Hébergé par: Organisé par:

Évènement National Africa-BB-Maps

Systèmes nationaux de cartographie à large bande au Bénin

9—11 Septembre 2025
Cotonou, Bénin

africabbmaps.itu.int/bj-kickoff/

Cérémonie d’Ouverture

Dr. Cosmas Zavazava

Director, ITU Telecommunication Development Bureau

Joel Neubert

Chef de Cooperation

Delegation de l'UE au Benin

Flavien BACHABI

Président de l' ARCEP Benin

Cérémonie d’Ouverture

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Photo de groupe officielle

Programme Jour 1

8:30 – 9:00	REGISTRATION AND WELCOME COFFEE
9:00 – 9:30	Opening Ceremony
9:30 – 9:45	Official Group photo
9:45 – 10:00	Keynote: The Role of Broadband Mapping in National Digital Development Plans
10:00 – 10:30	SESSION 1a: Context and Current State – Intervention by ARCEP
10:30 - 11:00	Coffee Break
11:00- 12:00	SESSION 1b: Context and Current State – Intervention by Governmental & Public sector
12:00 – 13:00	LUNCH BREAK
13:00 – 14:00	SESSION 1c: Context and Current State – Intervention by the Private Sector
14:00 – 14:15	Coffee Break
14:15 – 15:15	SESSION 2: Africa-BB-Maps in Côte d'Ivoire : Objectives, Technical Framework, Timeline
15:15 – 16:45	Recap of Day 1 and Objectives of Day 2

Présentation : Le rôle de la cartographie du haut débit dans les plans nationaux de développement numérique

Mr Ali Drissa Badiel

ITU Area Representative for Western Africa, ITU Regional office for Africa

Session 1a: Contexte et état des lieux - Intervention de l'ARCEP

Q&R et Discussion Session 1a

Pause-café

Session 1b: Contexte et état des lieux – Développement des systems de cartographie, Intervention du secteur public

Q&R et Discussion Session 1b

Session 1b: Contexte et état des lieux – Développement des systems de cartographie, Intervention du secteur public

Q&R et Discussion Session 1b

Session 1b: Contexte et état des lieux – Développement des systems de cartographie, Intervention du secteur public

Q&R et Discussion Session 1b

Pause Déjeuner

Session 1c: Contexte et état des lieux – Développement des systems de cartographie, Intervention du secteur privé

Modération: Mr. Dana Jon Kamason, Project Manager, Africa-BB-Maps, ITU

Session 1c: Contexte et état des lieux – Développement des systems de cartographie, Intervention du secteur privé

Mr Dana Jon Kamason

Project Manager, Africa-BB-Maps, ITU

Q&R et Discussion Session 1c

Session 2: Cartographie des réseaux enterrés: Problèmes et défis de la Côte d’Ivoire, comment y remédier?

Moderation: Mr. Dana Jon Kamason, Project Manager, Africa-BB-Maps, ITU

Pause-café

Session 2: Africa-BB-Maps au Benin: Objectifs, Méthodologie, Chronologie

Moderation: Mr. Dana Jon Kamason, Project Manager, Africa-BB-Maps, ITU

Session 2: Africa-BB-Maps au Benin : Objectifs, Méthodologie, Chronologie

Mr. Dana Jon Kamason

Project Manager, Africa-BB-Maps, ITU

Mr. Elind Sulmina

Project Officer, Africa-BB-Maps, ITU

Africa-BB-Maps - Objectif du Projet au Benin

To **establish** and **operationalise sustainable** national **broadband mapping systems** to enable:

- **Validated**, **publicly accessible** broadband data
- **Evidence-based** policy and regulation
- Targeted **infrastructure investment**
- Inclusive, equitable and **meaningful connectivity**
- Accelerated **digital transformation**
- **Regional harmonisation**
- Alignment with **international standards**

Africa-BB-Maps – 3 Pilliers Stratégiques pour le Benin

Africa-BB-Maps

Policy & Regulations

Creating the enabling environment for broadband mapping to thrive:

- Governance frameworks aligned with EU best practices
- Policy and regulatory integration
- Common data standards and interoperability
- Monitoring and evaluation mechanisms

Technology

Delivering state-of-the-art mapping platform:

- Geospatial platform (proprietary, open-source, or hybrid)
- Integration of infrastructure and service data
- Geoportals for public access and planning
- Tools for network analysis and policy formulation

Capacity Development

Empowering people and institutions to lead:

- Structured training through ITU Academy
- Hands-on learning in GIS, broadband policy, and data governance
- Support for ARCEP and stakeholders
- Benin- EU collaboration and regional knowledge exchange

National Ownership for Sustainability

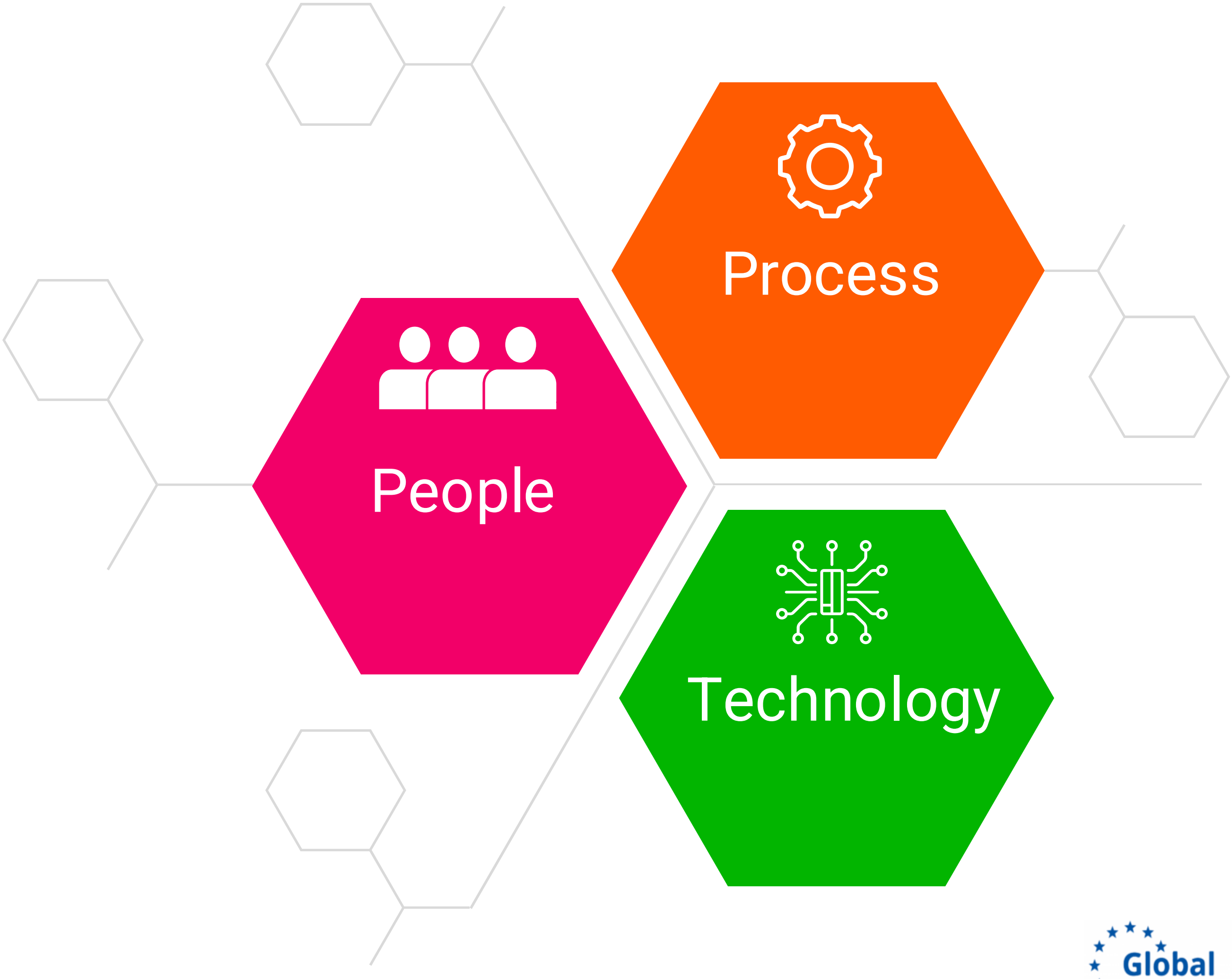
Global Gateway

Arcep BENIN

ITU

Africa-BB-Maps – Cadre Technique pour le Benin

People, Process, and Technology for Sustainable Broadband Mapping



Africa-BB-Maps – Résultat Attendu pour le Benin

01 Low

Status: No system, no capacity, no coordination.

Focus: Raise awareness and assess digital readiness.

02 Medium (Emerging)

Status: Foundations forming, but data and systems are minimal.

Focus: Build mandates, standards, and system blueprint.

03 Medium (Functional)

Status: Basic system running with limited features and data.

Focus: Deploy core components and train initial users.

04 High (Established)

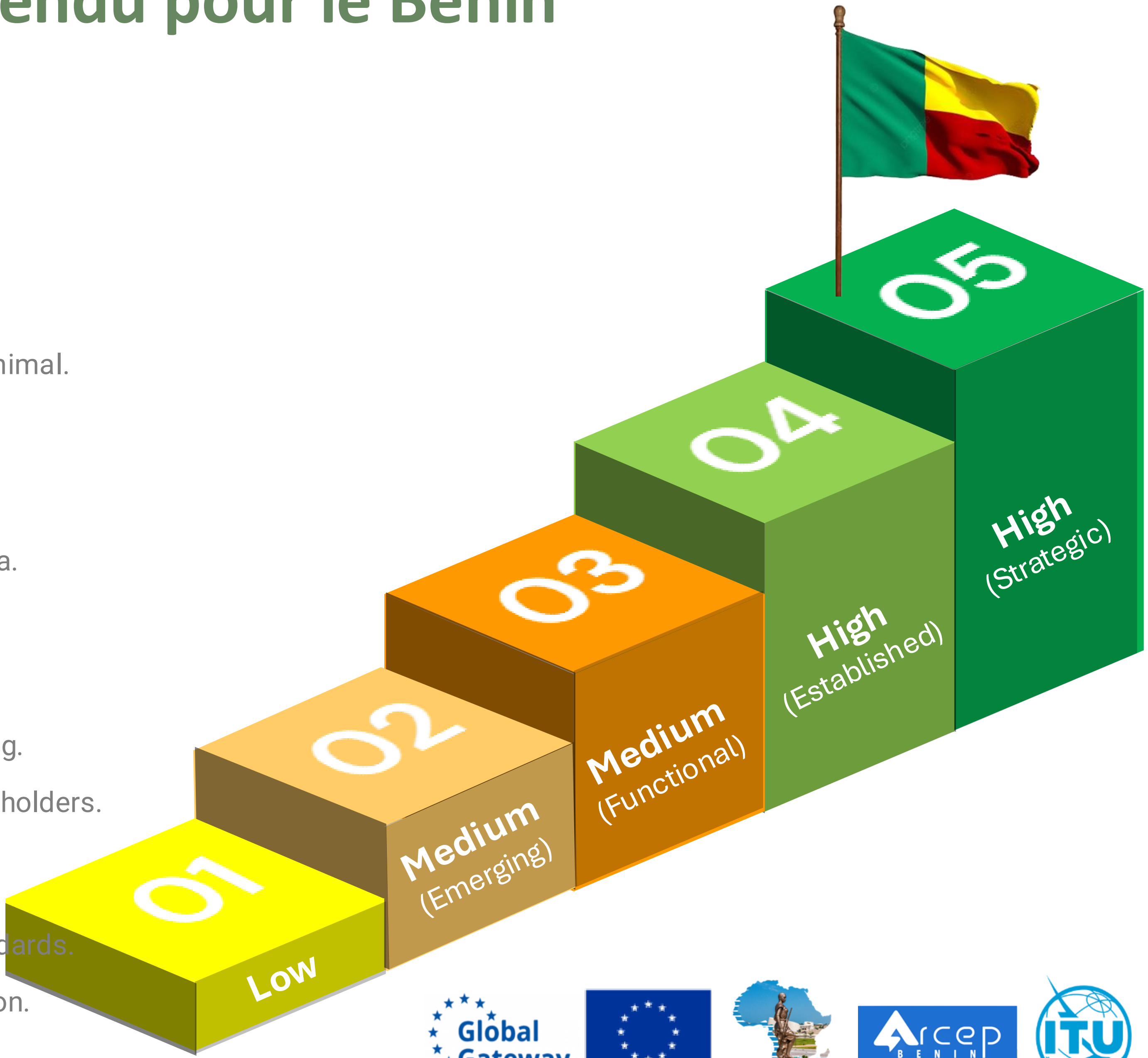
Status: Operational system integrated into national planning.

Focus: Institutionalise platform and scale use across stakeholders.

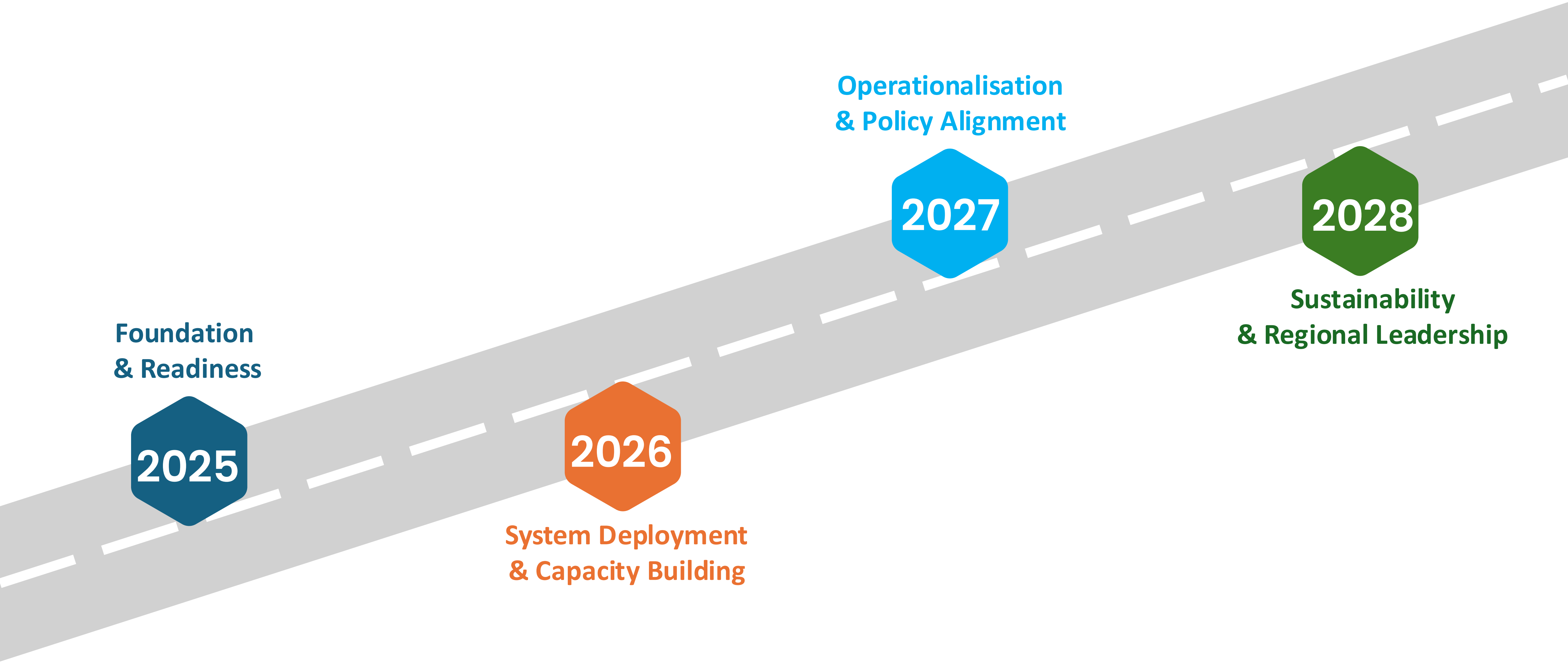
05 High (Strategic)

Status: Strategic tool aligned with regional and global standards.

Focus: Drive decision-making, enable regional harmonisation.



Africa-BB-Maps – Feuille de route pour le Benin



Session 2: Africa-BB-Maps au Benin
Aperçu de haut niveau de l'analyse des politiques

Mr. Elind Sulmina

Project Officer, Africa-BB-Maps, ITU

Travaux sur les politiques au Benin

Africa-BB-Maps vise à établir ou à renforcer les systèmes de cartographie à large bande au sein des autorités de régulation nationales, en s'assurant qu'elles disposent des capacités techniques, politiques et institutionnelles nécessaires pour les exploiter efficacement.

Nous visons un outil SIG de haute gamme

Mais pour ça on a un objectif politique : Renforcer les politiques necessaires pour un bon fonctionnement de ce système, pour que la cartographie du haut débit puisse fonctionner sans contraintes réglementaires.

