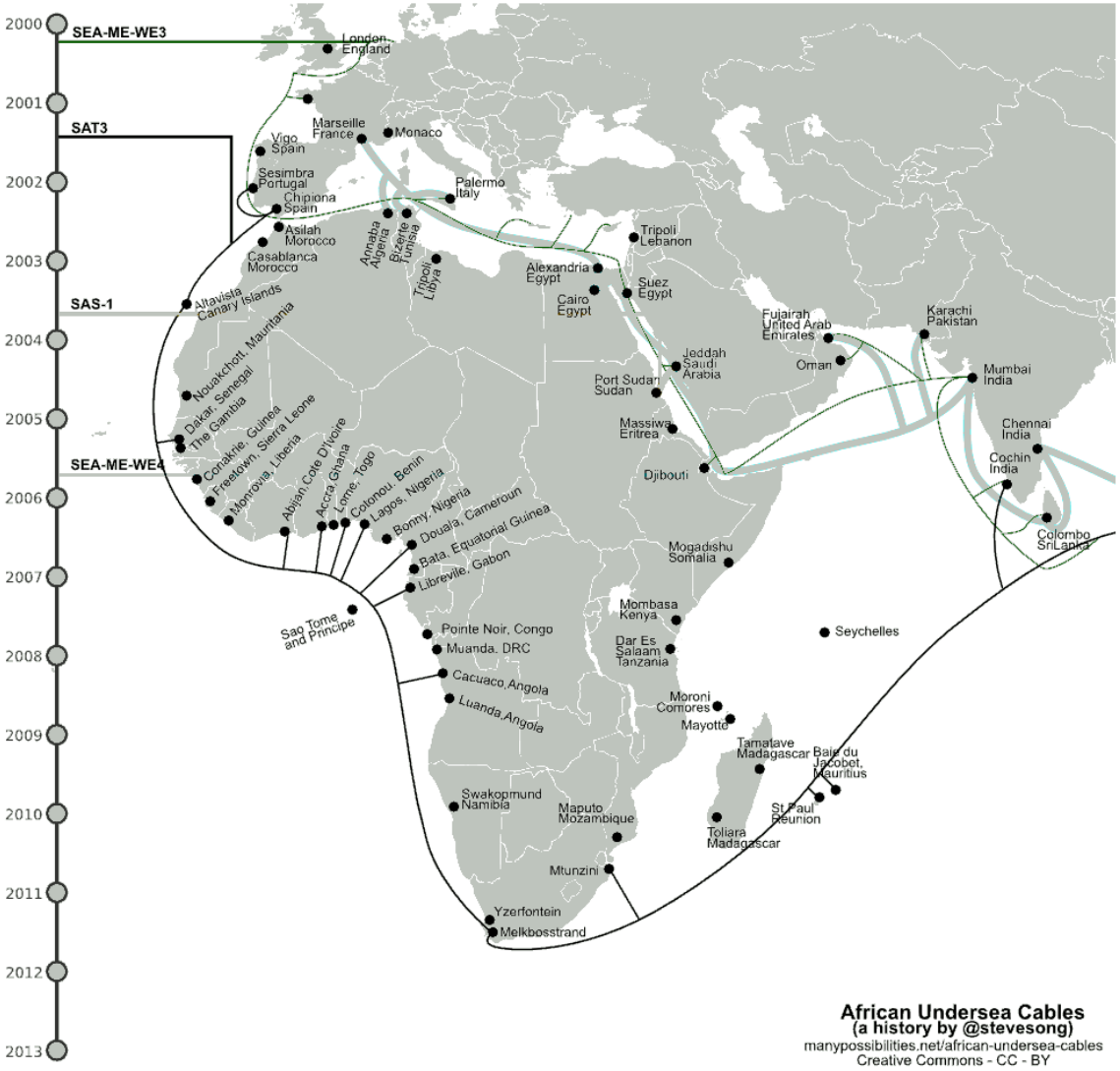
Opportunities

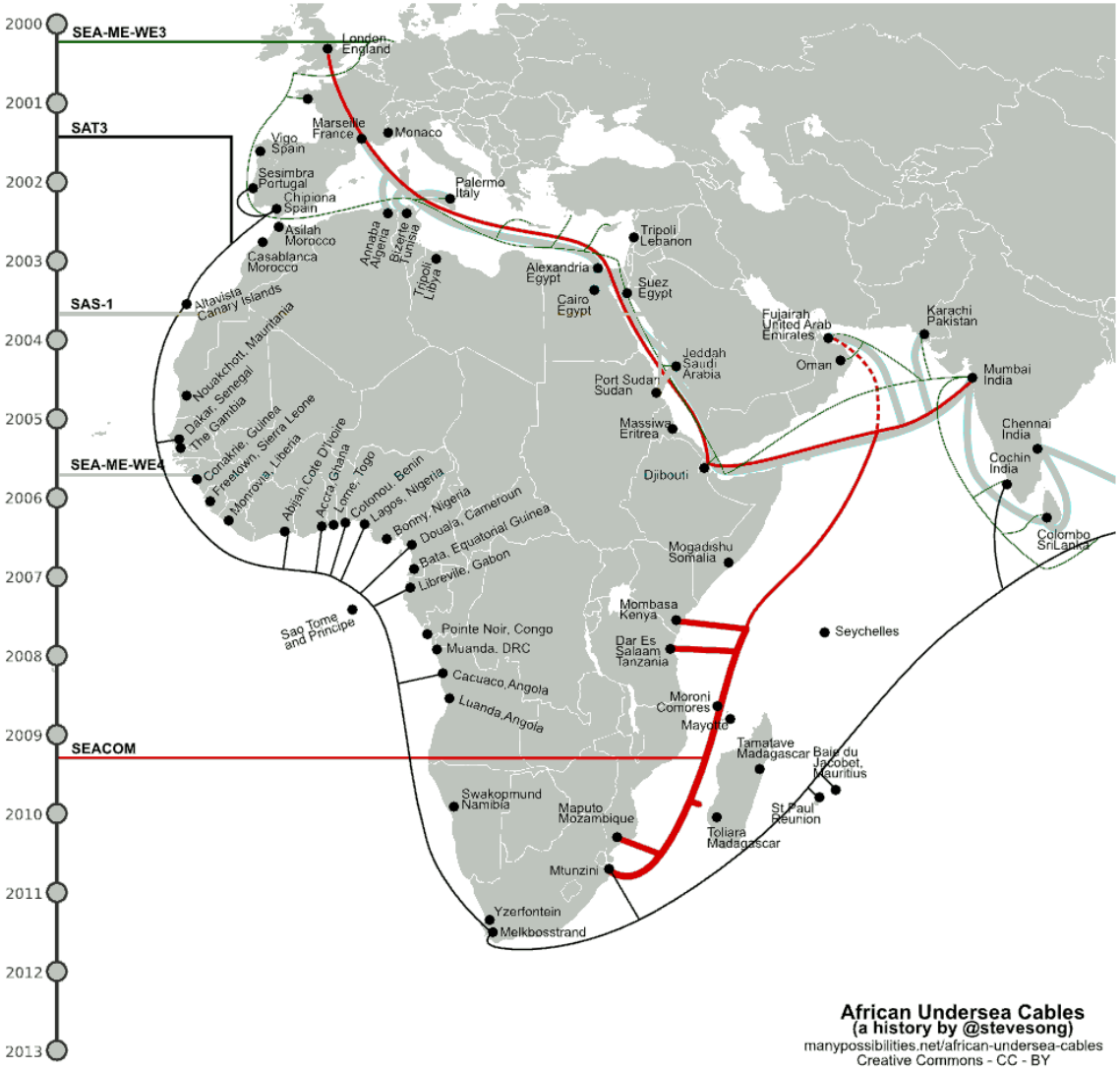

2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
London England
Marseille France
Monaco
Vigo Spain
Sesimbra Portugal
Chipiona Spain
Palermo Italy
Asilah Morocco
Casablanca Morocco
Annaba Algeria
Bizerte Tunisia
Tripoli Libya
Tripoli Lebanon
Alexandria Egypt
Cairo Egypt
Suez Egypt
Altavista Canary Islands
Nouakchott, Mauritania
Dakar, Senegal
The Gambia
Conakrie, Guinea
Freetown, Sierra Leone
Monrovia, Liberia
Abijan, Cote D'Ivoire
Accra, Ghana
Lome, Togo
Cotonou, Benin
Lagos, Nigeria
Bonny, Nigeria
Douala, Cameroun
Bata, Equatorial Guinea
Libreville, Gabon
Sao Tome and Principe
Pointe Noir, Congo
Muanda, DRC
Cacuaco,Angola
Luanda,Angola
Swakopmund Namibia
Maputo Mozambique
Mtunzini
Yzerfontein
Melkbosstrand
Fujairah United Arab Emirates
Oman
Jeddah Saudi Arabia
Port Sudan Sudan
Massiwa Eritrea
Djibouti
Mogadishu Somalia
Mombasa Kenya
Dar Es Salaam Tanzania
Moroni Comores
Mayotte
Tamatave Madagascar
Toliara Madagascar
Baie du Jacobet, Mauritius
St Paul Reunion
Seychelles
Karachi Pakistan
Mumbai India
Chennai India
Cochin India
Colombo SriLanka
African Undersea Cables
(a history by @stevesong)
manypossibilities.net/african-undersea-cables
Creative Commons - CC - BY