Produits :

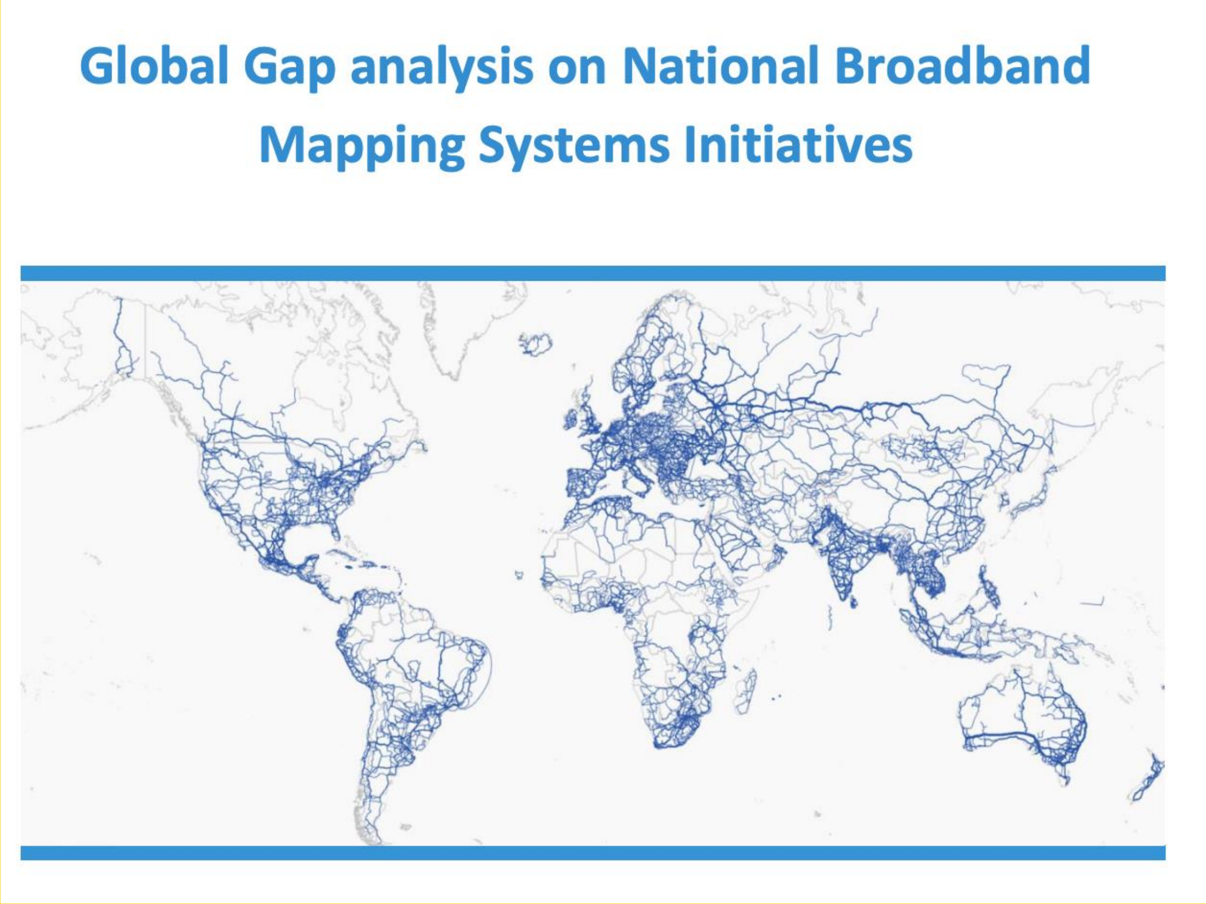
- 1.2 Analyse des politiques et lignes directrices au niveau national
- 1.3 Dialogue et sensibilisation aux niveaux national et régional

Piliers du travail politique

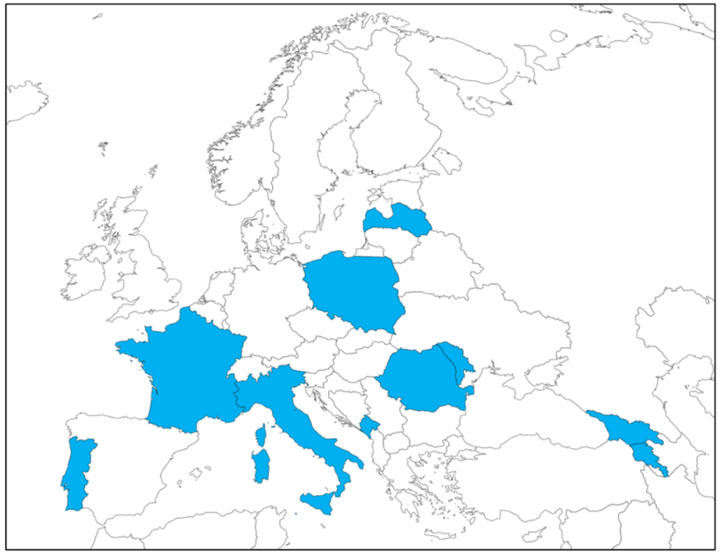
La composante politique d’Africa-BB-Maps repose sur trois piliers interconnectés qui guident toutes les interventions nationales.

1. Réaliser une évaluation de référence et une analyse des besoins – Revue ciblée de l’écosystème national afin d’identifier les lacunes et d’affiner les approches.
2. Fournir des recommandations ciblées – Renforcer les cadres juridiques et réglementaires et optimiser les systèmes techniques.
3. Dialogue politique et sensibilisation – Favoriser la compréhension, l’alignement des parties prenantes et l’harmonisation régionale.

Pratiques et cadres réglementaires 2021 et 2023

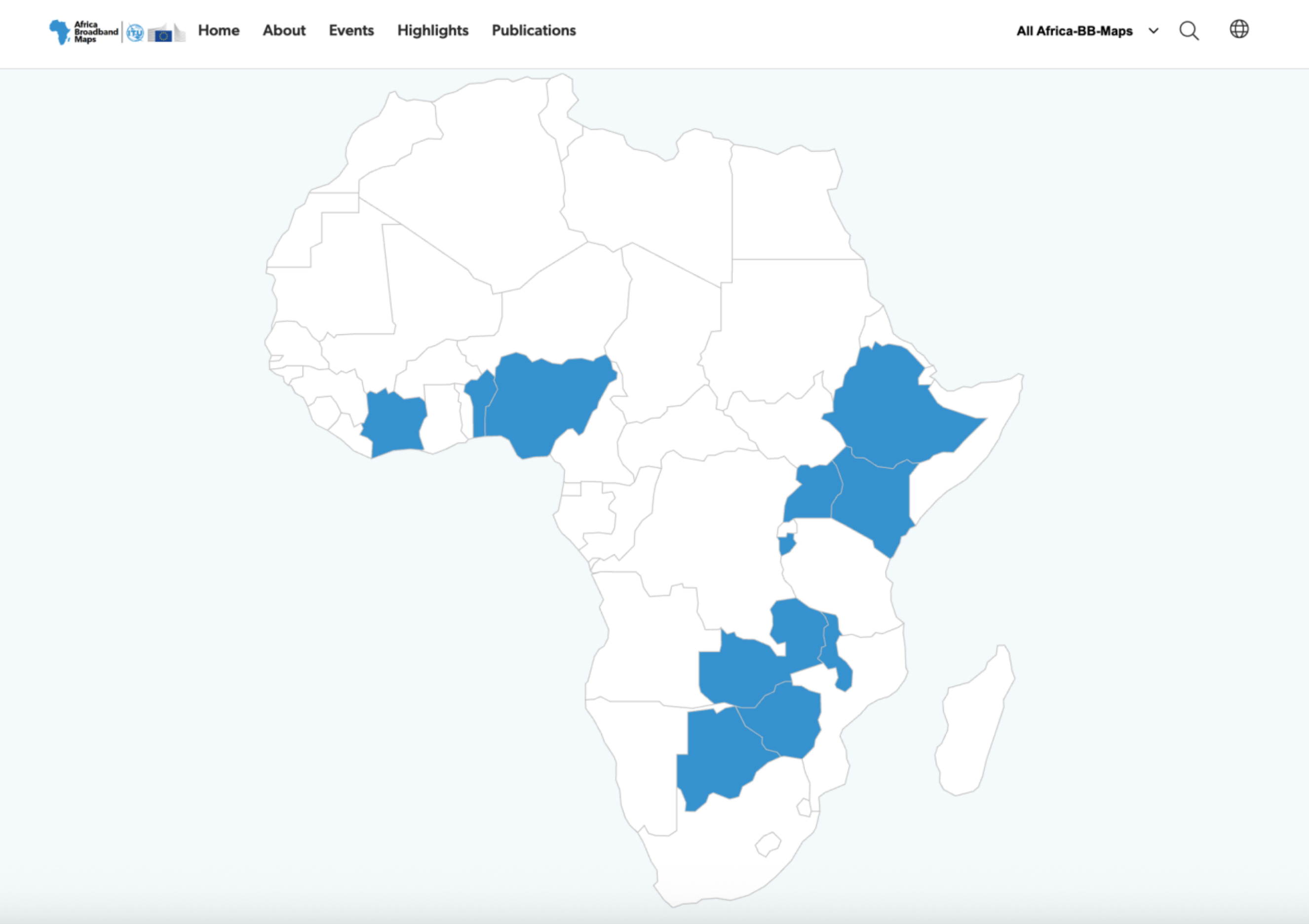


Pratiques et cadres réglementaires 2023

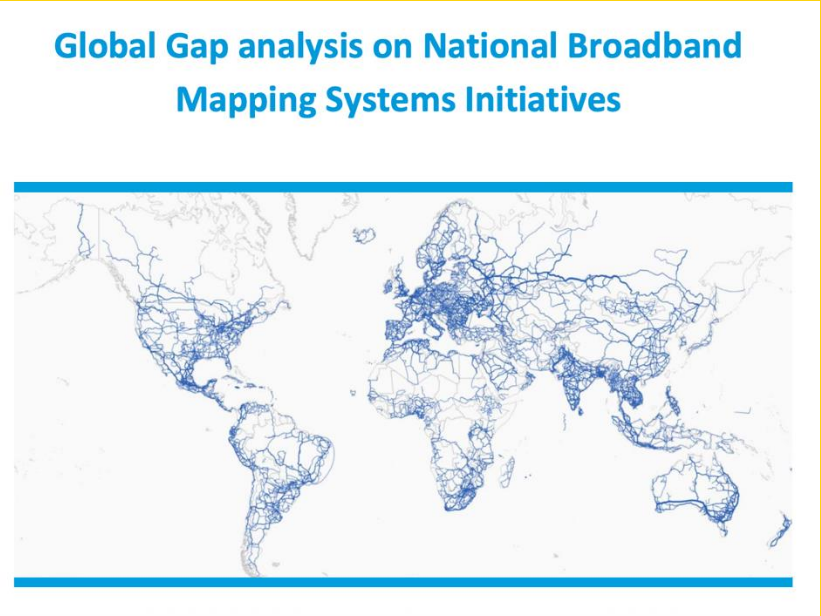


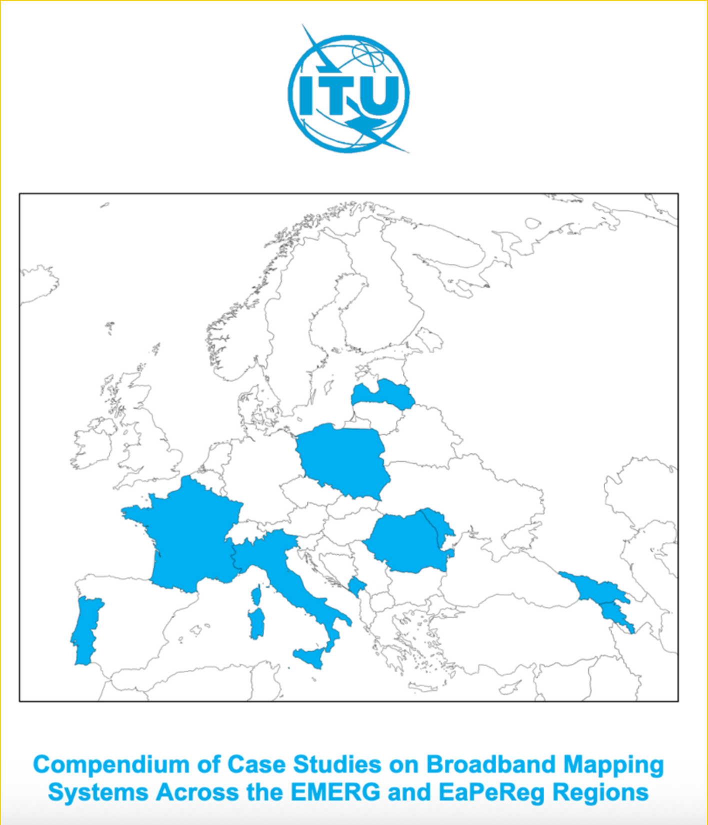
Compendium of Case Studies on Broadband Mapping Systems Across the EMERG and EaPeReg Regions

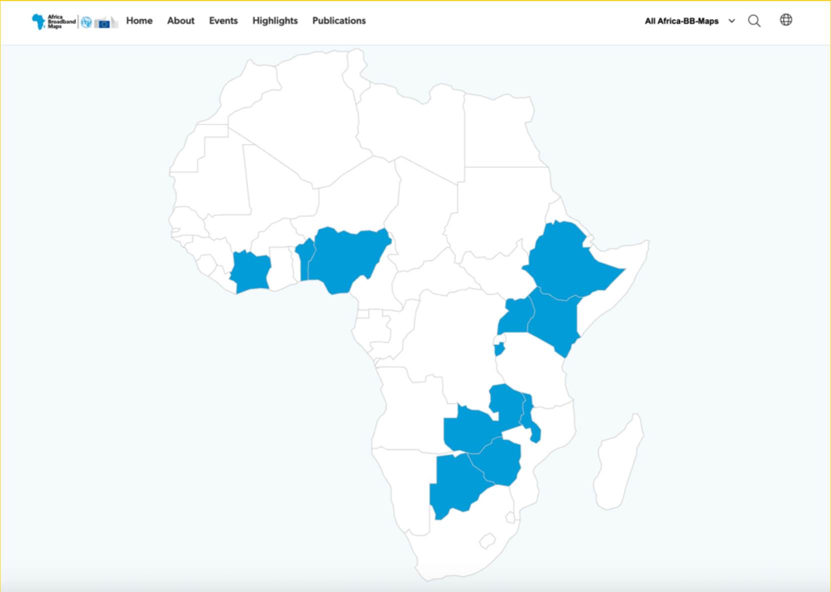
Pratiques et cadres réglementaires 2025



Pratiques et cadres réglementaires 2021 – 2023 – 2025



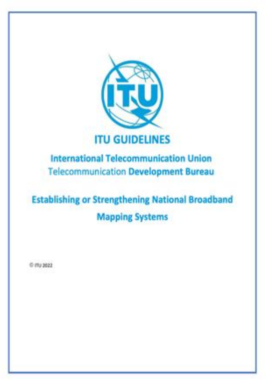




Pratiques et cadres réglementaires

S’inspirer des meilleures pratiques mondiales, telles que celles de l’UIT et de l’UE

- Lignes directrices de l’UIT sur l’établissement ou le renforcement des systèmes nationaux de cartographie du haut débit
- Rapport d’analyse des politiques de l’UIT sur l’établissement ou le renforcement d’un environnement favorable à la mise en place de systèmes de cartographie du haut débit
- Recueil de l’UIT d’études de cas sur les systèmes de cartographie du haut débit dans les régions EMERG et EaPeReg
- Lignes directrices de l’UE en matière d’aides d’État (2023)
- Code européen des communications électroniques (2018)



Promotion des systèmes nationaux de cartopgrahie à l'arge bande

La concertation politique est essentielle pour garantir que la cartographie du haut débit soit comprise, soutenue et intégrée dans les stratégies numériques nationales.

Africa-BB-Maps travaille afin de sensibiliser et de promouvoir l'harmonisation.

- Ateliers nationaux et régionaux
- Engagement avec les ministères, les régulateurs et le secteur privé
- Plaidoyer pour des approches harmonisées de la cartographie
- Partage des bonnes pratiques régionales et mondiales
- Mobilisation des parties prenantes pour l'adoption de la cartographie

Résultats politiques attendus

1. Une meilleure cohérence des politiques avec les bonnes pratiques régionales
2. Intégration de la cartographie du haut débit dans les stratégies nationales TIC
3. Des données transparentes et fiables pour les décisions d'investissement et de planification
4. Renforcement des capacités des institutions ivoiriennes à gérer les systèmes de cartographie
5. Contribution à l'harmonisation régionale et à la connectivité transfrontalière

Opening Remarks: Strategic Technical Priorities for Broadband Infrastructure Mapping

SESSION 3: Études de cas de l’UIT : quelles leçons en tirer ?

Moderation: Mr. Elind Sulmina, Project Officer, Africa-BB-Maps, ITU

Étude Polonais – Système SIG en Pologne

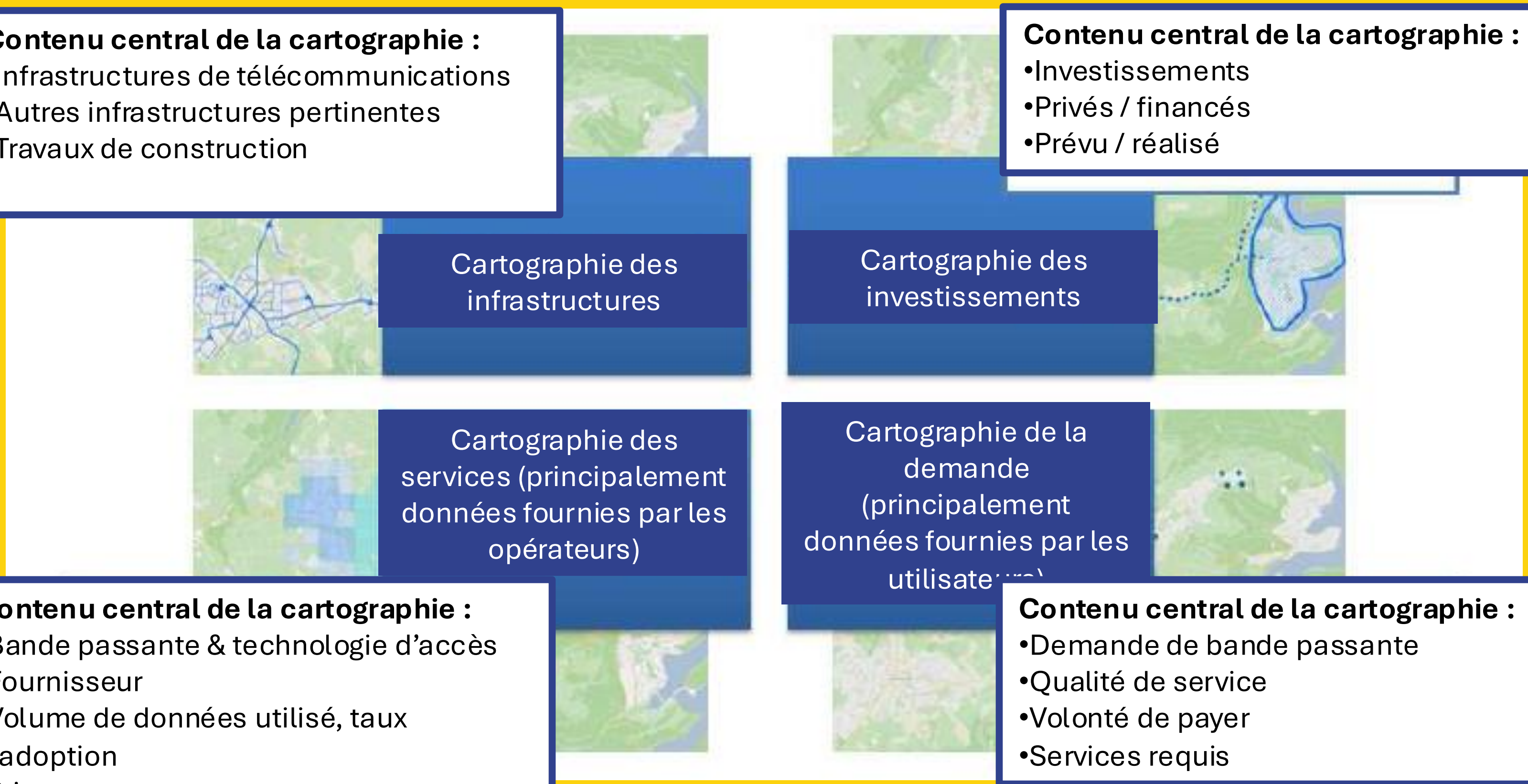
Moderation: Mr. Elind Sulmina, Project Officer, Africa-BB-Maps, ITU

Categories of Broadband Mapping

SESSION 3: Études de cas de l’UIT : quelles leçons en tirer ?

Contenu central de la cartographie :
- Infrastructures de télécommunications
- Autres infrastructures pertinentes
- Travaux de construction

Contenu central de la cartographie :
- Investissements
- Privés / financés
- Prévu / réalisé



Contenu central de la cartographie :
- Bande passante & technologie d’accès
- Fournisseur
- Volume de données utilisé, taux d’adoption
- Prix

Contenu central de la cartographie :
- Demande de bande passante
- Qualité de service
- Volonté de payer
- Services requis

Example de Structure des données

Nœuds	
Adresse du nœud – province	
Adresse du nœud – commune	
Adresse du nœud – identifiant unique de la commune (si possible)	
Adresse du nœud – nom de la ville	
Adresse du nœud – identifiant unique du nom de la ville (si possible)	
Adresse du nœud – nom de la rue	
Adresse du nœud – identifiant unique de la rue (si possible)	
Adresse du nœud – numéro du bâtiment	
Coordonnées du centre géométrique du nœud	**Coordonnées géographiques : longitude et latitude dans le système de coordonnées WGS-84 avec une précision de 1 m**
	Emplacement du nœud : • Bâtiment de bureaux • Bâtiment résidentiel • Bâtiment industriel • Bâtiment de services • Bâtiment public • Objet sacré • Infrastructure du réseau électrique • Tour • Mât • Conteneur • Poteau • Regard de câbles
Possibilité de partage de surface dans l’installation où le nœud est situé	Oui / Non

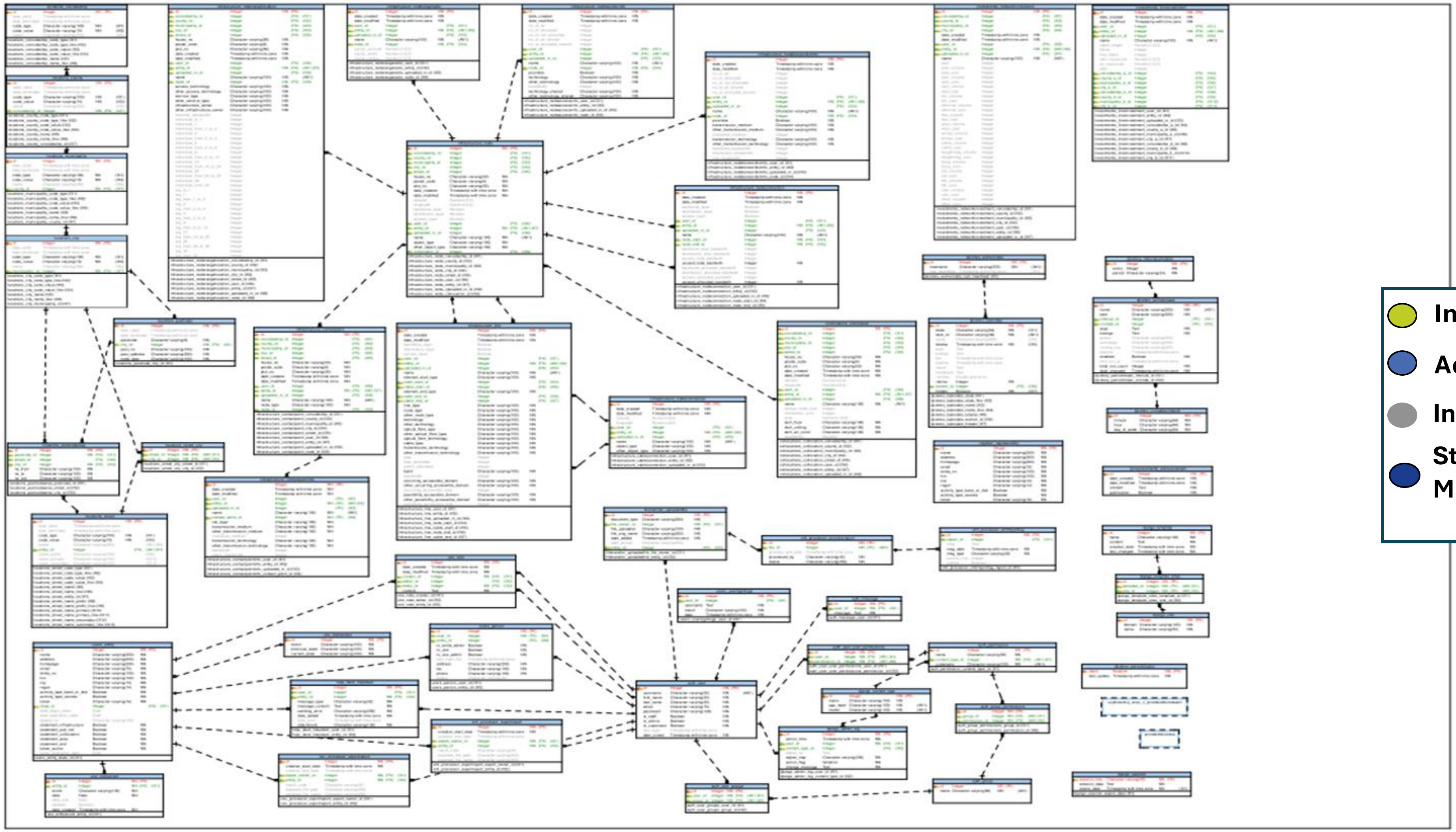
Example de Structure des données

Technologies pour les supports	Fibre optique : • 10 Mb/s Ethernet • 100 Mb/s Fast Ethernet • 1 Gigabit Ethernet • 10 Gigabit Ethernet • 40 Gigabit Ethernet • 100 Gigabit Ethernet • GPON • EPON • SDH • PDH • (EURO) DOCSIS 3.x • (EURO) DOCSIS 2.x • (EURO) DOCSIS 1.x Câble coaxial / cuivre : • (EURO) DOCSIS 3.x • (EURO) DOCSIS 2.x • (EURO) DOCSIS 1.x • 10 Mb/s Ethernet • 100 Mb/s Fast Ethernet • 1 Gigabit Ethernet • 10 Gigabit Ethernet • VDSL2 • VDSL • ADSL2+ • ADSL2 radio: • radio link, • WiFi 2.4 and 5 GHz; • WiFi - 5 GHz; • WiFi - 2.4 GHz;

Example de Structure des données

Couches du nœud de télécommunications	**Layer:** **Cœur de réseau (backbone)** **Distribution** **Accès**
Support de transmission	Transmission medium: • Fibre optique • Câble coaxial / cuivre • radio

Bande passante maximale pour une seule interface en téléchargement	
Bande passante maximale pour une seule interface en téléversement	
Nombre d’interfaces	
Source de financement du nœud	Source of funding: Commercial Aide publique (subvention de l’État)



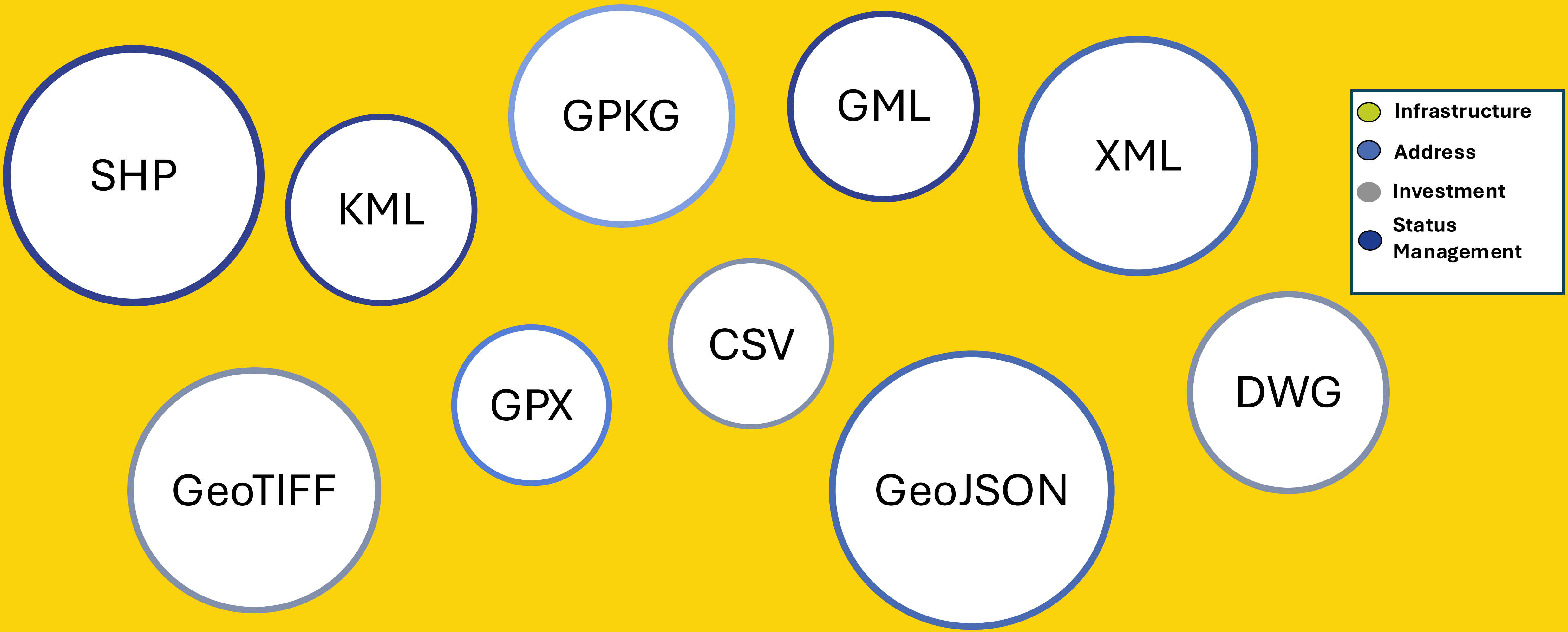
Infrastructure

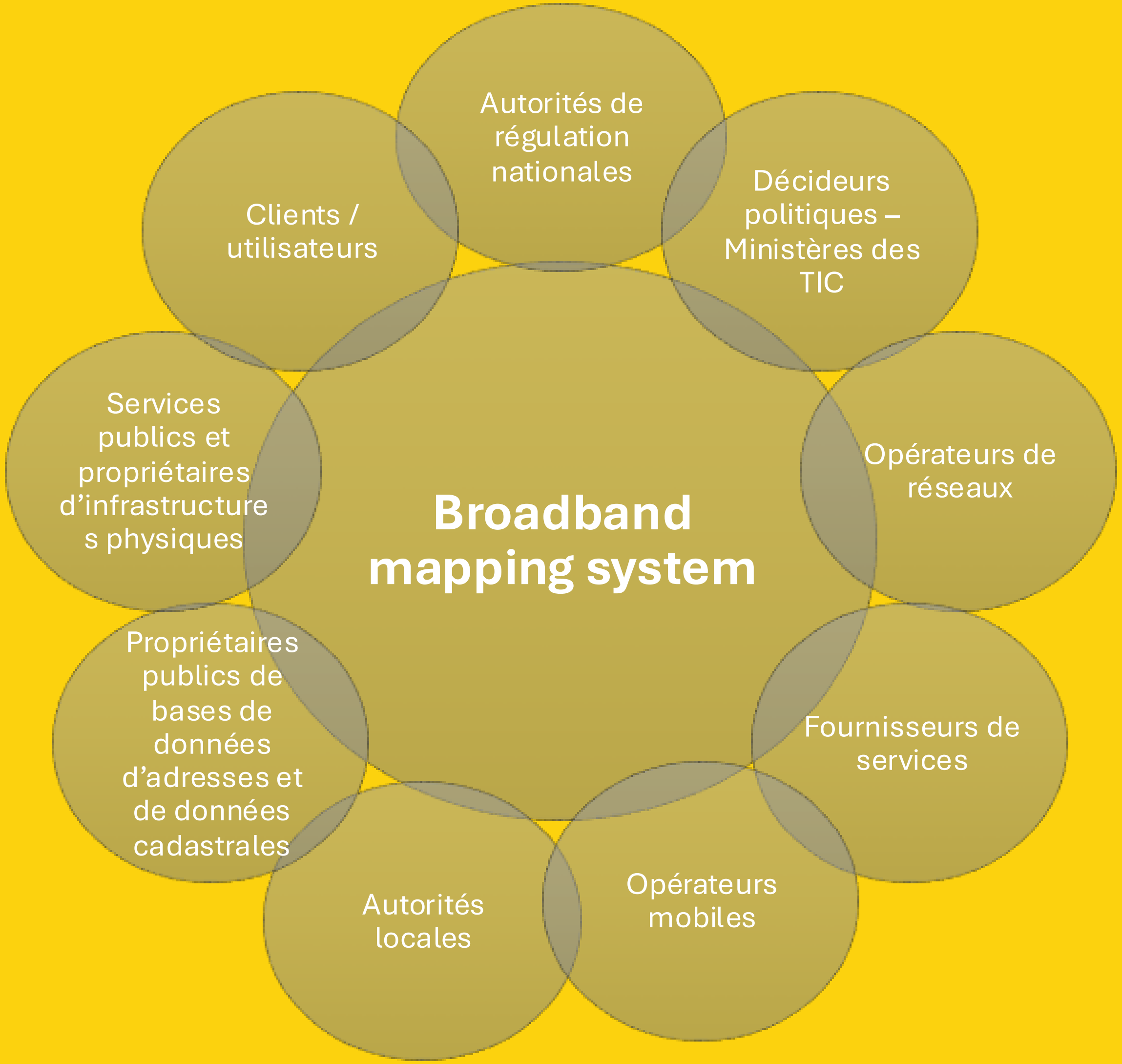
Address

Investment

Status Management

Formats de données dans le SIP



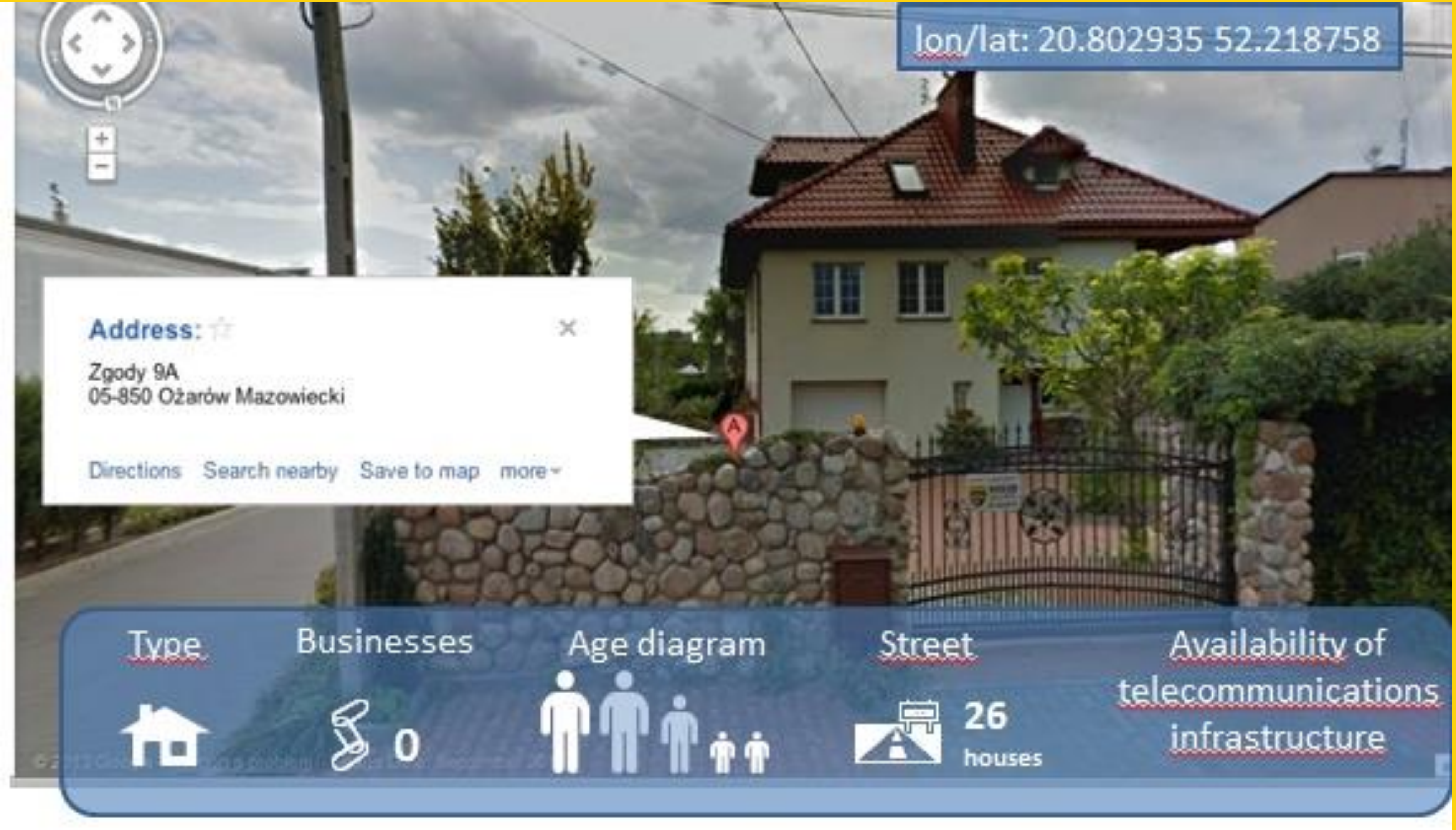

Broadband mapping system
Autorités de régulation nationales
Décideurs politiques – Ministères des TIC
Opérateurs de réseaux
Fournisseurs de services
Opérateurs mobiles
Autorités locales
Propriétaires publics de bases de données d'adresses et de données cadastrales
Services publics et propriétaires d'infrastructures physiques
Clients / utilisateurs

Bases de données – où obtenir l'information

•**Registre national officiel de la division territoriale** •*Bureau central de la statistique*	Central Statistical Office
•**Registre national polonais des frontières** •*Bureau général de la géodésie et de la cartographie* **BDOT10K - Base de données topographique**	General Office of Geodesy and Cartography
OSM OpenStreetMap **Plateforme de données ouvertes (participative / crowdsourcing)**	Open Data platform (crowdsourcing)
PESEL - Système électronique universel d'enregistrement de la population	Ministry of the Interior and Administration
•**Base de données démographiques**	Fournisseur commercial

Databases - where to get information

Données d’adresses	Rue, villes, bâtiments
Données d’adresses	Coordonnées géographiques
Caractéristiques des bâtiments	Catégories de bâtiments (bâtiment résidentiel, bâtiment commercial, etc.)
Informations sur la population	Informations sur la structure d’âge dans les bâtiments
Bases de données démographiques supplémentaires	Fournisseur commercial
Infrastructures passives	Registres géodésiques du réseau des services publics de la zone



lon/lat: 20.802935 52.218758
Address:
Zgody 9A
05-850 Ożarów Mazowiecki
Directions
Search nearby
Save to map
more
Type
Businesses
0
Age diagram
Street
26
houses
Availability of telecommunications infrastructure