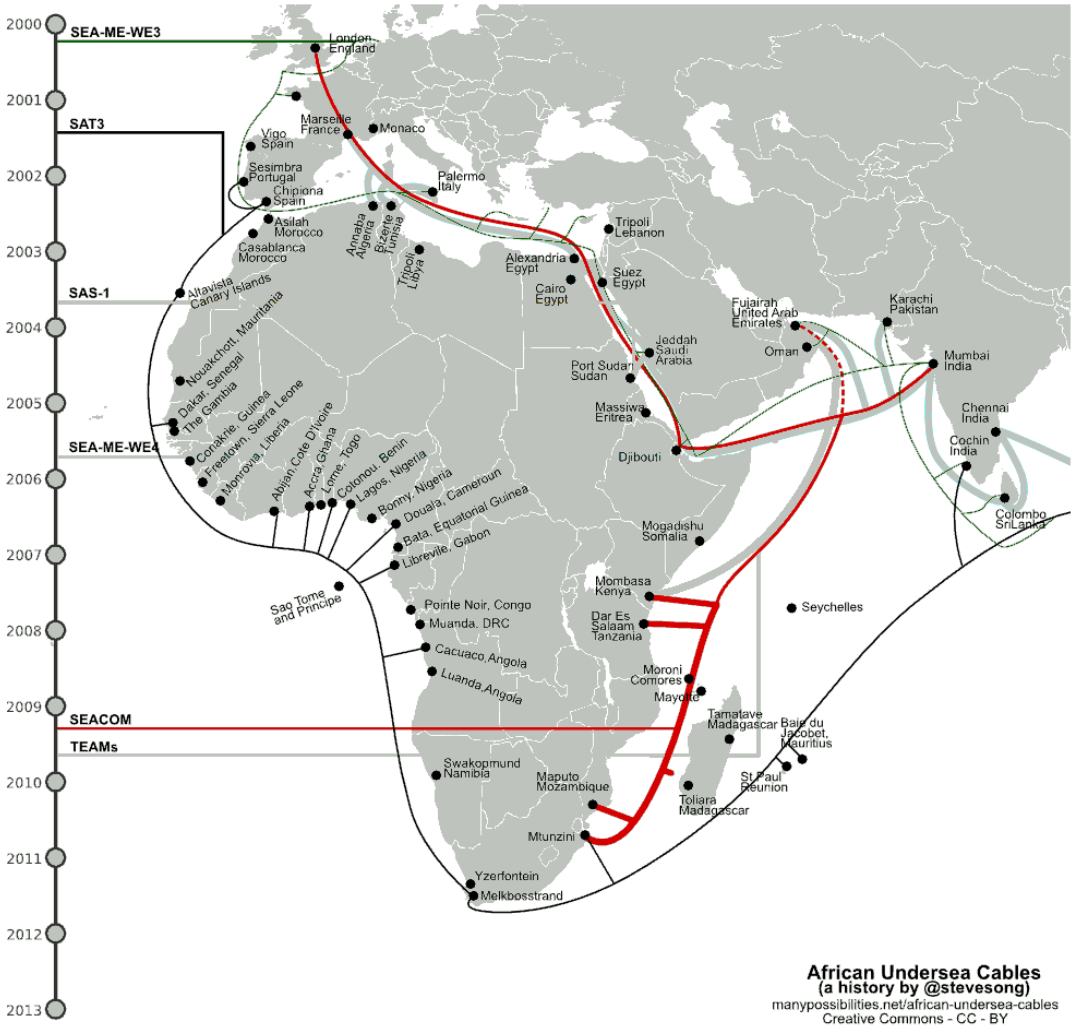

2000
SEA-ME-WE3
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
London, England
Marseille France
Monaco
Vigo Spain
Sesimbra Portugal
Chipiona Spain
Palermo Italy
Asilah Morocco
Casablanca Morocco
Annaba Algeria
Bizerte Tunisia
Tripoli Libya
Tripoli Lebanon
Alexandria Egypt
Cairo Egypt
Suez Egypt
Altavista Canary Islands
Nouakchott, Mauritania
Dakar, Senegal
The Gambia
Conakrie, Guinea
Freetown, Sierra Leone
Monrovia, Liberia
Abijan, Cote D'Ivoire
Accra, Ghana
Lome, Togo
Cotonou, Benin
Lagos, Nigeria
Bonny, Nigeria
Douala, Cameroun
Bata, Equatorial Guinea
Libreville, Gabon
Sao Tome and Principe
Pointe Noir, Congo
Muanda, DRC
Cacuaco, Angola
Luanda, Angola
Swakopmund Namibia
Maputo Mozambique
Mtunzini
Yzerfontein
Melkbosstrand
Fujairah United Arab Emirates
Jeddah Saudi Arabia
Oman
Karachi Pakistan
Mumbai India
Chennai India
Cochin India
Colombo SriLanka
Port Sudan Sudan
Massiwa Eritrea
Djibouti
Mogadishu Somalia
Mombasa Kenya
Dar Es Salaam Tanzania
Seychelles
Moroni Comores
Mayotte
Tamatave Madagascar
Baie du Jacobet, Mauritius
St Paul Reunion
Toliara Madagascar
African Undersea Cables
(a history by @stevesong)
manypossibilities.net/african-undersea-cables
Creative Commons - CC - BY

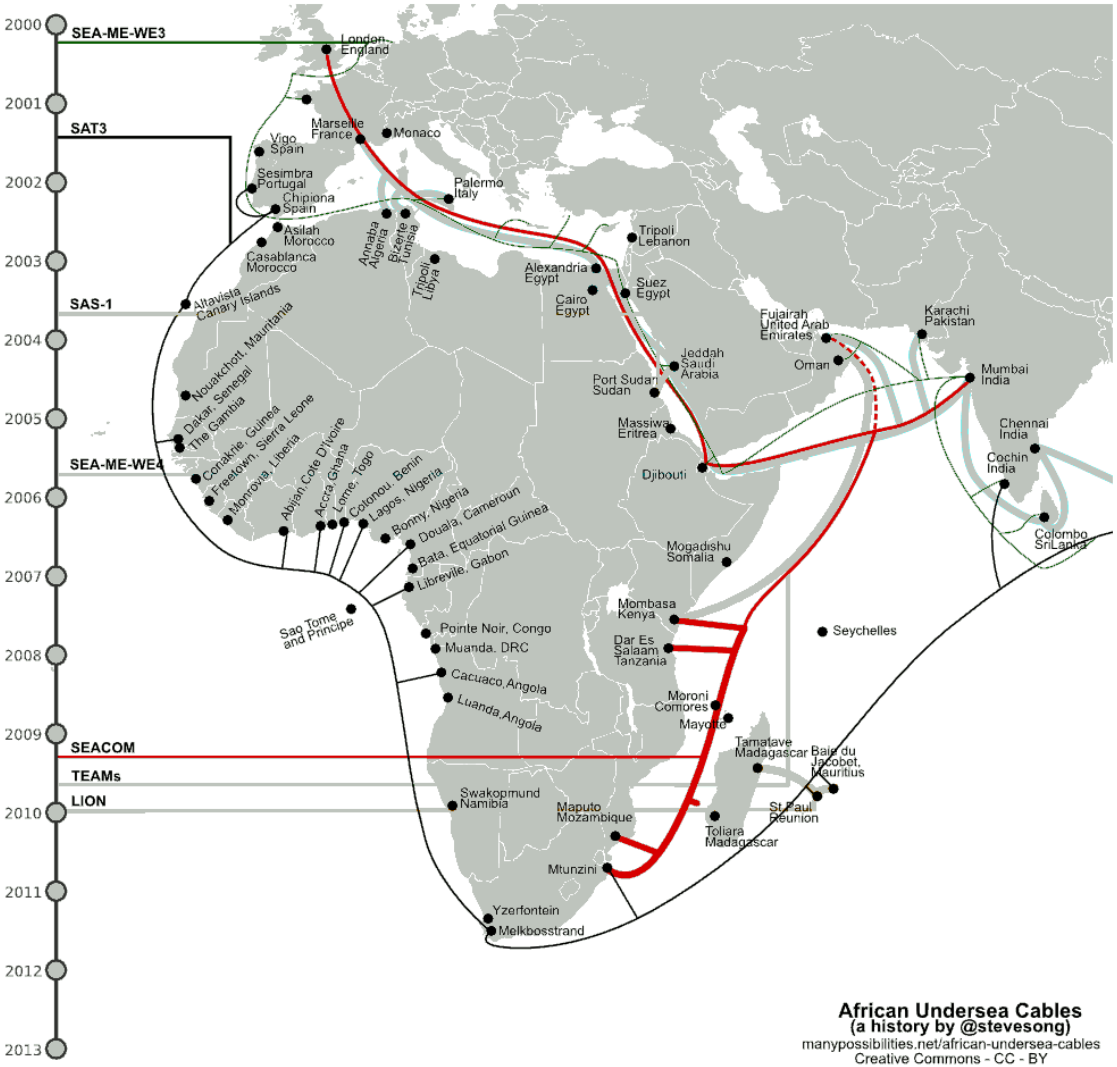

2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
SEA-ME-WE3
SAT3
London England
Marseille France
Monaco
Vigo Spain
Sesimbra Portugal
Chipiona Spain
Palermo Italy
Asilah Morocco
Casablanca Morocco
Annaba Algeria
Bizerte Tunisia
Tripoli Libya
Tripoli Lebanon
Alexandria Egypt
Suez Egypt
Cairo Egypt
Altavista Canary Islands
Nouakchott, Mauritania
Dakar, Senegal
The Gambia
Conakrie, Guinea
Freetown, Sierra Leone
Monrovia, Liberia
Abijan,Cote D'Ivoire
Accra,Ghana
Lome, Togo
Colonou, Benin
Lagos, Nigeria
Bonny, Nigeria
Douala, Cameroun
Bata, Equatorial Guinea
Libreville, Gabon
Sao Tome and Principe
Pointe Noir, Congo
Muanda, DRC
Cacuaco,Angola
Luanda,Angola
Swakopmund Namibia
Maputo Mozambique
Mtunzini
Yzerfontein
Melkbosstrand
Fujairah United Arab Emirates
Oman
Jeddah Saudi Arabia
Port Sudan Sudan
Massiwa Eritrea
Djibouti
Karachi Pakistan
Mumbai India
Chennai India
Cochin India
Colombo SriLanka
Mogadishu Somalia
Mombasa Kenya
Dar Es Salaam Tanzania
Seychelles
Moroni Comores
Mayotte
Tamatave Madagascar
Baie du Jacobet, Mauritius
St Paul Reunion
Toliara Madagascar
African Undersea Cables
(a history by @stevesong)
manypossibilities.net/african-undersea-cables
Creative Commons - CC - BY