Reglès pour la qualité des données

- Trop d'interfaces à tous les niveaux du réseau

Discordance entre l'adresse du nœud et les données de colocalisation

Aucun lien radio indiqué dans la liste des licences radio affichées

Potential failure to show nodes on the route of the radio line

Interface WiFi dans la couche squelette

Aucun lien radio indiqué dans la liste des licences radio affichées

Coordonnées en dehors du district

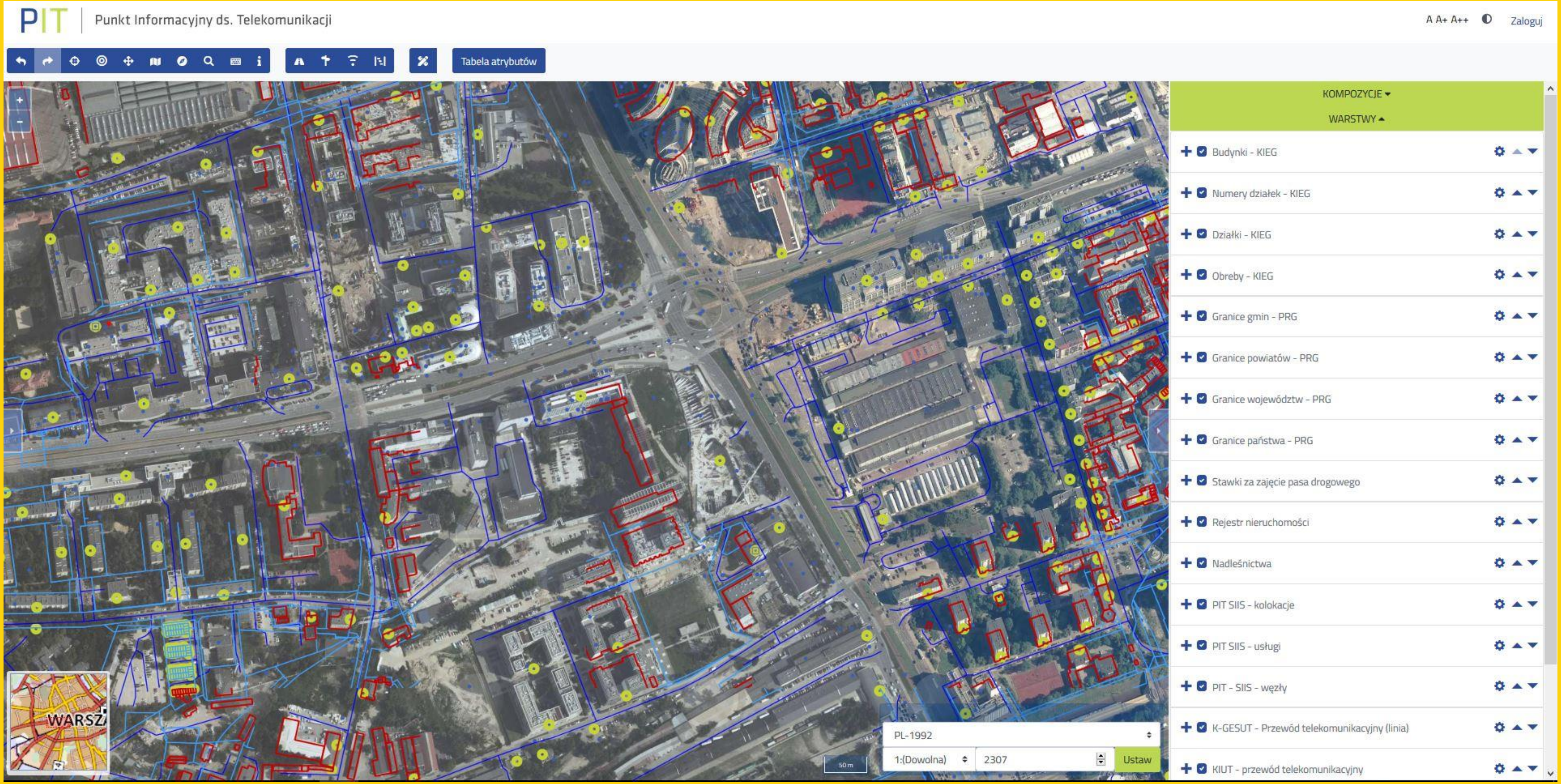
Non-conformité des données pour les lignes radio dans la bande licenciée avec la liste des licences radio

Pas de points intermédiaires indiqués sur le tracé du câble

Aucune indication des points intermédiaires le long du tracé du câble

Règles de qualité des données – exemples

Id	Rule name	Description	Tip
1.	Le rayon du secteur est en dehors de la plage indiquée de la technologie d'accès radio	La valeur du rayon spécifiée dépasse les seuils d'avertissement acceptés dans le contexte du rayon maximal pour la technologie.	1. It is necessary to verify the radius values, which should be given in metres.
2.	Début et fin de la ligne de câble au même point	Le début et la fin de la ligne (adresse ou coordonnées géographiques) indiquent exactement le même point.	Vérifier l'adresse ou les coordonnées des extrémités.
3.	Interface WiFi dans la couche de dorsale	Une couche dorsale a été indiquée pour l'interface WiFi – le WiFi n'est pas une technologie de couche dorsale.	Vérifier les couches réseau prévues pour cette interface.
4.	Le nombre de fibres dans les câbles indiqués n'est pas conforme aux normes	Pour les lignes en fibre optique, un nombre impair de fibres a été indiqué ou il existe deux paires de câbles avec une longueur connue de plus de 100 m.	1. Le nombre de fibres dans le câble doit être pair et supérieur à zéro. 2. Un cordon de raccordement (câble à deux fibres) peut avoir une longueur maximale de 100 m.



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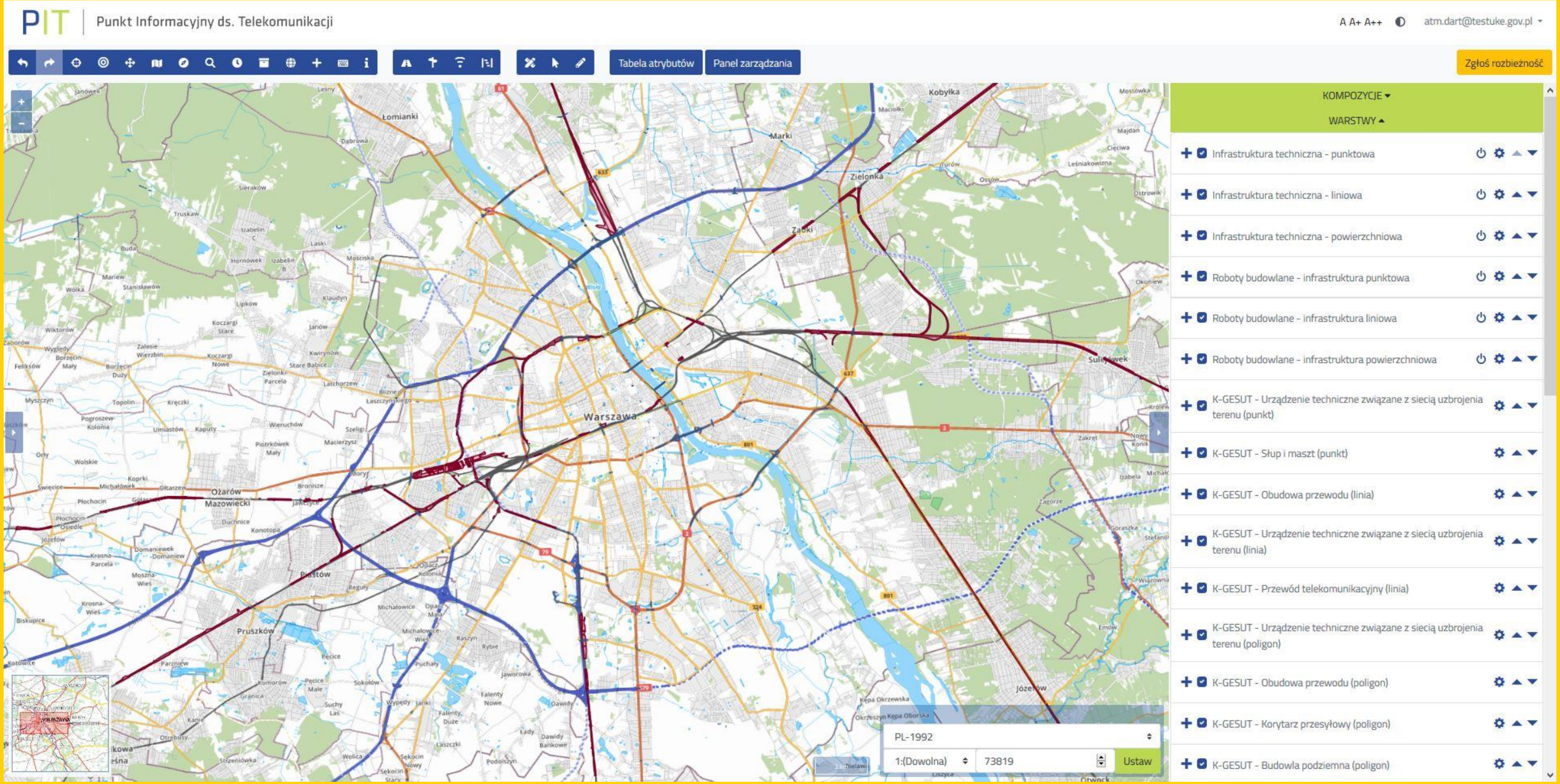
PIT
Punkt Informacyjny ds. Telekomunikacji
A A+ A++
atm.dart@testuke.gov.pl
Tabela atrybutów
Panel zarządzania
Zgłoś rozbieżność
KOMPOZYCJE
WARSTWY
Infrastruktura techniczna - punktowa
Infrastruktura techniczna - liniowa
Infrastruktura techniczna - powierzchniowa
Roboty budowlane - infrastruktura punktowa
Roboty budowlane - infrastruktura liniowa
Roboty budowlane - infrastruktura powierzchniowa
K-GESUT - Urządzenie techniczne związane z siecią uzbrojenia terenu (punkt)
K-GESUT - Słup i maszt (punkt)
K-GESUT - Obudowa przewodu (linia)
K-GESUT - Urządzenie techniczne związane z siecią uzbrojenia terenu (linia)
K-GESUT - Przewód telekomunikacyjny (linia)
K-GESUT - Urządzenie techniczne związane z siecią uzbrojenia terenu (poligon)
K-GESUT - Obudowa przewodu (poligon)
K-GESUT - Korytarz przesyłowy (poligon)
K-GESUT - Budowla podziemna (poligon)
PL-1992
1:(Dowolna)
73819
Ustaw
Warszawa
Łomianki
Marki
Zielonka
Ząbki
Kobyłka
Sulejówek
Ożarów Mazowiecki
Piastów
Pruszków
Józefów

Merci ! Questions?

Broadband Maps: A policy perspective

Prof. Thomas Senaji

Outline

- Broadband Policies/Strategies themes
- Benin’s broadband policy
- Key Barriers to Broadband Connectivity: A Supply and Demand Perspective
- Megatrends in broadband policies in Sub-Saharan Africa
- Role of Regional ICT regulators associations in Africa
- Some Lessons from BEREC

Broadband policies/ Strategies themes

Broadband policies and strategies in Sub-Saharan Africa focus on several key themes:

Digital Inclusion

- Many African countries aim to bridge the digital divide by increasing access to high-speed internet, particularly in rural and underserved areasareas;

Infrastructure Development

- Governments are investing in fiber-optic technology, 5G networks, and satellite connectivity to expand broadband coverage.

Policy themes ...

Public-Private Partnerships

- Collaboration between governments and private sector entities is crucial for mobilizing resources and expertise to drive digital development; examples include the World Bank's Digital Development Partnership and the African Union's Broadband Commission for Sustainable Development

Affordability and Accessibility

- Efforts to make broadband more affordable include reducing device costs, promoting digital literacy, and developing online safety initiatives. Governments are also working to address the digital skills gap and promote digital entrepreneurship.

Innovation and Entrepreneurship

Initiatives like regulatory sandboxes and innovation hubs are supporting the development of startups and tech-based ventures, fostering a culture of innovation and entrepreneurship in Africa.

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Policy themes …

Mobile Money and Fintech:

Mobile money platforms, such as M-Pesa in Kenya, have revolutionized financial inclusion and entrepreneurship in Africa, enabling users to access financial services, make payments, and conduct business transactions using mobile phones.

5G and Emerging Technologies:

The adoption of 5G and other emerging technologies is expected to drive economic growth, improve efficiency, and enable new services. African countries are investing in 5G infrastructure, with several countries already launching 5G services.

Benin's Broadband policy pillars

Benin has launched an ambitious strategy for the development of high and very-high-speed broadband, integrated into its Government Action Program (PAG) 2021–2026. The main pillars of Benin's broadband policy are structured around digital inclusion, territorial connectivity, and economic transformation.

1. *Strengthening the National Backbone*
2. *Digital integration into Infrastructure Projects*
3. *Alternative Technologies and Satellite Connectivity*
4. *Access for Households and Businesses*
5. *Regulation and Infrastructure Protection*
6. *Social Inclusion and Digital Transformation*

Les axes de la politique de large bande

Le Bénin a engagé une stratégie ambitieuse pour le développement du haut et très haut débit, intégrée dans son Programme d'Action Gouvernemental (PAG) 2021–2026. Voici les principaux axes de la politique de large bande au Bénin, structurés autour de l'inclusion numérique, la connectivité territoriale et la transformation économique :

1. Renforcement du backbone national

- *Déploiement de la fibre optique sur tout le territoire, avec une cible de* ***3300 km de couverture****.*
- *Extension vers les* ***zones rurales*** *et les* ***communes non encore connectées*** *(objectif : 77 communes connectées d'ici mi-2025).*
- *Fiabilisation de la dorsale nationale par le développement de la* ***section Ouest****.*

2. Aménagement numérique des infrastructures

- *Intégration du haut débit dans les* ***projets d'infrastructure majeurs*** *: routes, énergie, eau.*
- *Raccordement de la* ***Zone Économique Spéciale de Glo-Djigbé*** *et transformation de* ***Benin IX*** *en point d'échange régional.*

3. Technologies alternatives et connectivité par satellite

- *Utilisation de solutions hybrides pour les zons difficiles d'accès.*
- *Déploiement de la* ***connectivité par satellite*** *pour renforcer l'inclusion numérique.*

4. Accès pour les foyers et les entreprises

- *Développement des* ***réseaux d'accès à Internet*** *à domicile et dans les PME.*
- *Appui à l'interconnexion des* ***secteurs administratifs*** *et services publics.*

5. Régulation et protection des infrastructures

- *L'ARCEP-Bénin joue un rôle clé dans la régulation juridique, économique et technique.*
- *Protection des **systèmes d'information** et des **infrastructures critiques** du pays.*
- *Promotion de la **concurrence saine** et de la **qualité de service** sur le marché.*

6. Inclusion sociale et transformation numérique

- *Objectif stratégique: faire du Bénin une **plateforme numérique régionale** pour l'Afrique de l'Ouest.*
- *Le taux de couverture 4G atteint **90 %,** avec une montée en puissance de la 5G.*

Global Gateway

Broadband maps play a crucial role ...

Broadband maps will provide critical information across all six Benin broadband policy pillars/objectives and targets, which will guide evidence-driven interventions, including *broadband coverage*, *quality of service*, *digital integration into infrastructure projects*, etc

Barriers to Regional Broadband Connectivity: Supply and Demand Perspective

Key barriers: Supply side

- **Infrastructure fragmentation**: Limited cross-border fiber and weak backbone integration.
- **Regulatory divergence**: Inconsistent licensing, spectrum allocation, and roaming policies.
- **High deployment costs**: inadequate/ lack of pooled financing and incentives for regional infrastructure.
- **Weak Coordination Mechanisms**: Absence of a binding digital single market strategy.

Key Barriers: a demand perspective

- **Affordability**: Data costs exceed 5% of GNI per capita per 1GB in many ECOWAS countries; ce qui est supérieur à l'objectif de moins de 2 % fixé par la Commission du haut débit pour 2025;

- **Digital literacy deficits** are particularly prevalent among women, rural populations, and young people;

- **Content gaps**: Limited local language content and e-services;

- **Trust and awareness:** There is low uptake due to cybersecurity concerns and limited digital literacy.

Principaux obstacles à la connectivité régionale à large bande : perspective de l'offre et de la demande

Obstacles de l'offre

- ***Fragmentation des infrastructures*** : *Fibre optique transfrontalière limitée et intégration faible des dorsales nationales.*
- ***Divergence réglementaire*** : *Régimes de licences, allocations de spectre et politiques d'itinérance incohérents entre les États membres.*
- ***Coûts élevés de déploiement*** : *Absence de financement mutualisé et d'incitations pour les infrastructures régionales.*
- ***Mécanismes de coordination faibles*** : *Absence d'une stratégie contraignante de marché numérique unique au niveau régional.*

Principaux obstacles du côté de la demande

- ***Accessibilité financière** : Le coût des données dépasse 5 % du revenu national brut par habitant dans plusieurs pays de la CEDEAO;*
- ***Déficits en littératie numérique** : Notamment chez les femmes, les populations rurales et les jeunes.*
- ***Manque de contenu local** : Faible disponibilité de contenus numériques en langues locales et de services électroniques.*
- ***Confiance et sensibilisation** : Faible adoption en raison des préoccupations liées à la cybersécurité et au manque de compétences numériques.*

Megatrends in broadband policies in Sub-Saharan Africa

Megatrends in broadband policies in Sub-Saharan Africa are shaping the continent's digital landscape; they include:

Digital Transformation:

- Africa is experiencing rapid digital growth, with a 115% increase in internet users between 2016 and 2021, and a growing digital economy expectedexpected to reach $712 billion by 2050.

Increased Connectivity:

- Initiatives like the West Africa Regional Communications Infrastructure Program (WARCIP) have extended broadband coverage, thus reducing costs and increasing accessibility.

Megatrends ....

Affordability :

Efforts to make broadband more affordable are underway, with the average cost of 1GB of mobile internet decreasing from 10.5% to 5.7% of monthly gross national income (GNI) per capita between 2019 and 2021 in some countries.

Digital Inclusion:

a growing focus on digital inclusion, with initiatives like the Digital Economy for Africa (DE4A) initiative aiming to ensure every individual, business, and government is digitally enabled by 2030.

Mega trends...

Regional Cooperation

Regional economic communities are promoting cooperation and harmonization of policies to support digital development, such as the African Continental Free Trade Area (AfCFTA) agreement.

Youth and Entrepreneurship

Africa's young population is driving digital innovation, with a growing number of digital hubs and startups across the continent. However, challenges such as digital literacy and access to funding remain.

These megatrends are transforming the digital landscape in Sub-Saharan Africa, presenting opportunities for economic growth, innovation, and development.

Some notable ICT regional regulators' associations in Africa

Lessons from BEREC

BEREC, or the Body of European Regulators for Electronic Communications, a key player in shaping the digital landscape of the European Union.

- brings together regulators from the telecommunications markets in the European Union to work collaboratively.
- ensures consistent implementation of the European regulatory framework for electronic communications.

Mission

- To foster independent, consistent, and high-quality regulation of digital markets for the benefit of Europe and its citizens

Objectives include:

- *Promoting full connectivity*: Ensuring seamless connectivity across the EU
- *Empowering end users*: Protecting consumers and promoting awareness
- *Supporting Sustainable and Open Digital Markets*: Fostering open internet, digital markets, and sustainability

Key BEREC Activities

BEREC's work encompasses various areas, including:

- **Regulatory Framework:** Implementing the European Electronic Communications Code
- **Market Analysis:** Monitoring and analyzing market trends
- **Consumer Protection:** Ensuring consumer rights and protection
- **Sustainability:** Promoting environmental sustainability in the telecom sector

Structure and membership of BEREC

Board of Regulators: Comprising representatives from national regulatory authorities

BEREC Office: A European Union agency supporting BEREC's work

Members: National Regulatory Authorities (NRAs) from EU member states, with voting rights and participants without voting rights.

BEREC plays a vital role in shaping the EU's digital future.