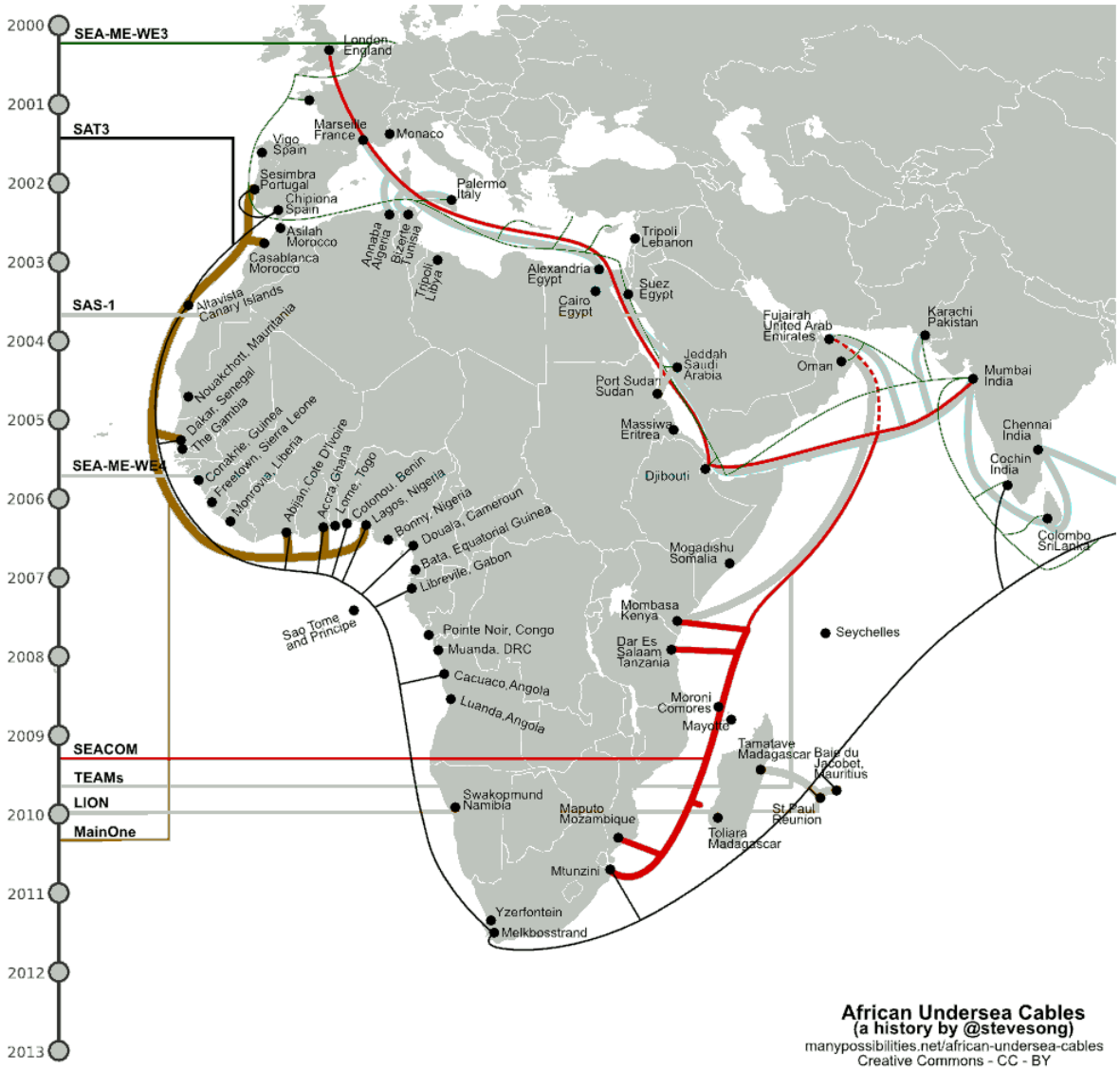

2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
SEA-ME-WE3
SAT3
SAS-1
London, England
Marseille France
Monaco
Vigo Spain
Sesimbra Portugal
Chipiona Spain
Palermo Italy
Asilah Morocco
Casablanca Morocco
Annaba Algeria
Bizerte Tunisia
Tripoli Libya
Tripoli Lebanon
Alexandria Egypt
Cairo Egypt
Suez Egypt
Atlavista Canary Islands
Nouakchott, Mauritania
Dakar, Senegal
The Gambia
Conakrie, Guinea
Freetown, Sierra Leone
Monrovia, Liberia
Abijan,Cote D'Ivoire
Accra,Ghana
Lome, Togo
Cotonou, Benin
Lagos, Nigeria
Bonny, Nigeria
Douala, Cameroun
Bata, Equatorial Guinea
Libreville, Gabon
Sao Tome and Principe
Pointe Noir, Congo
Muanda, DRC
Cacuaco,Angola
Luanda,Angola
Swakopmund Namibia
Maputo Mozambique
Mtunzini
Yzerfontein
Melkbosstrand
Fujairah United Arab Emirates
Oman
Jeddah Saudi Arabia
Port Sudan Sudan
Massiwa Eritrea
Djibouti
Karachi Pakistan
Mumbai India
Chennai India
Cochin India
Colombo SriLanka
Mogadishu Somalia
Mombasa Kenya
Dar Es Salaam Tanzania
Seychelles
Moroni Comores
Mayotte
Tamatave Madagascar
Baie du Jacobet, Mauritius
St Paul Reunion
Toliara Madagascar
African Undersea Cables
(a history by @stevesong)
manypossibilities.net/african-undersea-cables
Creative Commons - CC - BY

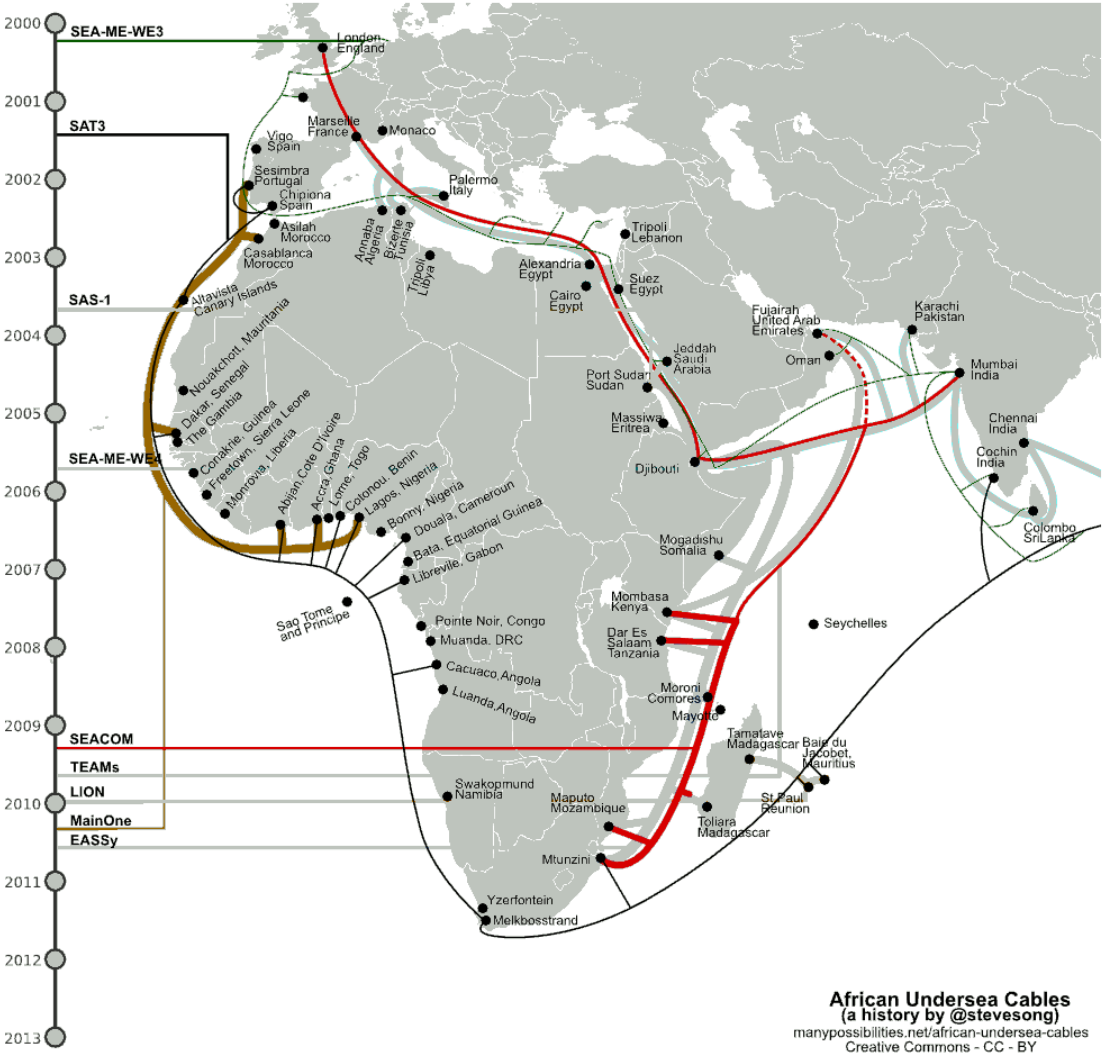

2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
SEA-ME-WE3
SAT3
SAS-1
SEA-ME-WE4
London, England
Marseille France
Monaco
Vigo Spain
Sesimbra Portugal
Chipiona Spain
Palermo Italy
Asilah Morocco
Casablanca Morocco
Annaba Algeria
Bizerte Tunisia
Tripoli Libya
Tripoli Lebanon
Alexandria Egypt
Cairo Egypt
Suez Egypt
Altavista Canary Islands
Nouakchott, Mauritania
Dakar, Senegal
The Gambia
Conakrie, Guinea
Freetown, Sierra Leone
Monrovia, Liberia
Abijan, Cote Divoire
Accra, Ghana
Lome, Togo
Cotonou, Benin
Lagos, Nigeria
Bonny, Nigeria
Douala, Cameroun
Bata, Equatorial Guinea
Libreville, Gabon
Sao Tome and Principe
Pointe Noir, Congo
Muanda, DRC
Cacuaco, Angola
Luanda, Angola
Swakopmund Namibia
Maputo Mozambique
Mtunzini
Yzerfontein
Melkbosstrand
Fujairah United Arab Emirates
Oman
Karachi Pakistan
Jeddah Saudi Arabia
Port Sudan Sudan
Massiwa Eritrea
Djibouti
Mumbai India
Chennai India
Cochin India
Colombo SriLanka
Mogadishu Somalia
Mombasa Kenya
Dar Es Salaam Tanzania
Seychelles
Moroni Comores
Mayotte
Tamatave Madagascar
Baie du Jacobot, Mauritius
St Paul Reunion
Toliara Madagascar
African Undersea Cables
(a history by @stevesong)
manypossibilities.net/african-undersea-cables
Creative Commons - CC - BY