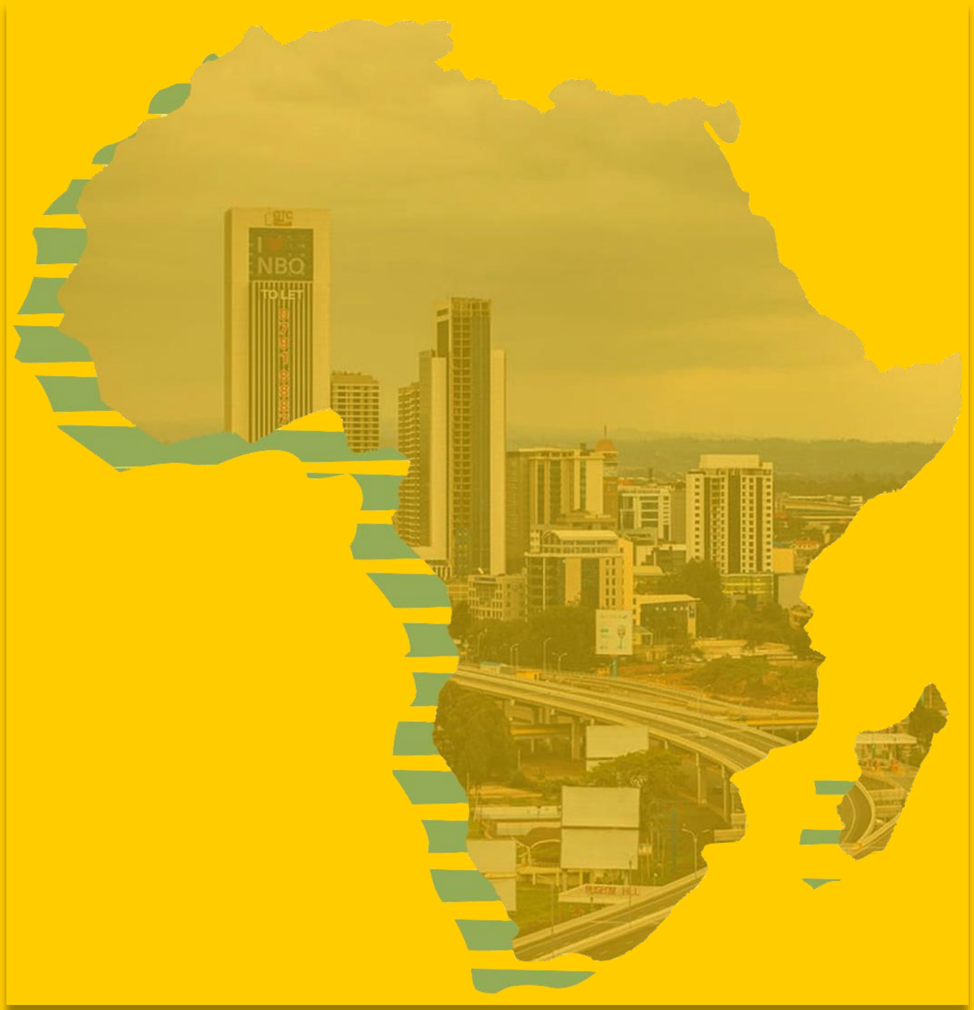
Thank you

Case Studies from ITU:

EU Broadband Mapping Systems

Laban Maiyo

ITU Speaker



Cotonou Benin (9-11 September 2025)

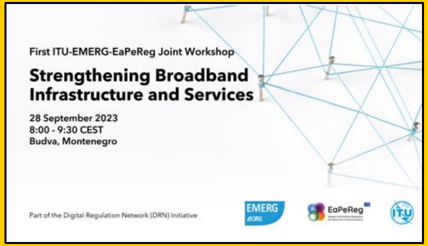
Global Gateway

Arcep BENIN

ITU

Compendium of case studies on broadband mapping systems in the EMERG and EaPeReg Regions

- Joint **Workshops** held in physical and online
- Compendium of **18 case studies** on broadband mapping from countries from **the EMERG and EaPeReg** communities



EU efforts towards a harmonized broadband mapping system

The European Union plays a key role in outlining the regulatory framework for broadband infrastructure and services.

The EU is supported by the Body of European Regulators for Electronic Communications (BEREC), which supports the consistent application of the EU regulatory framework and the functioning of the internal market of electronic communications.

Data Sources

- **Operators (ISPs)** - provides institutions data/information
- **Government agencies** (land cadaster, settlements, roads, utility, statistical authorities etc)
- **Publicly available data, geoportals** and **open source**
- National spatial data infrastructures (**NSDI**)

Collected data

Telecommunication infrastructure
Routes of cable lines
Service locations

Stakeholders

Telecommunication companies
Municipal units
Local government units

Reporting frequency

Regularly (monthly/quarterly)

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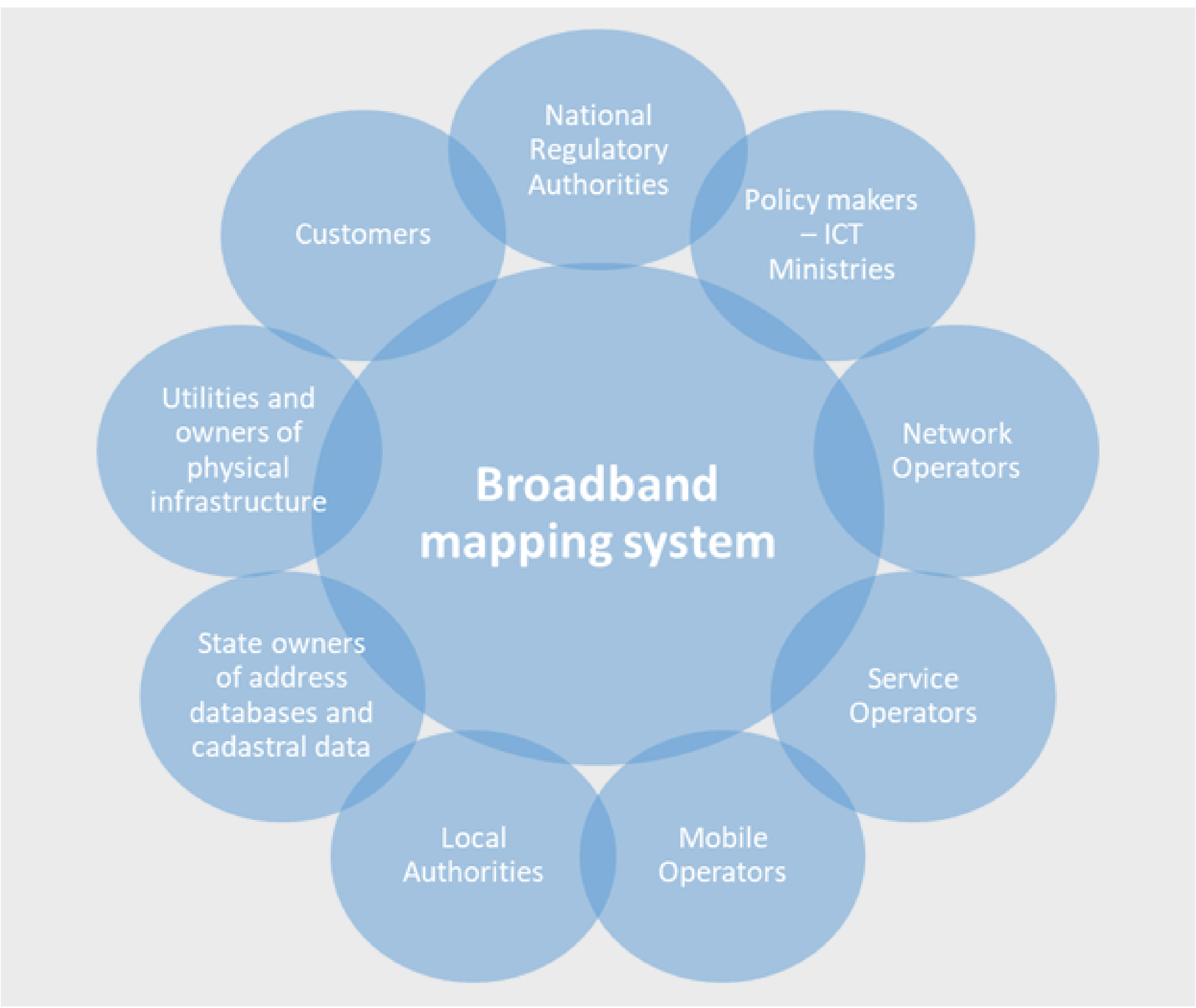
Cases Studies: EU Broadband Mapping Systems



- **Stakeholder analysis**
  - ✓ **Identify & map key stakeholders**
- **Next steps**
  - ✓ **Informing phase:** Providing stakeholders with balanced and objective information to help them understand the project
  - ✓ **Consulting phase:** Gathering feedback on the information provided
  - ✓ **Involving phase:** To define system requirements, ideas and concerns are fully understood and taken into account
  - ✓ **Collaboration phase:** Very useful at the stage of system testing. It is therefore worth involving them in this phase.

Systems Development

Three approaches (solutions)

	Pros	Cons
outsourced solution	· Responsibility for guaranteed results for the other party · No need for additional manpower on your own	· More expensive upfront · Less upfront · Less flexible in development Smaller understanding of the authority needs · Data confidentiality may be compromised.
In-house solution	· Cheaper initial costs · More flexibility in design and development · Creates detailed knowledge of the system	· Additional IT resources to maintain · A multidisciplinary team
hybrid approach	· Responsibility for guaranteed results for the other party · Understanding of business needs	· Additional resources to maintain · Less flexible in development

The Process

The Software Development Life Cycle

1. Planning:

- To determine the scope of the problem and identify solutions.
- To consider resources, costs, time, benefits, and more.

2. Analysis:

- The system analysis is performed.
- Essential for identifying the needs as well as how they can be met, who will be responsible for each element of the project, and what kind of schedule to expect.

3. Design:

- Focuses on creating the functional requirements of the proposed system.
- It is necessary to take into account the existing hardware or software, or network capabilities.

4. Implementation:

- Covers the work of programmers.

5. Testing and integration.

- Includes system integration with the existing environment and tests of the developed software.

6. Maintenance:

- Includes maintenance and regular required updates.
- End users can tune the system to increase performance, add new capabilities, or meet additional system user requirements.

ITU Guidelines

Annex to the ITU Guidelines

Establishing or Strengthening National Broadband Mapping Systems

1. Please choose how complicated the broadband mapping system should be:

simple
medium
advanced
complex

2. Please indicate the area of the country (in thousands of km^2)

Area of the country: 150

3. Please indicate the number of users of the broadband mapping system (e.g. telecommunications operators)

Number of users of the system: 100

4. Please indicate the average men-day price of a developer in your country

Ave… …icate the amount in any currency - the model result will be calculated for this currency

Complexity of the system	simple	medium	advanced	complex
Scope of mapping: • infrastructure mapping • service mapping • demand mapping • investment	1-2 items	2-3 items	all	all
A separate model for mobile networks	X	V	V	V
Form of data transfer: • data transmission, e.g. e-mail/data • transfer interface	e-mail	transfer interface	transfer interface	transfer interface
Number of supported data formats	1	1-2 formats	2-3 formats	more than 3
Data detail: • grids • buildings • points • lines	grids	grids/points	points; buildings; lines	points; buildings
Data presentation portal	X	X	V	V
Data validation rules	X	simple	advanced	advanced
Additional tool supporting data preparation	X	V	V	V
Helpdesk system	X	V	V	V
Mobile app	X	X	V	V
The level of detail of the system documentation	low level	medium level	high level	high level
Availability of analyses, reports	X	X	V	V
Single Information Point with geospatial connections between passive and active infrastructure	X	X	X	V

System cost calculation results

1. Number of men-days of a developer: 1 500
2. Broadband mapping system costs* 450 000 *The model result is calculated for chosen currency
3. The annual cost of maintaining the system* 8 100 *The model result is calculated for chosen currency

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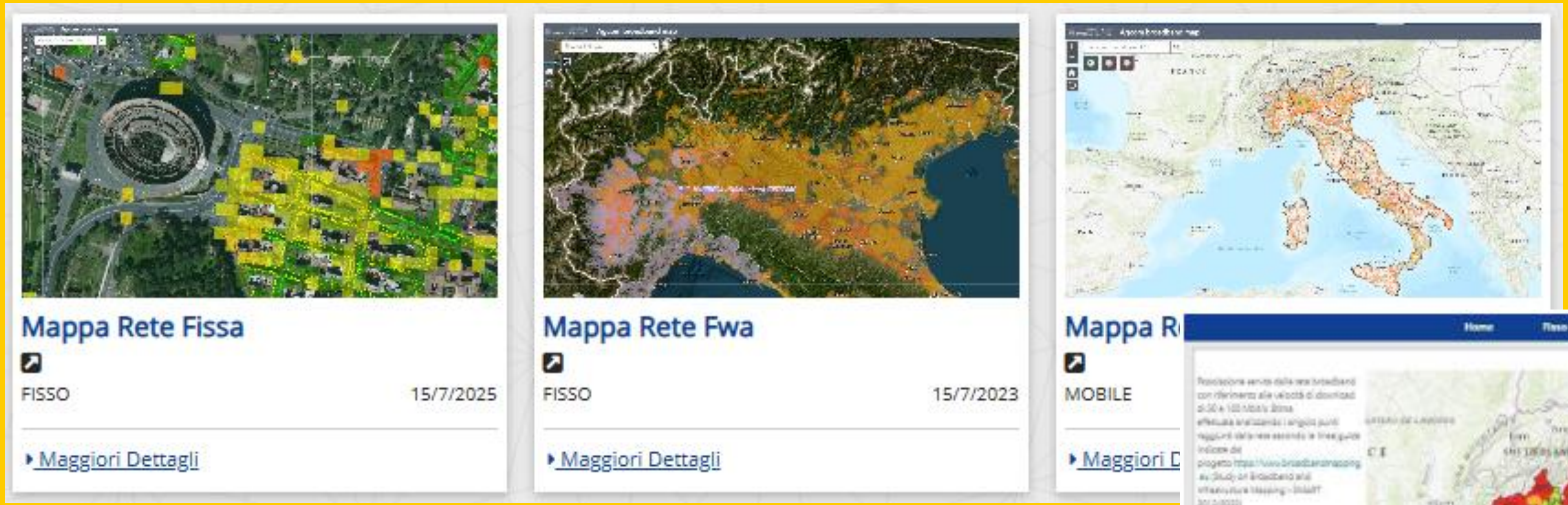
ITALY: Broadband Mapping System

http://geo.agcom.it/

Italy broadband mapping system

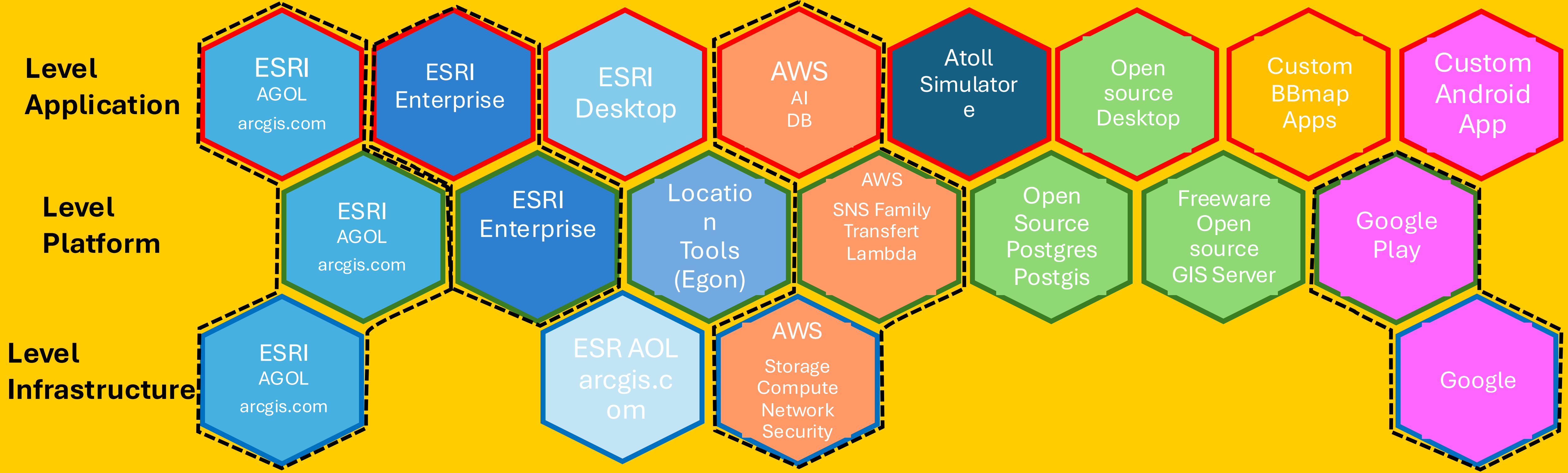


Show how the Italian broadband mapping system is very mature and allows for both granular and general data analyses, merging the information on local and national level.