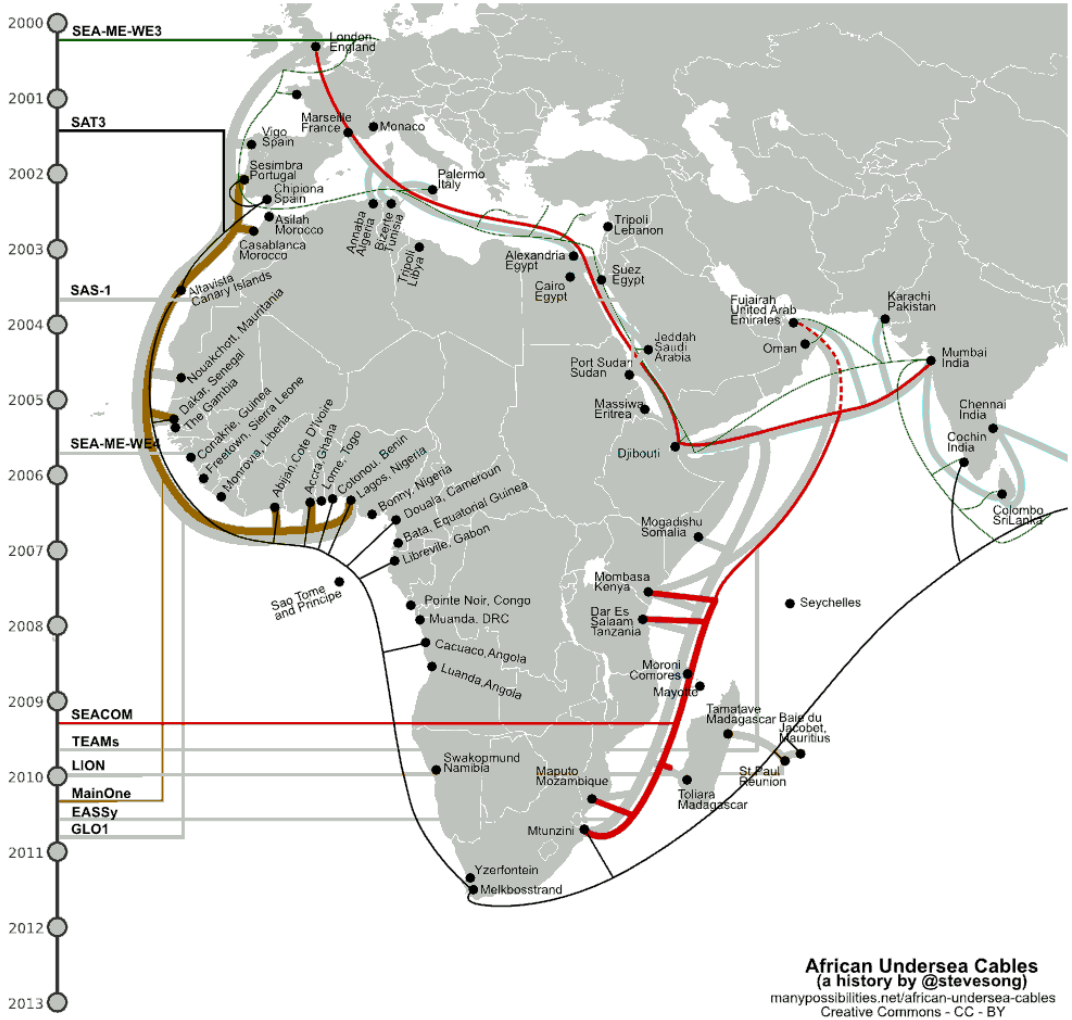

2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
SEA-ME-WE3
SAT3
SAS-1
SEA-ME-WE4
SEACOM
London, England
Marseille France
Monaco
Vigo Spain
Sesimbra Portugal
Chipiona Spain
Palermo Italy
Asilah Morocco
Casablanca Morocco
Annaba Algeria
Bizerte Tunisia
Tripoli Libya
Tripoli Lebanon
Alexandria Egypt
Cairo Egypt
Suez Egypt
Altavista Canary Islands
Nouakchott, Mauritania
Dakar, Senegal
The Gambia
Conakrie, Guinea
Freetown, Sierra Leone
Monrovia, Liberia
Abijan, Cote D'Ivoire
Accra Ghana
Lome, Togo
Colonou, Benin
Lagos, Nigeria
Bonny, Nigeria
Douala, Cameroun
Bata, Equatorial Guinea
Libreville, Gabon
Sao Tome and Principe
Pointe Noir, Congo
Muanda, DRC
Cacuaco,Angola
Luanda,Angola
Swakopmund Namibia
Maputo Mozambique
Mtunzini
Yzerfontein
Melkbosstrand
Jeddah Saudi Arabia
Port Sudan Sudan
Massiwa Eritrea
Djibouti
Fujairah United Arab Emirates
Oman
Karachi Pakistan
Mumbai India
Chennai India
Cochin India
Colombo SriLanka
Mogadishu Somalia
Mombasa Kenya
Dar Es Salaam Tanzania
Seychelles
Moroni Comores
Mayotte
Tamatave Madagascar
Baie du Jacobet, Mauritius
St Paul Reunion
Toliara Madagascar
African Undersea Cables
(a history by @stevesong)
manypossibilities.net/african-undersea-cables
Creative Commons - CC - BY

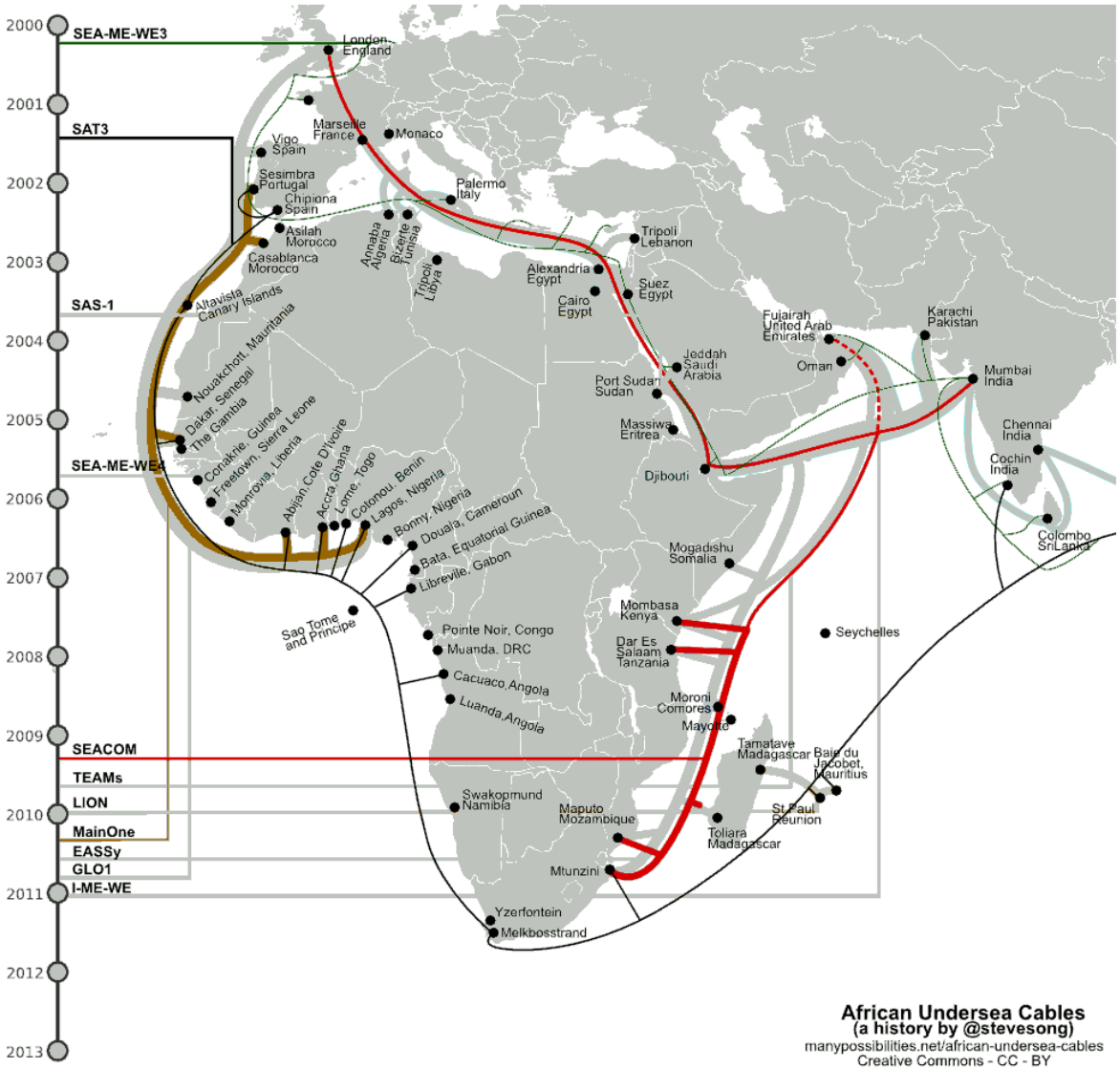

2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
SEA-ME-WE3
SAT3
SAS-1
SEA-ME-WE4
SEACOM
TEAMs
London, England
Marseille France
Monaco
Vigo Spain
Sesimbra Portugal
Chipiona Spain
Palermo Italy
Asilah Morocco
Casablanca Morocco
Annaba Algeria
Bizerte Tunisia
Tripoli Libya
Tripoli Lebanon
Alexandria Egypt
Cairo Egypt
Suez Egypt
Altavista Canary Islands
Nouakchott, Mauritania
Dakar, Senegal
The Gambia
Conakrie, Guinea
Freetown, Sierra Leone
Monrovia, Liberia
Abijan,Cote D'Ivoire
Accra,Ghana
Lome, Togo
Cotonou, Benin
Lagos, Nigeria
Bonny, Nigeria
Douala, Cameroun
Bata, Equatorial Guinea
Libreville, Gabon
Sao Tome and Principe
Pointe Noir, Congo
Muanda, DRC
Cacuaco,Angola
Luanda,Angola
Swakopmund Namibia
Maputo Mozambique
Mtunzini
Yzerfontein
Melkbosstrand
Fujairah United Arab Emirates
Oman
Jeddah Saudi Arabia
Port Sudan Sudan
Massiwa Eritrea
Djibouti
Mogadishu Somalia
Mombasa Kenya
Dar Es Salaam Tanzania
Moroni Comores
Mayotte
Tamatave Madagascar
Toliara Madagascar
Baie du Jacobet, Mauritius
St Paul Reunion
Seychelles
Karachi Pakistan
Mumbai India
Chennai India
Cochin India
Colombo SriLanka
African Undersea Cables
(a history by @stevesong)
manypossibilities.net/african-undersea-cables
Creative Commons - CC - BY

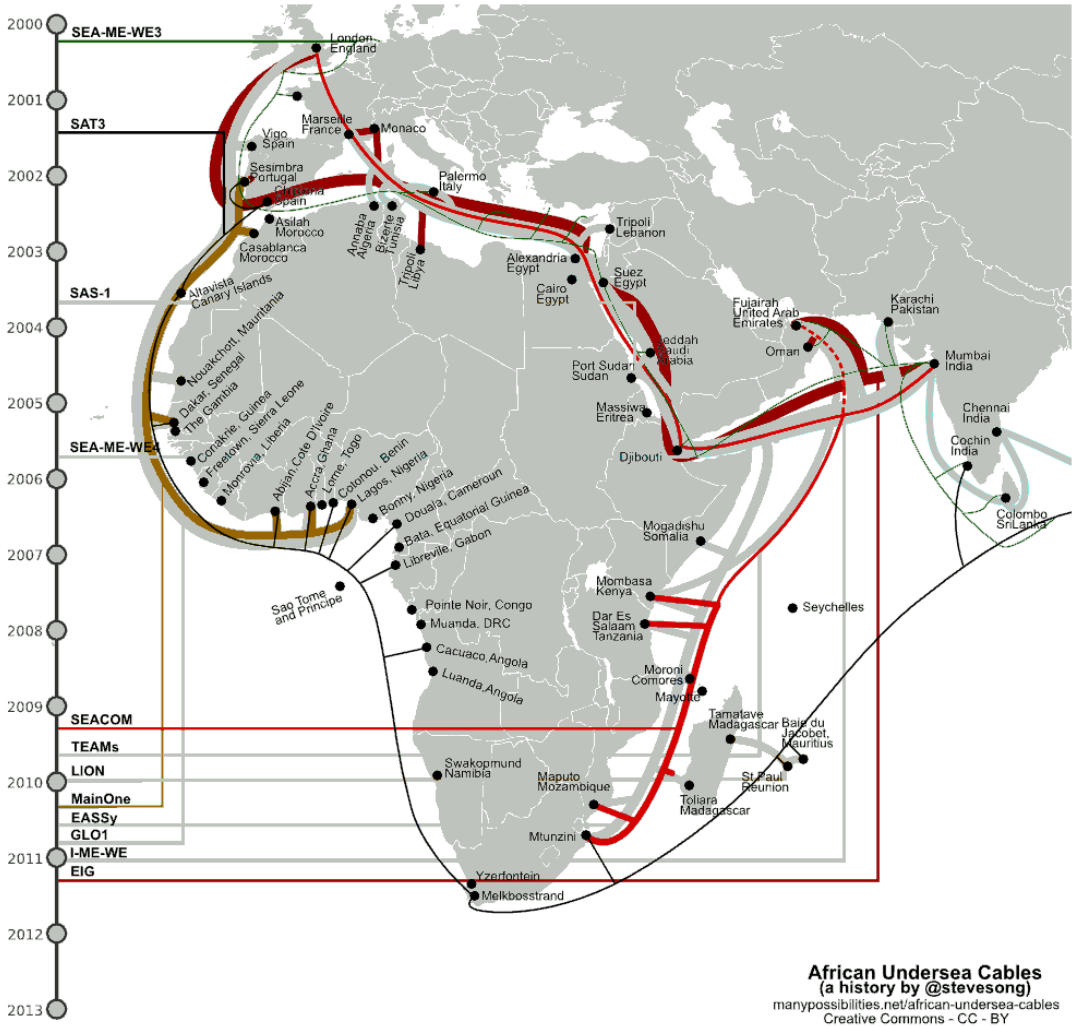

2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
SEA-ME-WE3
SAT3
SAS-1
SEA-ME-WE4
SEACOM
TEAMs
LION
London England
Marseille France
Monaco
Vigo Spain
Sesimbra Portugal
Chipiona Spain
Palermo Italy
Asilah Morocco
Casablanca Morocco
Annaba Algeria
Bizerte Tunisia
Tripoli Libya
Tripoli Lebanon
Alexandria Egypt
Cairo Egypt
Suez Egypt
Altavista Canary Islands
Nouakchott Mauritania
Dakar, Senegal
The Gambia
Conakrie, Guinea
Freetown, Sierra Leone
Monrovia, Liberia
Abijan,Cote D'Ivoire
Accra Ghana
Lome, Togo
Cotonou, Benin
Lagos, Nigeria
Bonny, Nigeria
Douala, Cameroun
Bata, Equatorial Guinea
Libreville, Gabon
Sao Tome and Principe
Pointe Noir, Congo
Muanda, DRC
Cacuaco,Angola
Luanda,Angola
Swakopmund Namibia
Yzerfontein
Melkbosstrand
Mtunzini
Maputo Mozambique
Toliara Madagascar
Tamatave Madagascar
Baie du Jacobet, Mauritius
St Paul Reunion
Moroni Comores
Mayotte
Mombasa Kenya
Dar Es Salaam Tanzania
Seychelles
Mogadishu Somalia
Djibouti
Massiwa Eritrea
Port Sudan Sudan
Jeddah Saudi Arabia
Fujairah United Arab Emirates
Oman
Karachi Pakistan
Mumbai India
Chennai India
Cochin India
Colombo SriLanka
African Undersea Cables
(a history by @stevesong)
manypossibilities.net/african-undersea-cables
Creative Commons - CC - BY

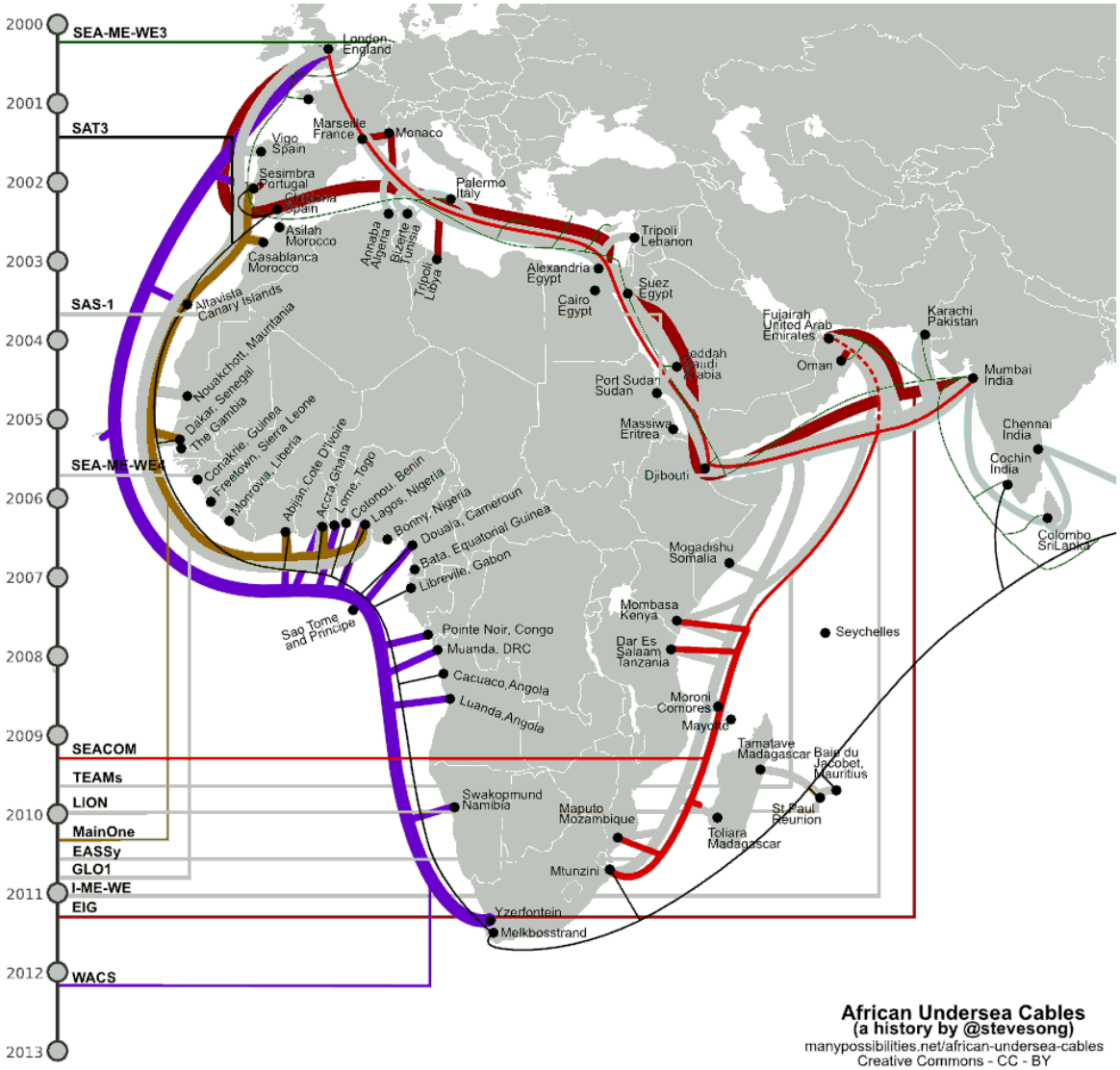

2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
SEA-ME-WE3
SAT3
SAS-1
SEA-ME-WE4
SEACOM
TEAMs
LION
MainOne
London England
Marseille France
Monaco
Vigo Spain
Sesimbra Portugal
Chipiona Spain
Palermo Italy
Asilah Morocco
Casablanca Morocco
Annaba Algeria
Bizerte Tunisia
Tripoli Libya
Tripoli Lebanon
Alexandria Egypt
Cairo Egypt
Suez Egypt
Altavista Canary Islands
Nouakchott, Mauritania
Dakar, Senegal
The Gambia
Conakrie, Guinea
Freetown, Sierra Leone
Monrovia, Liberia
Abijan,Cote D'Ivoire
Accra,Ghana
Lome, Togo
Colonou, Benin
Lagos, Nigeria
Bonny, Nigeria
Douala, Cameroun
Bata, Equatorial Guinea
Libreville, Gabon
Sao Tome and Principe
Pointe Noir, Congo
Muanda, DRC
Cacuaco,Angola
Luanda,Angola
Swakopmund Namibia
Maputo Mozambique
Mtunzini
Yzerfontein
Melkbosstrand
Fujairah United Arab Emirates
Oman
Jeddah Saudi Arabia
Port Sudan Sudan
Massiwa Eritrea
Djibouti
Mogadishu Somalia
Mombasa Kenya
Dar Es Salaam Tanzania
Moroni Comores
Mayotte
Seychelles
Tamatave Madagascar
Toliara Madagascar
Baie du Jacobet, Mauritius
St Paul Reunion
Karachi Pakistan
Mumbai India
Chennai India
Cochin India
Colombo SriLanka
African Undersea Cables
(a history by @stevesong)
manypossibilities.net/african-undersea-cables
Creative Commons - CC - BY