Milestones

- **Reliability** – Data is accurate and trustworthy
- **Resolution level** – Mapping is detailed and granular
- **Timely updates** – Data is continuously and regularly updated
- **Completeness** – All network infrastructures is included
- **Flexibility** – BBmap can't impose definitions but adapts to local process

ITALY: Broadband Mapping System

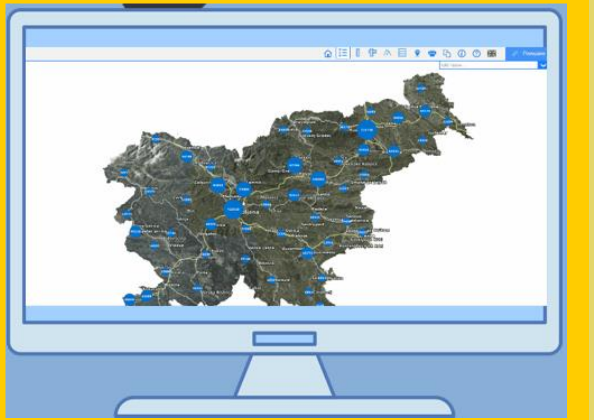


- Integrates both **licensed** and **open-source solutions**
- In recent years, **development efforts have increasingly focused on open source**, across all layers of the technology stack
- The architecture is designed to be **modular and adaptable**, allowing for **low-investment evolutions** in response to changing needs
- Attention is paid to **maintenance and upgrade costs**: a sophisticated system with high update costs risks becoming **unsustainable in the long term**

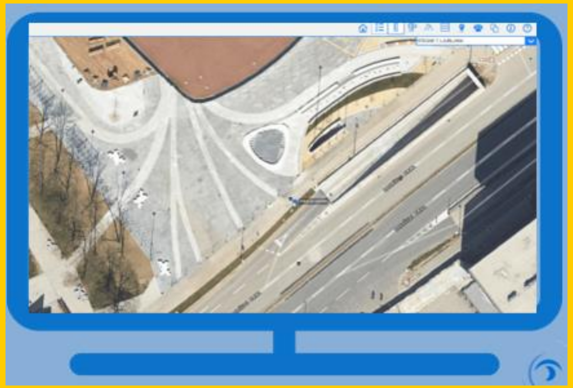
SLOVENIA: Broadband Mapping System

Slovenia broadband mapping system (AKOS)

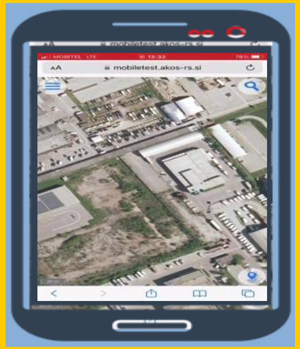
http://gis.akos-rs.si/



- **Geoportal:** The Geoportal is meant to lower the costs of building very high capacity networks (VHCN)
- To encourage shared use and joint construction
- Allows public access to AKOS data (single portal)
- For transparency of operation and proactive publication of spatial information



- **Layers and tools:** More than 110 layers in the fields of telecommunications, public infrastructure, postal services and railways
- Simple and minimalistic design - all users can browse and analyse the data and create maps



- **Mobile Geoportal:** Allows public access to AKOS data (single portal).
- 1/3 of Geoportal users access it through mobile device
- Less tools and layers in a comparison with desktop version, but data is served from the same databases

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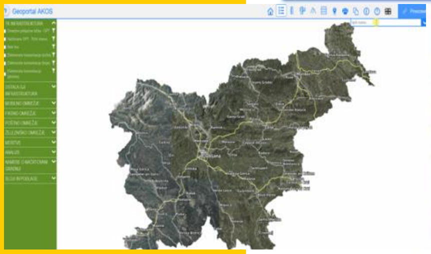
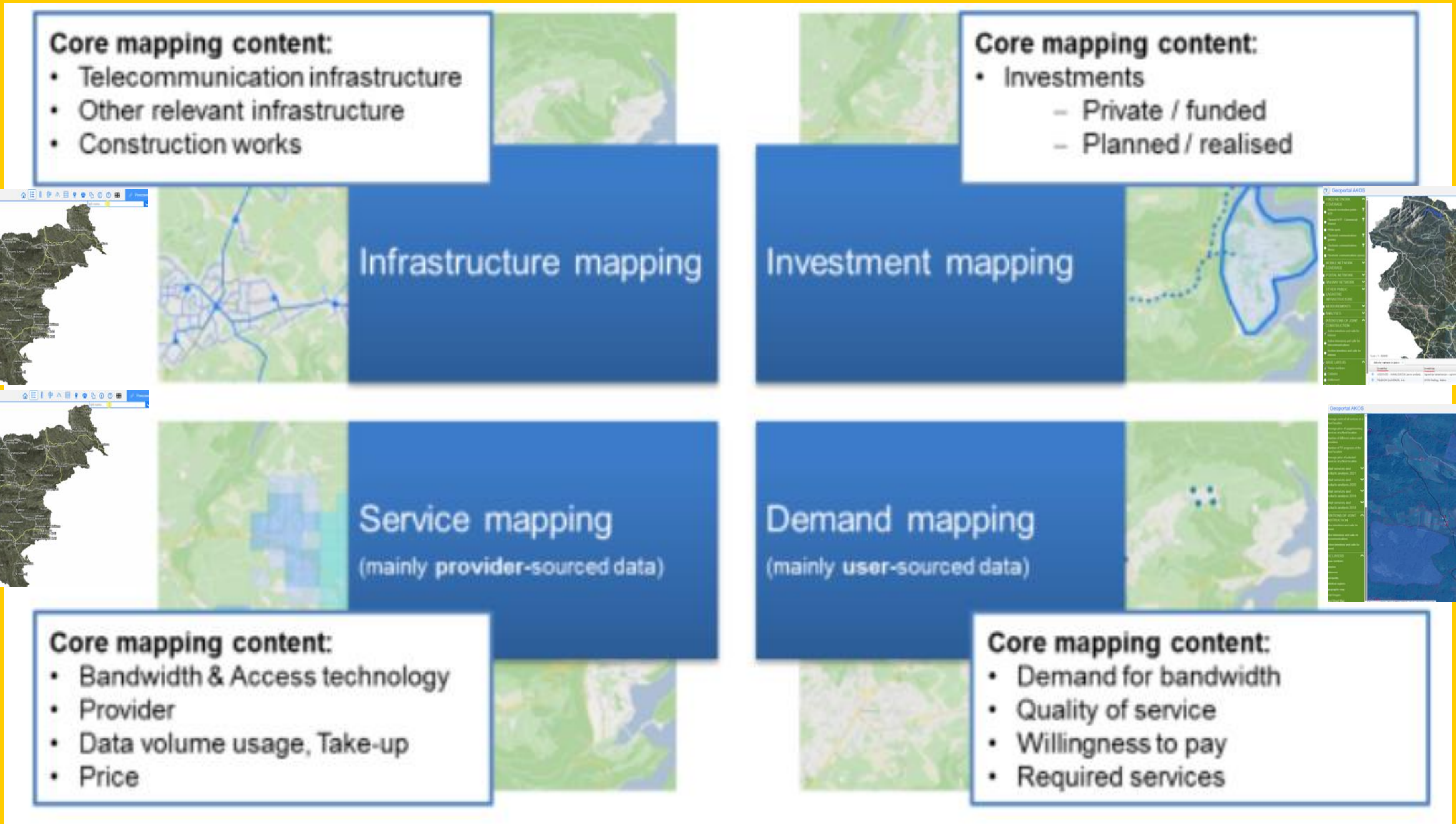
COMMUNICATIONS AUTHORITY OF KENYA

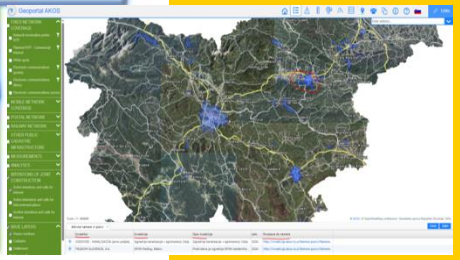
ITU

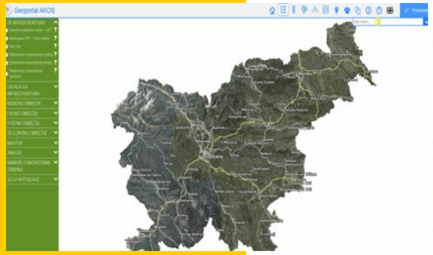
SLOVENIA: Broadband Mapping System

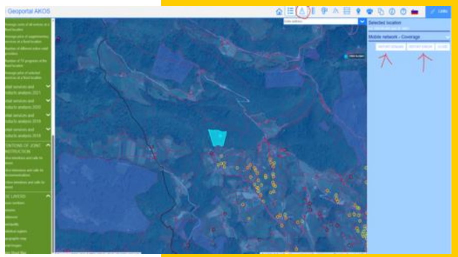
Four types of broadband mapping











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LUTHUANIA: Broadband Mapping (the process)

Goal and the process

- Determine the coverage of existing electronic communications networks capable of providing broadband services, including the Very High-Capacity Networks (VHCN)

START:
May 18th, 2023

1. METHODOLOGY

2. DATA COLLECTION & VERIFICATION

3. EVALUATION OF NETWORK COVERAGE

4. PUBLIC CONSULTATION ON RESULTS

5. PUBLICATION OF RESULTS

FINISH:
January 18th, 2024

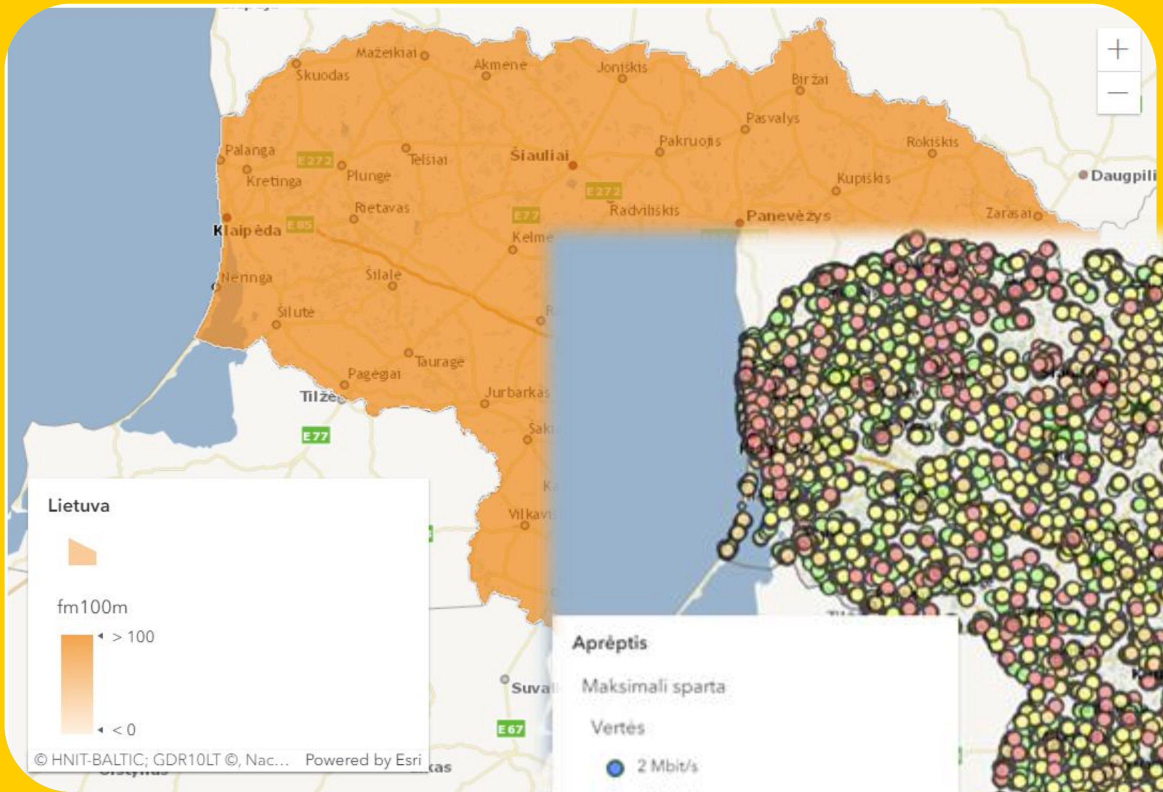
LUTHUANIA: Broadband Mapping

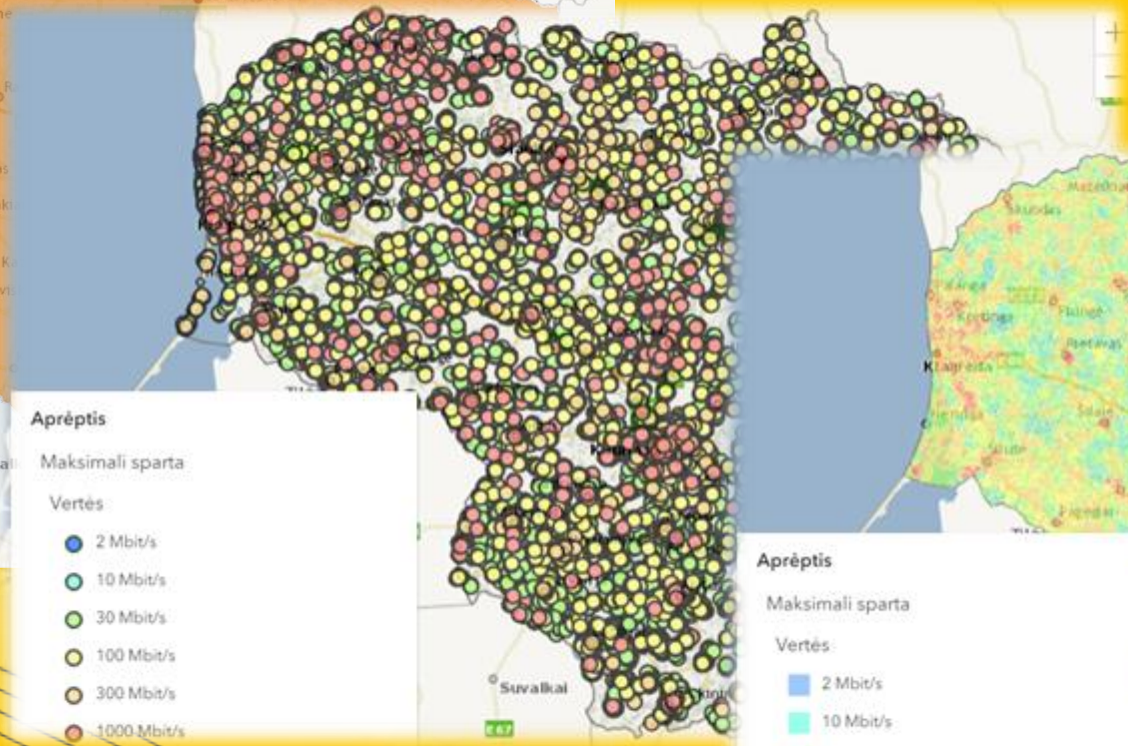
Online App for broadband survey

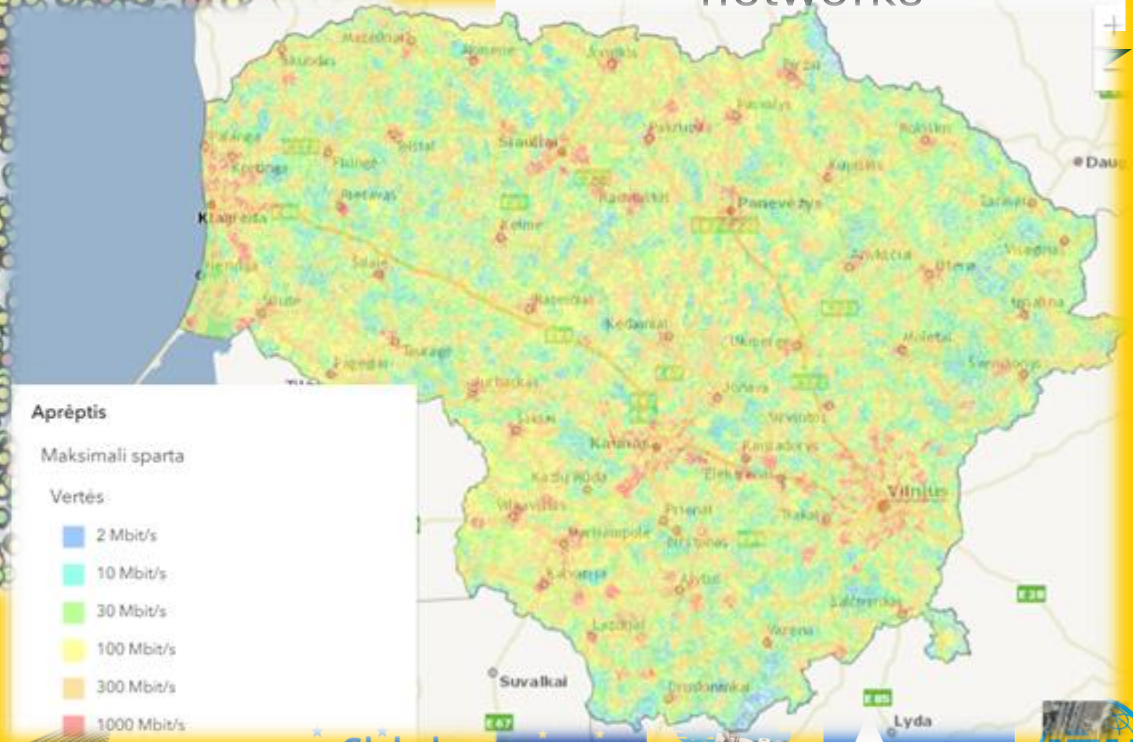
placiajuostis.rrt.lt

Exact locations of fixed connections

Expected download speed in mobile networks





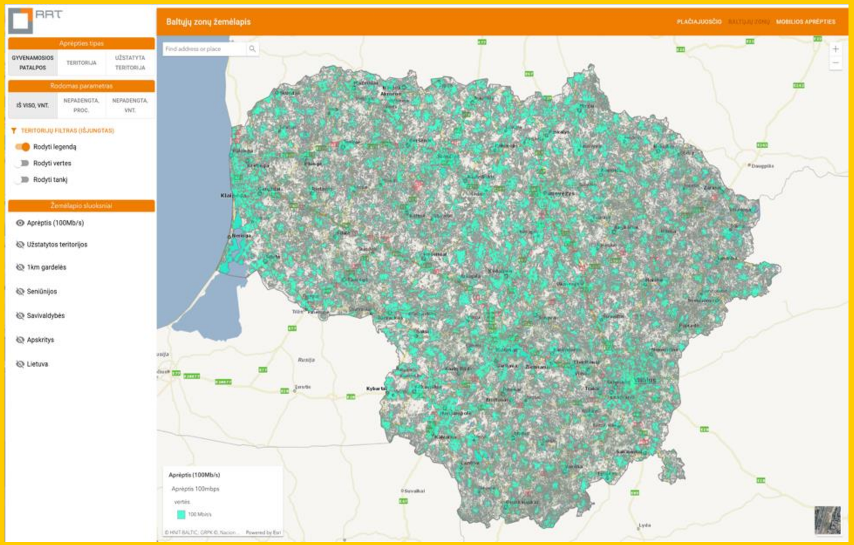


Overall percentage of covered households

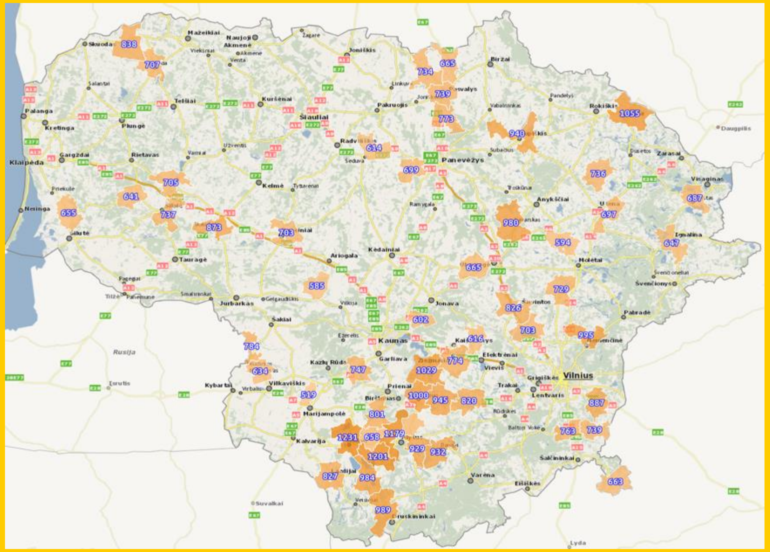
LUTHUANIA: Broadband Mapping

Mapping white spaces

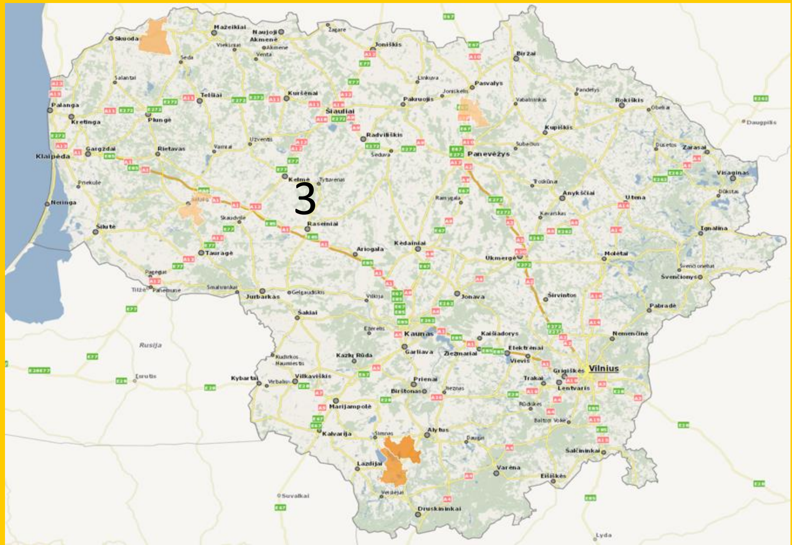
Determine households and territories where 100 Mb/s data transfer speeds are not available with current infrastructure of electronic communications networks (or won't be available within next 3 years)