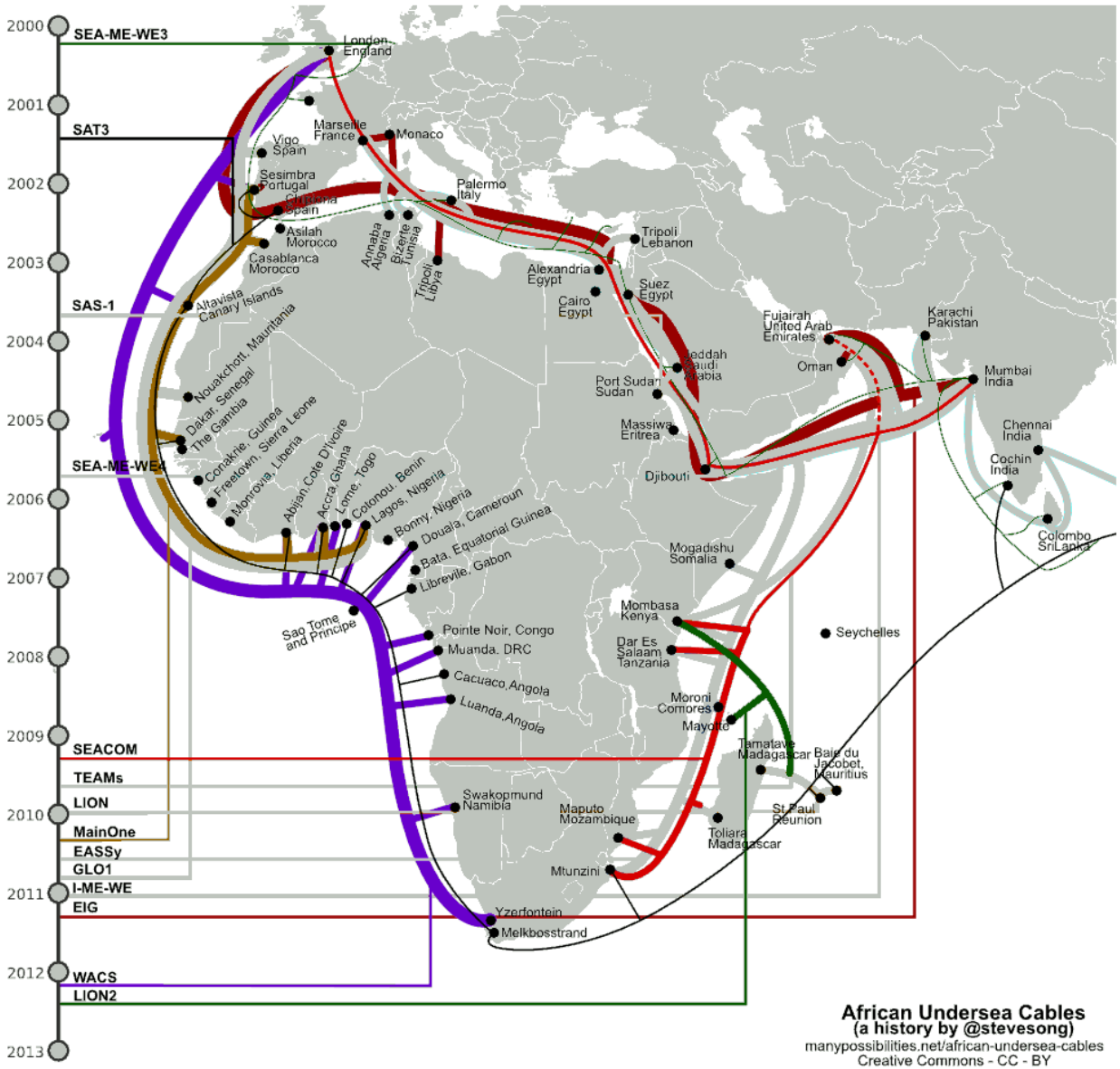

2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
SEA-ME-WE3
SAT3
SAS-1
SEA-ME-WE4
SEACOM
TEAMs
LION
MainOne
EASSy
London, England
Marseille France
Monaco
Vigo Spain
Sesimbra Portugal
Chipiona Spain
Asilah Morocco
Casablanca Morocco
Palermo Italy
Annaba Algeria
Bizerte Tunisia
Tripoli Libya
Tripoli Lebanon
Alexandria Egypt
Cairo Egypt
Suez Egypt
Fujairah United Arab Emirates
Karachi Pakistan
Oman
Jeddah Saudi Arabia
Port Sudan Sudan
Massiwa Eritrea
Djibouti
Mumbai India
Chennai India
Cochin India
Colombo SriLanka
Mogadishu Somalia
Mombasa Kenya
Dar Es Salaam Tanzania
Seychelles
Moroni Comores
Mayotte
Tamatave Madagascar
Baie du Jacobet, Mauritius
St Paul Reunion
Toliara Madagascar
Maputo Mozambique
Mtunzini
Swakopmund Namibia
Yzerfontein
Melkbosstrand
Altavista Canary Islands
Nouakchott, Mauritania
Dakar, Senegal
The Gambia
Conakrie, Guinea
Freetown, Sierra Leone
Monrovia, Liberia
Abijan, Cote D'Ivoire
Accra, Ghana
Lome, Togo
Cotonou, Benin
Lagos, Nigeria
Bonny, Nigeria
Douala, Cameroun
Bata, Equatorial Guinea
Libreville, Gabon
Sao Tome and Principe
Pointe Noir, Congo
Muanda, DRC
Cacuaco,Angola
Luanda,Angola
African Undersea Cables
(a history by @stevesong)
manypossibilities.net/african-undersea-cables
Creative Commons - CC - BY

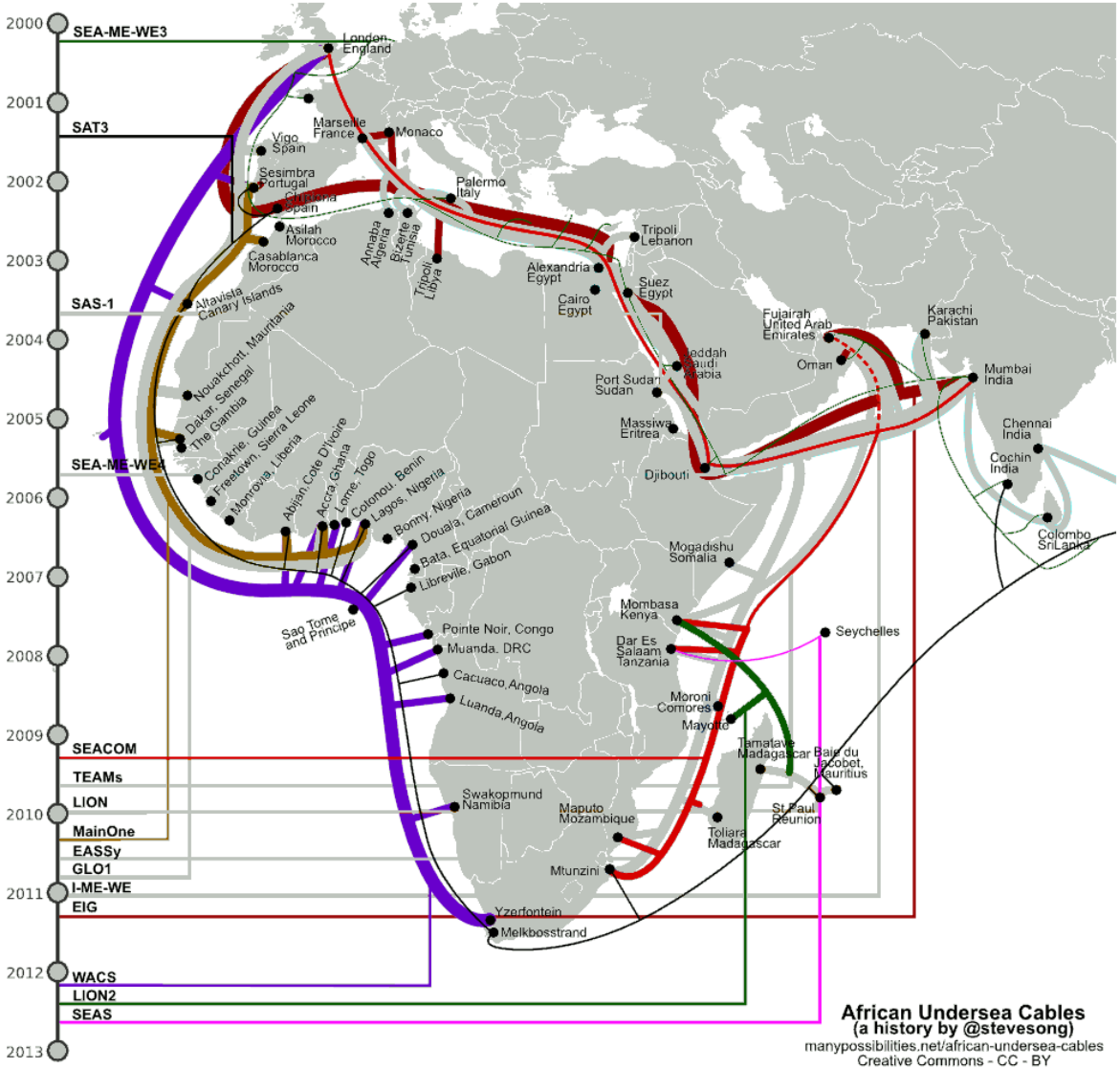

2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
SEA-ME-WE3
SAT3
SAS-1
SEA-ME-WE4
SEACOM
TEAMs
LION
MainOne
EASSy
GLO1
London, England
Marseille France
Monaco
Vigo Spain
Sesimbra Portugal
Chipiona Spain
Asilah Morocco
Casablanca Morocco
Palermo Italy
Annaba Algeria
Bizerte Tunisia
Tripoli Libya
Tripoli Lebanon
Alexandria Egypt
Suez Egypt
Cairo Egypt
Altavista Canary Islands
Nouakchott, Mauritania
Dakar, Senegal
The Gambia
Conakrie, Guinea
Freetown, Sierra Leone
Monrovia, Liberia
Abijan, Cote D'Ivoire
Accra, Ghana
Lome, Togo
Cotonou, Benin
Lagos, Nigeria
Bonny, Nigeria
Douala, Cameroun
Bata, Equatorial Guinea
Libreville, Gabon
Sao Tome and Principe
Pointe Noir, Congo
Muanda, DRC
Cacuaco, Angola
Luanda, Angola
Swakopmund Namibia
Yzerfontein
Melkbosstrand
Mtunzini
Maputo Mozambique
Toliara Madagascar
Tamatave Madagascar
Baie du Jacobet, Mauritius
St Paul Reunion
Moroni Comores
Mayotte
Mombasa Kenya
Dar Es Salaam Tanzania
Mogadishu Somalia
Djibouti
Massiwa Eritrea
Port Sudan Sudan
Jeddah Saudi Arabia
Fujairah United Arab Emirates
Oman
Karachi Pakistan
Mumbai India
Chennai India
Cochin India
Colombo SriLanka
Seychelles
African Undersea Cables
(a history by @stevesong)
manypossibilities.net/african-undersea-cables
Creative Commons - CC - BY