Mapping platform



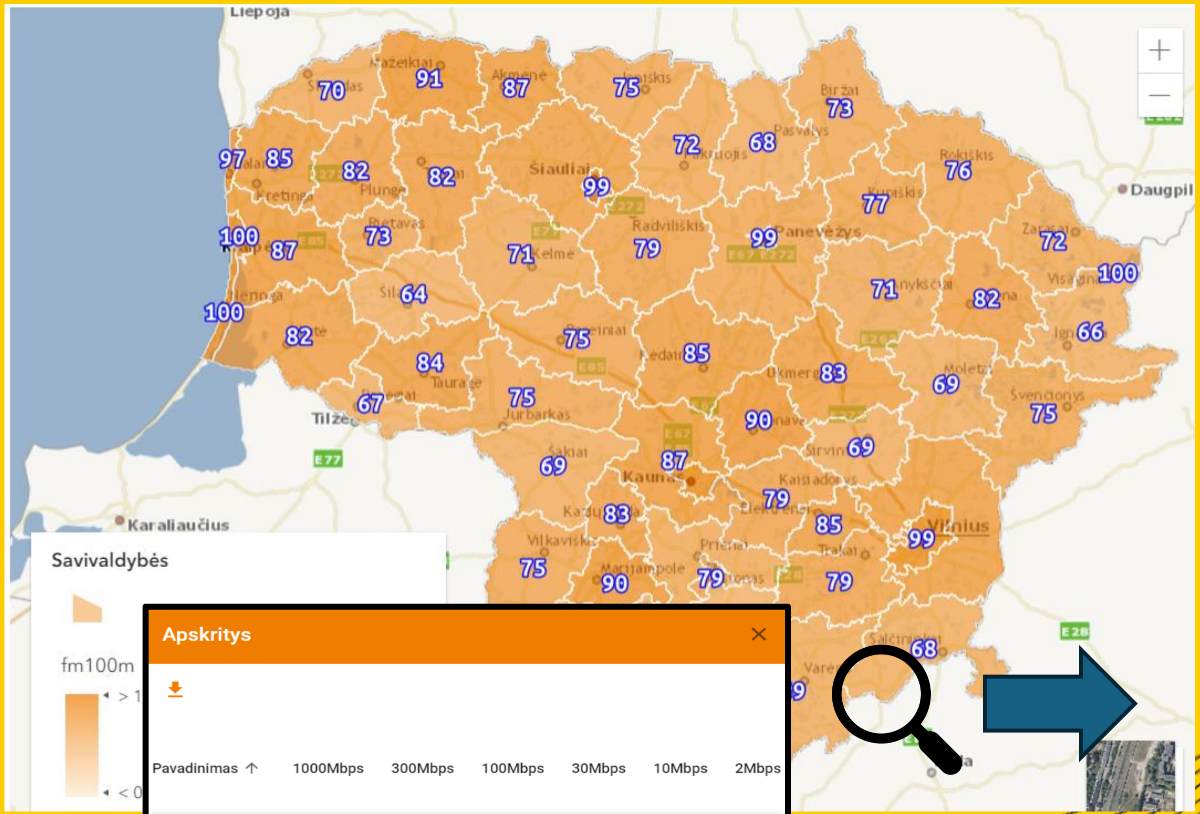
Finding areas that need improvement most



Filtering by: coverage type, number of objects, administrative borders, absolute values, percentages, density of households, etc.

LUTHUANIA: Broadband Mapping

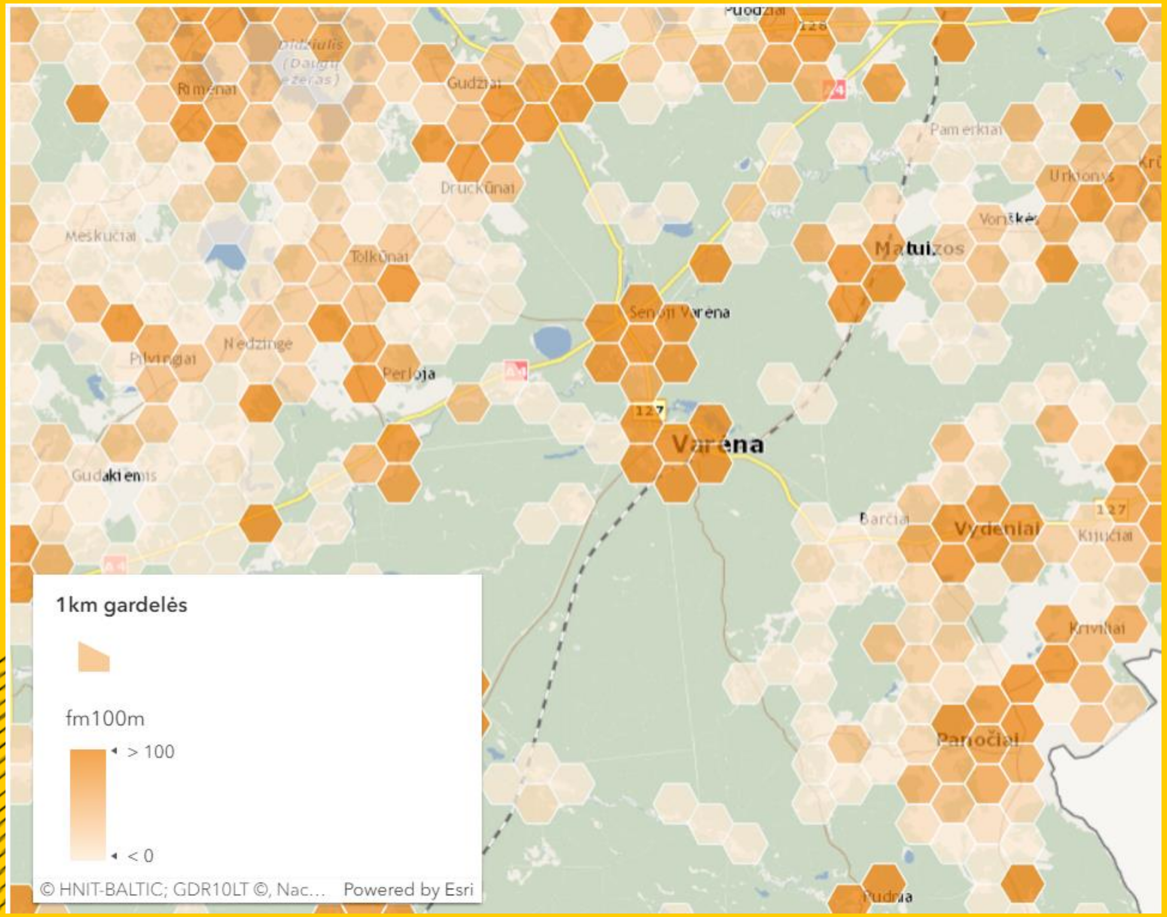
Online app for broadband survey



Apskritys

Pavadinimas ↑	1000Mbps	300Mbps	100Mbps	30Mbps	10Mbps	2Mbps
Alytaus apskritis	36.3	45.4	51.1	63.3	63.3	63.3
Kauno apskritis	45.6	68.4	72.3	82.3	82.3	82.3
Klaipėdos apskritis	40.4	73.9	76.9	84.8	84.8	84.8
Marijampolės apskritis	5.4	36.3	45.8	68.5	68.5	68.5
Panevėžio apskritis	13.3	50.4	56.8	70.1	70.1	70.1
Šiaulių apskritis	14.2	52.2	60.0	73.8	74.2	74.2
Tauragės apskritis	22.6	29.7	40.1	61.2	61.2	61.2
Telšių apskritis	51.8	55.8	61.8	75.1	75.1	75.1
Utenos apskritis	15.7	38.2	44.6	56.1	56.1	56.5
Vilniaus apskritis	39.7	73.9	76.2	82.5	82.5	82.5

Multiple options to analyze the results



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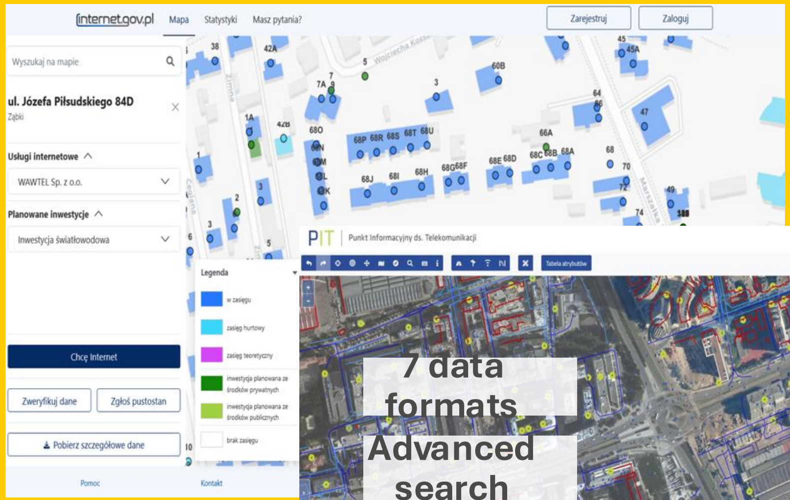
POLAND: Broadband Mapping System

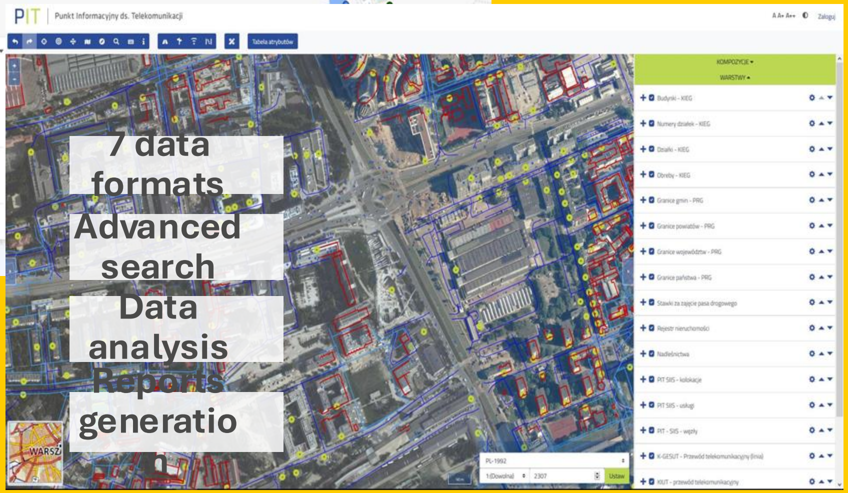
Data presentation system - Ministry of Digital Affairs

Location

Available operator

Media selection (fttx)





7 data formats

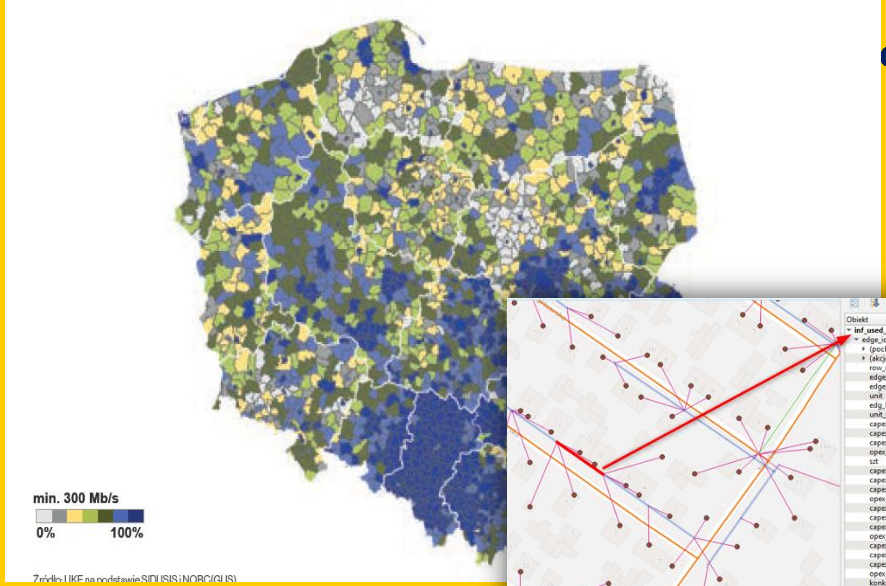
Advanced search

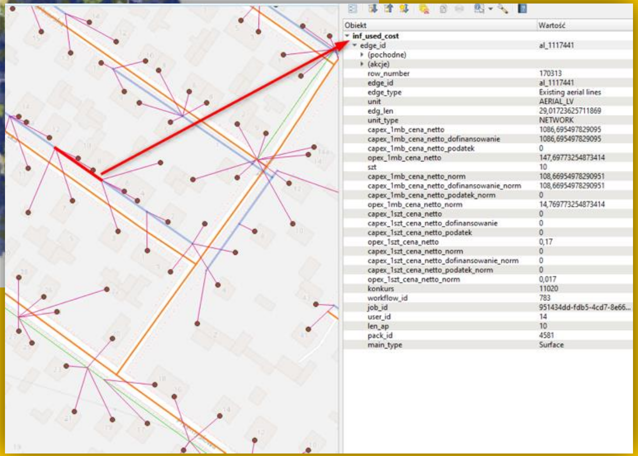
Data analysis

Reports generatio

Source: https://internet.gov.pl/map/?center=2349820.3607533704%3B6851791.294293443&zoom=20

es





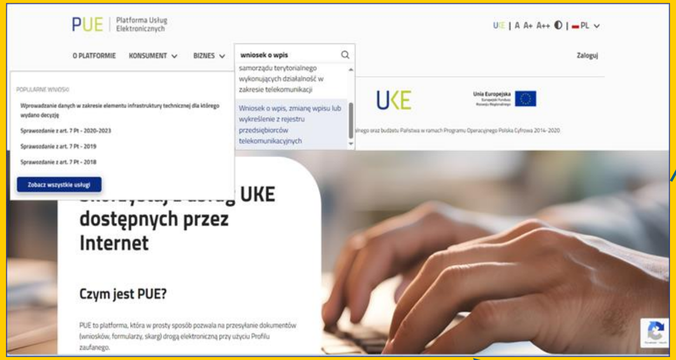
Source: UKE upon data from https://internet.gov.pl/

- In Sidusis (system maintained by the Ministry of Digital Affairs) information about the range of fixed-line networks is collected.
- Hence it is known how many households can use the Internet with specific parameters, i.e., in general, entrepreneurs provide information about what services they can provide in a specific place.
- Such information is published by the Ministry of Digital Affairs on the website **internet.gov.pl**

The maps shows the number of address points which are passed by the internet infrastructure of certain parameters, like 300 Mb/s.

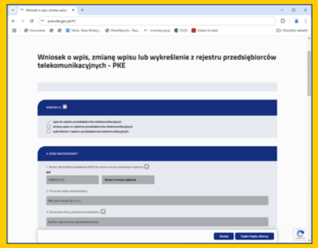
POLAND: Poland-Telecommunication Register

- A communications platform enables the exchange of data between the UK (NRA) and telecommunications
- The platform enables registration, making changes to registers and obtaining electronic confirmation of entered data



pue.uke.gov.pl

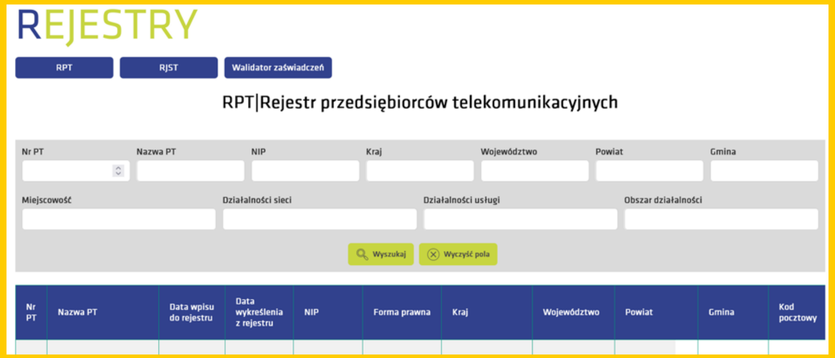
Application



rejestry.uke.gov.pl

3 working days formal processing by UKE

Telecommunication register (database)



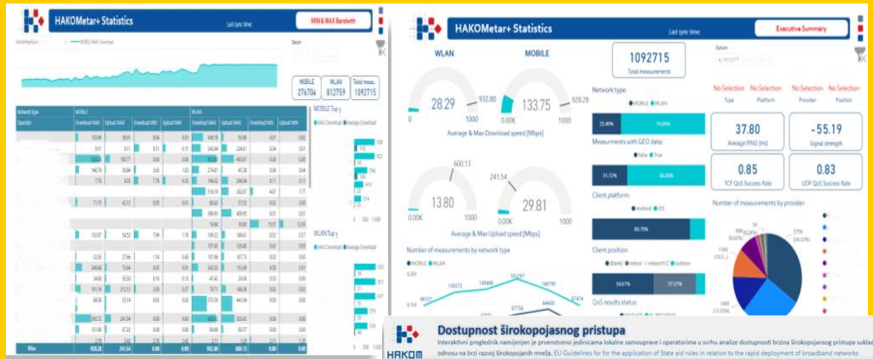
7days

Confirmation from the register

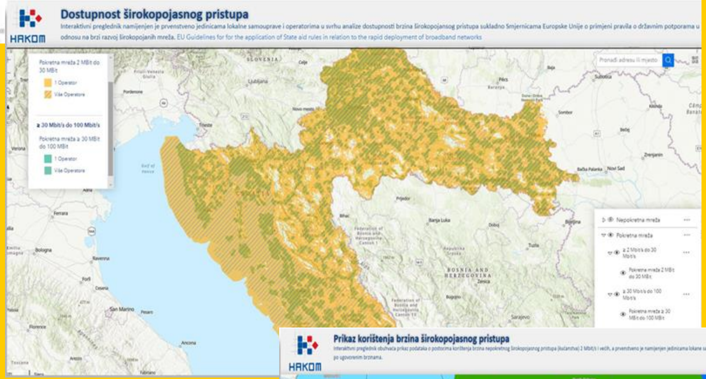
An application for maintaining and sharing information (every day) from the telecommunications registry

SLOVENIA: Broadband Mapping Dashboard

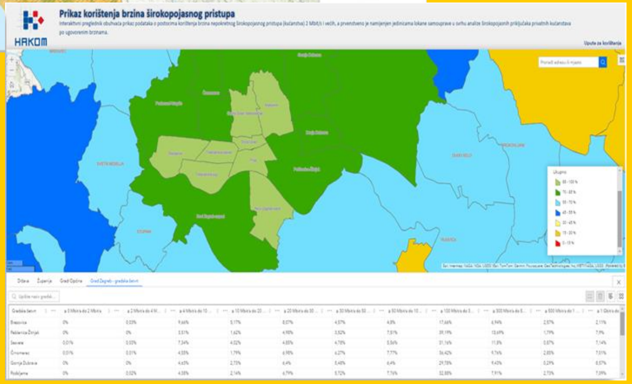
Mapping measured QoS for Mobile, WLAN and LAN from user device