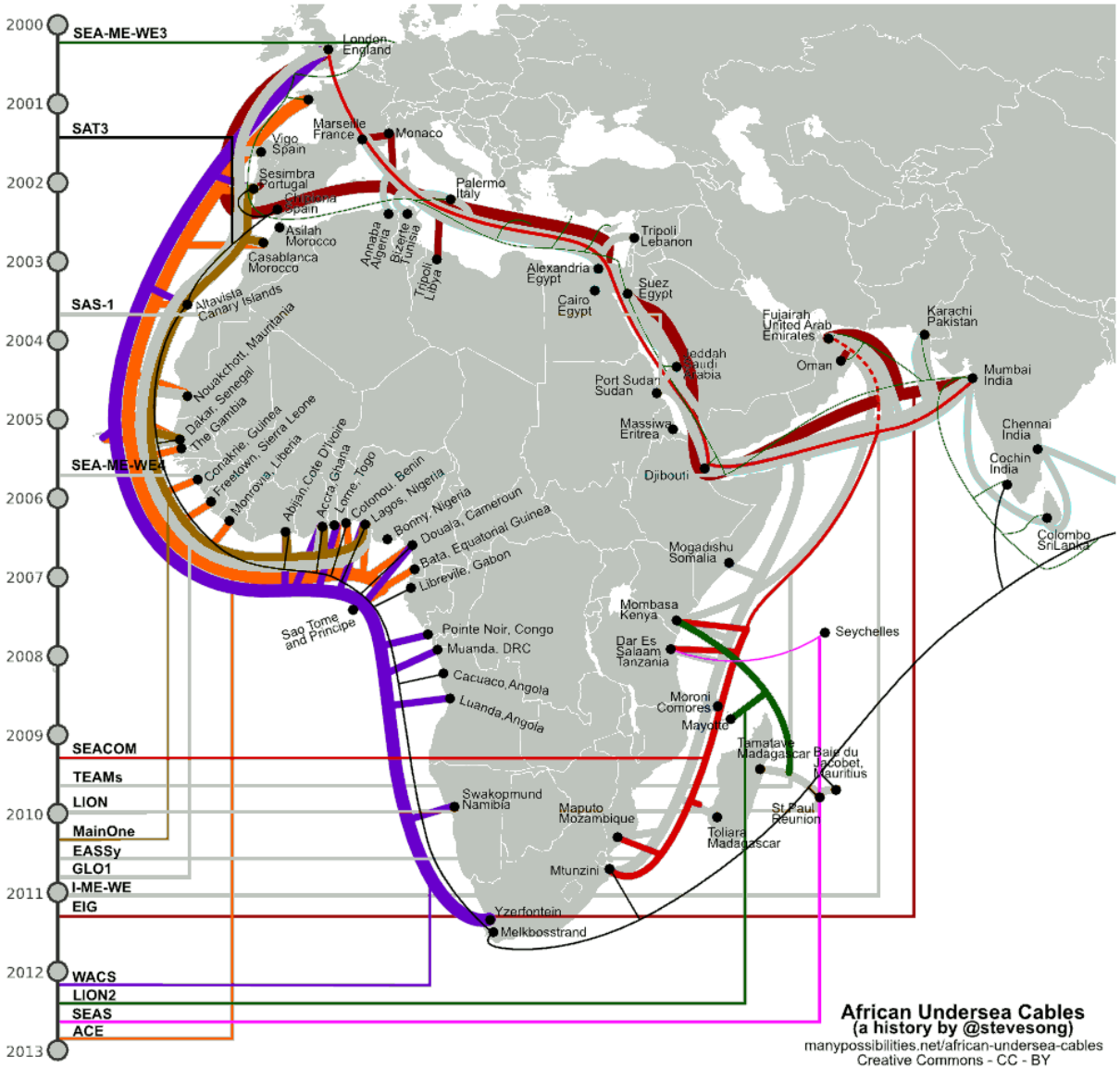

2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
SEA-ME-WE3
SAT3
SAS-1
SEA-ME-WE4
SEACOM
TEAMs
LION
MainOne
EASSy
GLO1
I-ME-WE
London England
Marseille France
Monaco
Vigo Spain
Sesimbra Portugal
Chipiona Spain
Asilah Morocco
Casablanca Morocco
Palermo Italy
Annaba Algeria
Bizerte Tunisia
Tripoli Libya
Tripoli Lebanon
Alexandria Egypt
Cairo Egypt
Suez Egypt
Altavista Canary Islands
Nouakchott, Mauritania
Dakar, Senegal
The Gambia
Conakrie, Guinea
Freetown, Sierra Leone
Monrovia, Liberia
Abijan,Cote D'Ivoire
Accra,Ghana
Lome, Togo
Colonou, Benin
Lagos, Nigeria
Bonny, Nigeria
Douala, Cameroun
Bata, Equatorial Guinea
Libreville, Gabon
Sao Tome and Principe
Pointe Noir, Congo
Muanda, DRC
Cacuaco,Angola
Luanda,Angola
Swakopmund Namibia
Yzerfontein
Melkbosstrand
Maputo Mozambique
Mtunzini
Fujairah United Arab Emirates
Oman
Jeddah Saudi Arabia
Port Sudan Sudan
Massiwa Eritrea
Djibouti
Karachi Pakistan
Mumbai India
Chennai India
Cochin India
Colombo SriLanka
Mogadishu Somalia
Mombasa Kenya
Dar Es Salaam Tanzania
Seychelles
Moroni Comores
Mayotte
Tamatave Madagascar
Baie du Jacobet, Mauritius
St Paul Reunion
Toliara Madagascar
African Undersea Cables
(a history by @stevesong)
manypossibilities.net/african-undersea-cables
Creative Commons - CC - BY

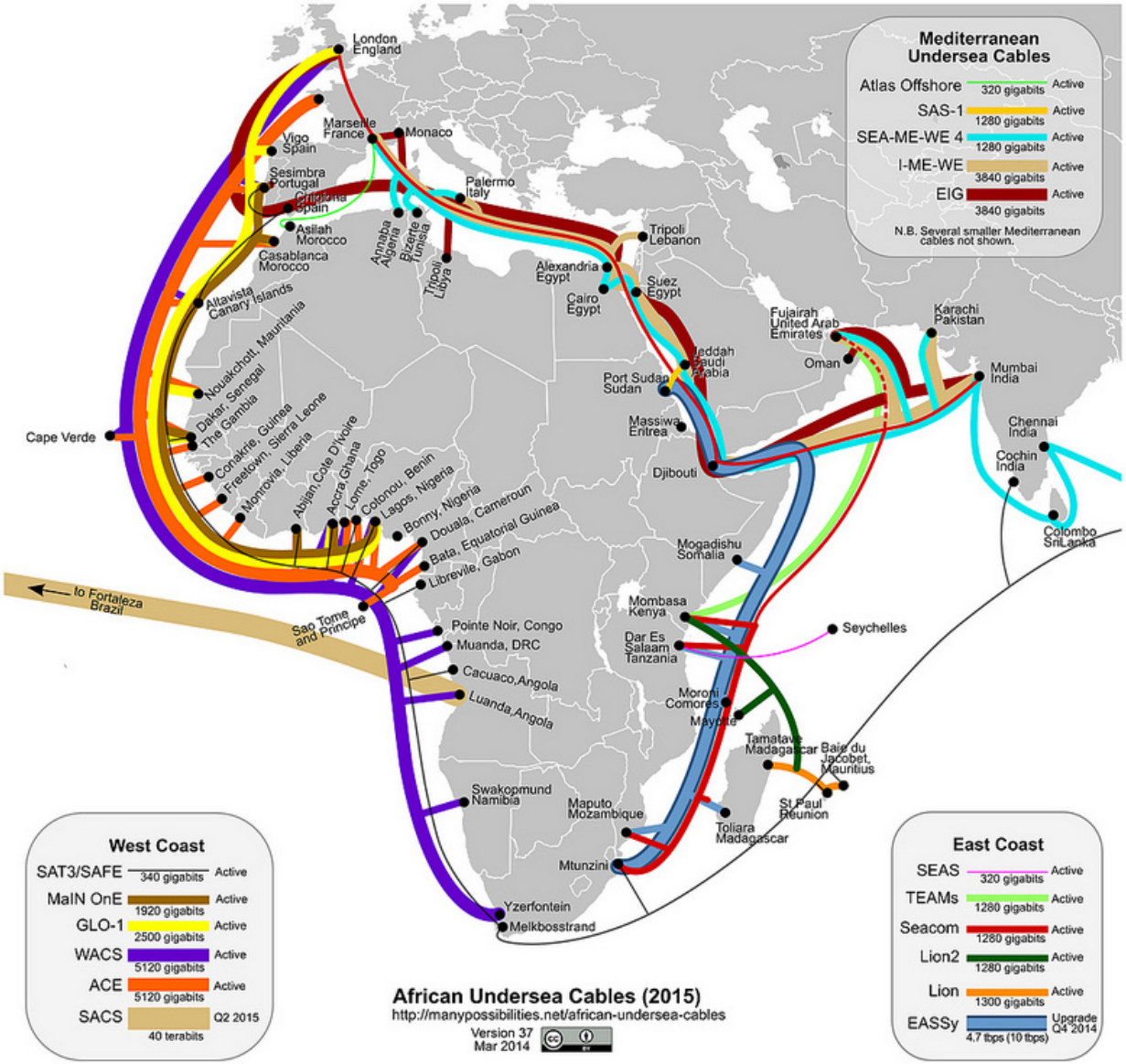

2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
SEA-ME-WE3
SAT3
SAS-1
SEA-ME-WE4
SEACOM
TEAMs
LION
MainOne
EASSy
GLO1
I-ME-WE
EIG
London, England
Marseille France
Monaco
Vigo Spain
Sesimbra Portugal
Chipiona Spain
Palermo Italy
Asilah Morocco
Casablanca Morocco
Annaba Algeria
Bizerte Tunisia
Tripoli Libya
Tripoli Lebanon
Alexandria Egypt
Cairo Egypt
Suez Egypt
Fujairah United Arab Emirates
Oman
Karachi Pakistan
Mumbai India
Chennai India
Cochin India
Colombo SriLanka
Jeddah Saudi Arabia
Port Sudan Sudan
Massiwa Eritrea
Djibouti
Mogadishu Somalia
Mombasa Kenya
Dar Es Salaam Tanzania
Seychelles
Moroni Comoros
Mayotte
Tamatave Madagascar
Baie du Jacobet, Mauritius
St Paul Reunion
Toliara Madagascar
Maputo Mozambique
Swakopmund Namibia
Mtunzini
Yzerfontein
Melkbosstrand
Sao Tome and Principe
Pointe Noir, Congo
Muanda, DRC
Cacuaco,Angola
Luanda,Angola
Libreville, Gabon
Bata, Equatorial Guinea
Douala, Cameroun
Bonny, Nigeria
Lagos, Nigeria
Cotonou, Benin
Lome, Togo
Accra Ghana
Abijan,Cote D'Ivoire
Monrovia, Liberia
Freetown, Sierra Leone
Conakrie, Guinea
The Gambia
Dakar, Senegal
Nouakchott, Mauritania
Allvavista Canary Islands
African Undersea Cables
(a history by @stevesong)
manypossibilities.net/african-undersea-cables
Creative Commons - CC - BY


2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
SEA-ME-WE3
SAT3
SAS-1
SEA-ME-WE4
SEACOM
TEAMs
LION
MainOne
EASSy
GLO1
I-ME-WE
EIG
WACS
London, England
Marseille France
Monaco
Vigo Spain
Sesimbra Portugal
Palermo Italy
Asilah Morocco
Casablanca Morocco
Annaba Algeria
Bizerte Tunisia
Tripoli Libya
Tripoli Lebanon
Alexandria Egypt
Cairo Egypt
Suez Egypt
Altavista Canary Islands
Nouakchott, Mauritania
Dakar, Senegal
The Gambia
Conakrie, Guinea
Freetown, Sierra Leone
Monrovia, Liberia
Abijan,Cote D'Ivoire
Accra,Ghana
Lome, Togo
Colonou, Benin
Lagos, Nigeria
Bonny, Nigeria
Douala, Cameroun
Bata, Equatorial Guinea
Libreville, Gabon
Sao Tome and Principe
Pointe Noir, Congo
Muanda, DRC
Cacuaco,Angola
Luanda,Angola
Swakopmund Namibia
Yzerfontein
Melkbosstrand
Port Sudan Sudan
Massiwa Eritrea
Djibouti
Fujairah United Arab Emirates
Oman
Karachi Pakistan
Mumbai India
Chennai India
Cochin India
Colombo SriLanka
Mogadishu Somalia
Mombasa Kenya
Dar Es Salaam Tanzania
Seychelles
Moroni Comores
Mayotte
Tamatave Madagascar
Baie du Jacobet, Mauritius
St Paul Reunion
Toliara Madagascar
Maputo Mozambique
Mtunzini
African Undersea Cables
(a history by @stevesong)
manypossibilities.net/african-undersea-cables
Creative Commons - CC - BY


2000
SEA-ME-WE3
2001
SAT3
2002
2003
SAS-1
2004
2005
SEA-ME-WE4
2006
2007
2008
2009
SEACOM
TEAMs
LION
2010
MainOne
EASSy
GLO1
I-ME-WE
2011
EIG
2012
WACS
LION2
2013
London, England
Marseille France
Monaco
Vigo Spain
Sesimbra Portugal
Palermo Italy
Asilah Morocco
Casablanca Morocco
Annaba Algeria
Bizerte Tunisia
Tripoli Libya
Tripoli Lebanon
Alexandria Egypt
Cairo Egypt
Suez Egypt
Altavista Canary Islands
Nouakchott, Mauritania
Dakar, Senegal
The Gambia
Conakrie, Guinea
Freetown, Sierra Leone
Monrovia, Liberia
Abijan,Cote D'Ivoire
Accra,Ghana
Lome, Togo
Cotonou, Benin
Lagos, Nigeria
Bonny, Nigeria
Douala, Cameroun
Bata, Equatorial Guinea
Libreville, Gabon
Sao Tome and Principe
Pointe Noir, Congo
Muanda, DRC
Cacuaco,Angola
Luanda,Angola
Swakopmund Namibia
Yzerfontein
Melkbosstrand
Maputo Mozambique
Mtunzini
Toliara Madagascar
Port Sudan Sudan
Massiwa Eritrea
Djibouti
Jeddah Saudi Arabia
Fujairah United Arab Emirates
Oman
Karachi Pakistan
Mumbai India
Chennai India
Cochin India
Colombo SriLanka
Mogadishu Somalia
Mombasa Kenya
Dar Es Salaam Tanzania
Moroni Comores
Mayotte
Seychelles
Tamatave Madagascar
Baie du Jacobet, Mauritius
St Paul Reunion
African Undersea Cables
(a history by @stevesong)
manypossibilities.net/african-undersea-cables
Creative Commons - CC - BY


2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
SEA-ME-WE3
SAT3
SAS-1
SEA-ME-WE4
SEACOM
TEAMs
LION
MainOne
EASSy
GLO1
I-ME-WE
EIG
WACS
LION2
SEAS
London, England
Marseille France
Monaco
Vigo Spain
Sesimbra Portugal
Chipiona Spain
Palermo Italy
Asilah Morocco
Casablanca Morocco
Annaba Algeria
Bizerte Tunisia
Tripoli Libya
Tripoli Lebanon
Alexandria Egypt
Cairo Egypt
Suez Egypt
Altavista Canary Islands
Nouakchott, Mauritania
Dakar, Senegal
The Gambia
Conakrie, Guinea
Freetown, Sierra Leone
Monrovia, Liberia
Abijan, Cote D'Ivoire
Accra, Ghana
Lome, Togo
Cotonou, Benin
Lagos, Nigeria
Bonny, Nigeria
Douala, Cameroun
Bata, Equatorial Guinea
Libreville, Gabon
Sao Tome and Principe
Pointe Noir, Congo
Muanda, DRC
Cacuaco,Angola
Luanda,Angola
Swakopmund Namibia
Yzerfontein
Melkbosstrand
Maputo Mozambique
Mtunzini
Toliara Madagascar
Mombasa Kenya
Dar Es Salaam Tanzania
Moroni Comores
Mayotte
Tamatave Madagascar
Baie du Jacobet, Mauritius
St Paul Reunion
Seychelles
Mogadishu Somalia
Djibouti
Massiwa Eritrea
Port Sudan Sudan
Jeddah Saudi Arabia
Fujairah United Arab Emirates
Oman
Karachi Pakistan
Mumbai India
Chennai India
Cochin India
Colombo SriLanka
African Undersea Cables
(a history by @stevesong)
manypossibilities.net/african-undersea-cables
Creative Commons - CC - BY


2000
SEA-ME-WE3
2001
SAT3
2002
2003
SAS-1
2004
2005
SEA-ME-WE4
2006
2007
2008
2009
SEACOM
TEAMs
LION
2010
MainOne
EASSy
GLO1
2011
I-ME-WE
EIG
2012
WACS
LION2
SEAS
ACE
2013
London, England
Marseille France
Monaco
Vigo Spain
Sesimbra Portugal
Chipiona Spain
Asilah Morocco
Casablanca Morocco
Palermo Italy
Annaba Algeria
Bizerte Tunisia
Tripoli Libya
Tripoli Lebanon
Alexandria Egypt
Cairo Egypt
Suez Egypt
Altavista Canary Islands
Nouakchott, Mauritania
Dakar, Senegal
The Gambia
Conakrie, Guinea
Freetown, Sierra Leone
Monrovia, Liberia
Abijan, Cote D'Ivoire
Accra Ghana
Lome, Togo
Cotonou, Benin
Lagos, Nigeria
Bonny, Nigeria
Douala, Cameroun
Bata, Equatorial Guinea
Libreville, Gabon
Sao Tome and Principe
Pointe Noir, Congo
Muanda, DRC
Cacuaco,Angola
Luanda,Angola
Swakopmund Namibia
Yzerfontein
Melkbosstrand
Jeddah Saudi Arabia
Port Sudan Sudan
Massiwa Eritrea
Djibouti
Fujairah United Arab Emirates
Oman
Karachi Pakistan
Mumbai India
Chennai India
Cochin India
Colombo SriLanka
Mogadishu Somalia
Mombasa Kenya
Dar Es Salaam Tanzania
Seychelles
Moroni Comores
Mayotte
Tamatave Madagascar
Baie du Jacobet, Mauritius
St Paul Reunion
Toliara Madagascar
Maputo Mozambique
Mtunzini
African Undersea Cables
(a history by @stevesong)
manypossibilities.net/african-undersea-cables
Creative Commons - CC - BY


Mediterranean Undersea Cables
Atlas Offshore 320 gigabits Active
SAS-1 1280 gigabits Active
SEA-ME-WE 4 1280 gigabits Active
I-ME-WE 3840 gigabits Active
EIG 3840 gigabits Active
N.B. Several smaller Mediterranean cables not shown.
West Coast
SAT3/SAFE 340 gigabits Active
MaIN OnE 1920 gigabits Active
GLO-1 2500 gigabits Active
WACS 5120 gigabits Active
ACE 5120 gigabits Active
SACS 40 terabits Q2 2015
East Coast
SEAS 320 gigabits Active
TEAMs 1280 gigabits Active
Seacom 1280 gigabits Active
Lion2 1280 gigabits Active
Lion 1300 gigabits Active
EASSy 4.7 tbps (10 tbps) Upgrade Q4 2014
African Undersea Cables (2015)
http://manypossibilities.net/african-undersea-cables
Version 37
Mar 2014
London England
Marseille France
Monaco
Vigo Spain
Sesimbra Portugal
Conil Spain
Asilah Morocco
Casablanca Morocco
Palermo Italy
Annaba Algeria
Bizerte Tunisia
Tripoli Libya
Tripoli Lebanon
Alexandria Egypt
Cairo Egypt
Suez Egypt
Altavista Canary Islands
Nouakchott, Mauritania
Dakar, Senegal
The Gambia
Cape Verde
Conakrie, Guinea
Freetown, Sierra Leone
Monrovia, Liberia
Abijan, Cote D'Ivoire
Accra, Ghana
Lome, Togo
Cotonou, Benin
Lagos, Nigeria
Bonny, Nigeria
Douala, Cameroun
Bata, Equatorial Guinea
Libreville, Gabon
to Fortaleza Brazil
Sao Tome and Principe
Pointe Noir, Congo
Muanda, DRC
Cacuaco,Angola
Luanda,Angola
Swakopmund Namibia
Maputo Mozambique
Mtunzini
Yzerfontein
Melkbosstrand
Toliara Madagascar
Tamatave Madagascar
Baie du Jacobet, Mauritius
St Paul Reunion
Moroni Comores
Mayotte
Mombasa Kenya
Dar Es Salaam Tanzania
Seychelles
Mogadishu Somalia
Djibouti
Massiwa Eritrea
Port Sudan Sudan
Jeddah Saudi Arabia
Fujairah United Arab Emirates
Oman
Karachi Pakistan
Mumbai India
Chennai India
Cochin India
Colombo SriLanka

Contacting WACREN …

- www.wacren.net
- info@wacren.net
- @wacren
- community@lists.wacren.net
- tech@lists.wacren.net

THANK YOU !

Boubakar Barry

Boubakar.Barry@wacren.net

info@wacren.net