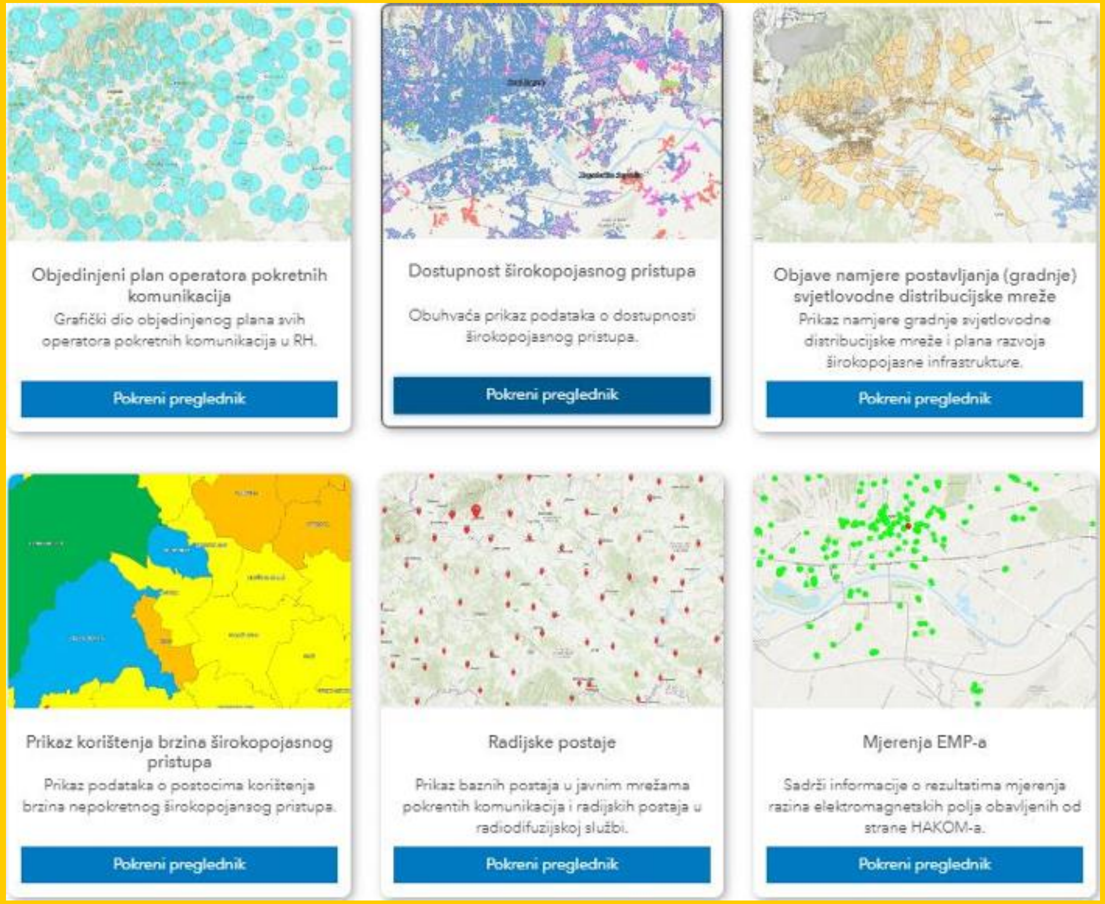
Mapping of broadband coverage



Mapping of take-up rate



HAKOM e-Maps



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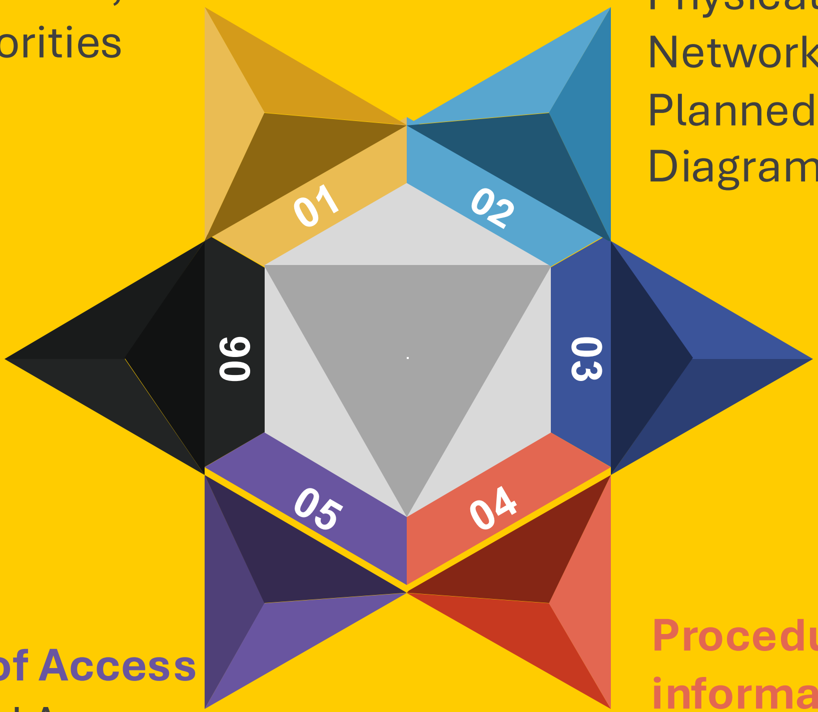
CYPRUS: Broadband Portal

Integration – Access Exploitation of Geographic Data in a unified portal

Sources of information
Electronic Communications operators, Other network operatos, Public Authorities

Categories of information
Physical infrastructures, Surveys of Network Deployments (art 22 EECC), Planned civil works, In house Wiring Diagrams



Method of Publication
Dynamic Maps, Reports and Statistics, Provision of data

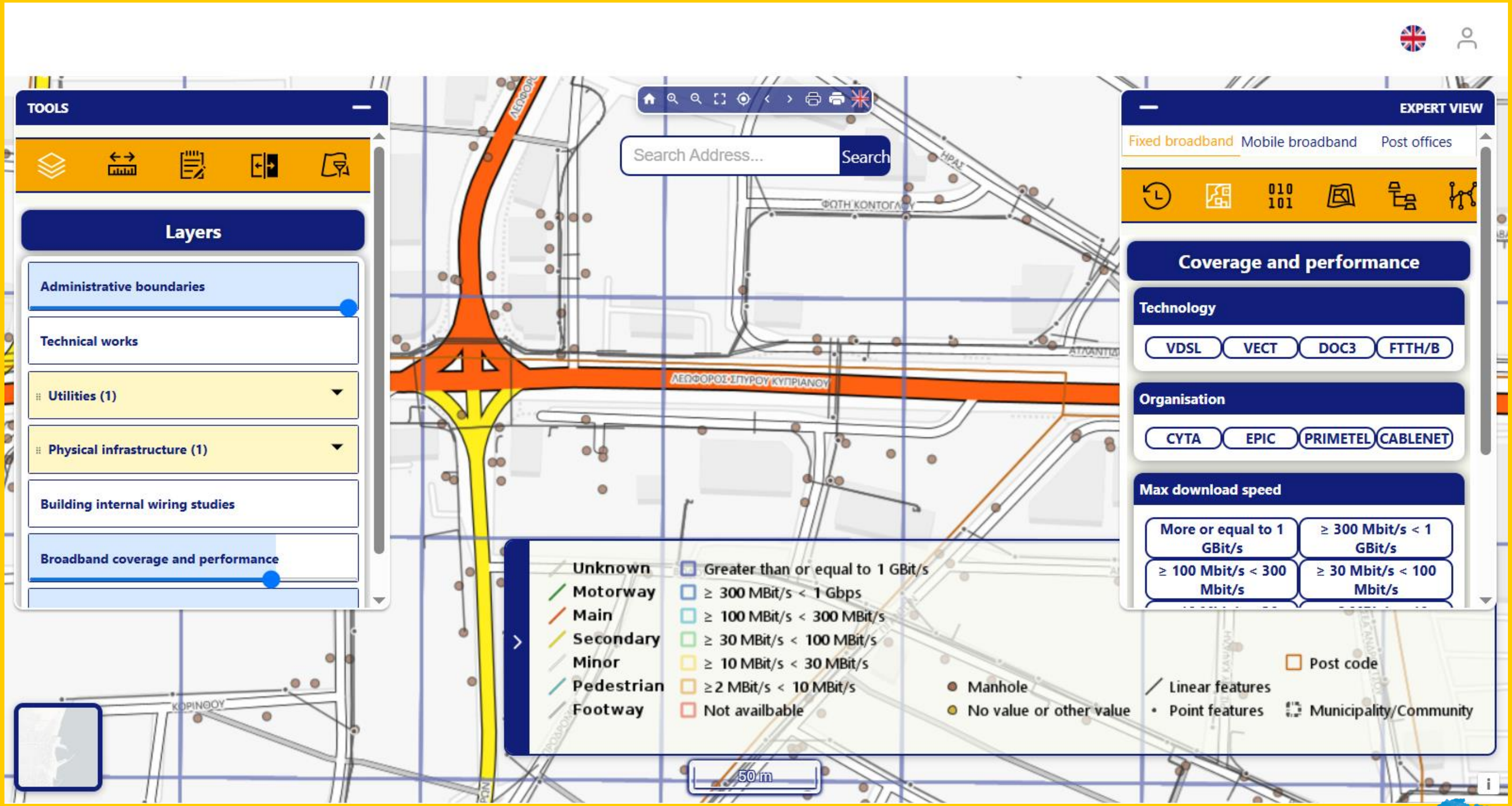
Type of information
Geodata (vector, raster, spatial reference κτλ.), word/excel files

Type of Access
Internal Use, Restricted Access, Public Access

Procedures to provide information
Email, webservices, upload server, timeframes

CYPRUS: Broadband Portal

Unified data



Regional Harmonization Initiatives

Broadband Transmission Capacity Indicators

- Building BB geodatabases using indicators
- Development of metadata catalogues and data standards (OFDS)
- Enhancing interoperability across systems and countries

- **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 7**: **Population within reach** of transmission networks

The End
Thank You

Q&R

Q&R

Q&R

Pause-café

SESSION 4: technical Deep-Dive: Architecture, Standards, Tools & Data Ecosystem

Setting the stage & Moderation: Mr. Dana Jon Kamason, Project Manager, Africa-BB-Maps, ITU

Mr. Dana Jon Kamason

Project Manager, ITUAfrica-BB-Maps,

Représentant

ARCEP

Africa-BB-Maps – Geospatial Software Choices for Benin

Africa-BB-Maps – Geospatial Software Benin’s Choices

capacitor

spring boot

ANGULAR

Java 8

React

PostgreSQL

Laravel

Leaflet

Open Street Map

OpenLayers

Global Gateway

Arcep BENIN

ITU

Africa-BB-Maps – Architecture Pillars

Best Practice and Design Recommendations

Security

Performance & Scalability

Reliability

Integration

Automation

Observability

Africa-BB-Maps – Architecture Systems Patterns

Geospatial in Nature, Supports Multiple Deployment Models

Location Services

Self-service mapping, analysis, and sharing

Enterprise application hosting and management

Data editing and management

Imagery data management and analytics

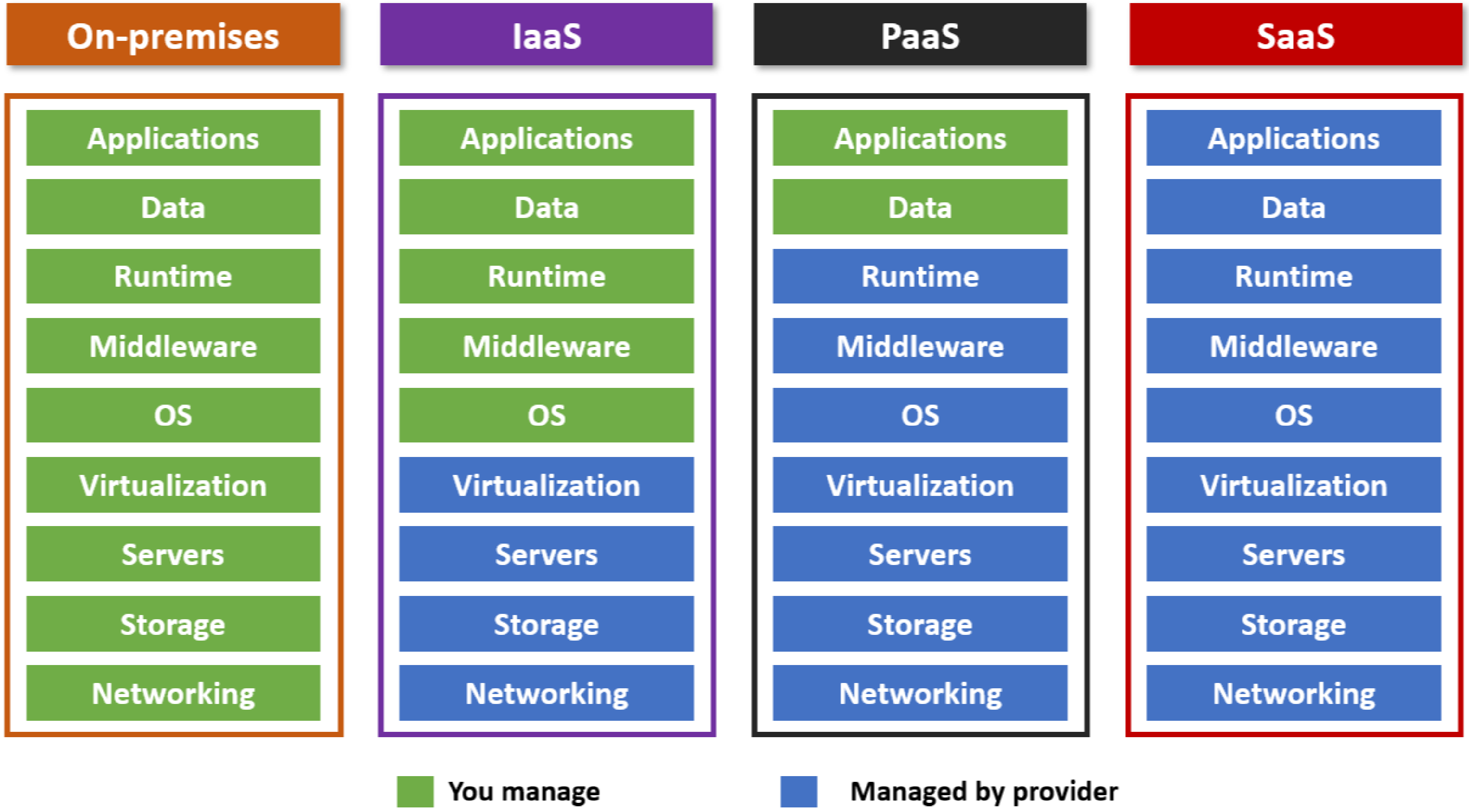
Mobile operation and offline data management

Real-time data streaming and analytics

Big data analytics

Global Gateway

Africa-BB-Maps – Architecture Deployment Model



Geospatial
Open Source

Africa-BB-Maps – Geospatial Open Source Software

https://www.osgeo.org/

Africa-BB-Maps – Geospatial Open Source Projects

deegree
deegree is open source software for spatial data infrastructures and the geospat...

Website · Source · Documentation

GDAL/OGR
GDAL is a C++ translator library for more than 200 raster and vector geospatial ...

Website · Source · Documentation

GeoMoose
GeoMoose is a Web Client JavaScript Framework for displaying distributed cartogr...

GeoNetwork
A catalog to manage spatially referenced resources. It provides powerful metadat...

Website · Source · Documentation

GeoNode
GeoNode is a web-based application and platform for developing geospatial inform...

Website · Source · Documentation

GEOS
GEOS (Geometry Engine – Open Source) is a C++ port of the Java Topology Su...

Website · Source · Documentation

GeoServer
Designed for interoperability, GeoServer publishes data from any major spatial d...

Website · Source · Documentation

GeoTools
An open source Java library providing a standards compliant approach for visuali...

Website · Source · Documentation

GRASS
GRASS is a powerful computational engine for raster, vector, and geospatial proc...

Website · Source · Documentation

gvSIG Desktop
gvSIG is a powerful, user-friendly, interoperable GIS used by thousands o...

Website · Source · Documentation

Mapbender
Mapbender is a web based geoportal framework to publish, register, view, navigat...

Website · Source · Documentation

MapServer
Known as one of the fastest mapping engines in the world, MapServer is an Open S...

Website · Source · Documentation

Marble
Versatile, yet easy to use. Use Marble similar to a desktop globe; pan around an...

Website · Source

OpenLayers
OpenLayers makes it easy to put a dynamic map in any web page. It can display ma...

Website · Source · Documentation

Orfeo ToolBox
Orfeo ToolBox is an open-source project for state-of-the-art remote sensing, inc...

Website · Source · Documentation

OSGeoLive
OSGeoLive is a self-contained bootable DVD, USB thumb drive or Virtual Machine b...

Website · Source · Documentation

pgRouting
pgRouting extends the PostGIS / PostgreSQL geospatial database providing routing...

Website · Source · Documentation

PostGIS
PostGIS adds GIS spatial types and support to PostgreSQL. It is used by Database...

Website · Source · Documentation

https://www.osgeo.org/projects/

Africa-BB-Maps – Geospatial Open Source Projects

PROJ
PROJ is a generic coordinate transformation software that transforms geospatial ...

Website · Source · Documentation

pycsw
pycsw is an OGC CSW server implementation written in Python. Started in 2010 (mo...

Website · Source · Documentation

pygeoapi
pygeoapi is an OGC API to geospatial data

Website · Source · Documentation

FDO
FDO Data Access Technology is an API for manipulating, defining and analyzing ge...

Website · Documentation

GC2/Vidi
A platform for building spatial data infrastructure and deploying browser based ...

Website · Source · Documentation

GeoExt
A JavaScript Toolkit for Rich Web Mapping Applications

Website · Source · Documentation

PyWPS
PyWPS is an implementation of the Web Processing Service standard from the Open ...

Website · Source · Documentation

QGIS Desktop
QGIS is the leading Free and Open Source Desktop GIS. It allows you to create, e...

Website · Source · Documentation

ZOO-Project
ZOO-Project is a C-based WPS (Web Processing Service) implementation. It is an o...

Website · Source · Documentation

GeoHealthCheck
GeoHealthCheck is a Python application to support monitoring OGC Web Services up...

Website · Source · Documentation

GeoServer Client PHP
GeoServer Client PHP is library for interacting with the GeoServer API.

Website · Source · Documentation

GeoStyler
generic styler for geodata

Website · Source · Documentation

actinia
Actinia is an open source REST API for scalable, distributed, high performance p...

Website · Source · Documentation

EOEPCA+
EOEPCA+'s vision is to streamline the access to and processing of earth observat...

Website · Documentation

ETF
ETF is a testing framework for validating data and APIs in Spatial Data Infrastr...

Website · Source · Documentation

GeoWebCache
GWC is a tile server and caching proxy written in Java.

Website · Source · Documentation

Giswater
An intelligent technology, free and open source for the integral water cycle man...

Website · Source · Documentation

istSOS
IstSOS is an OGC Sensor Observation Service server implementation written in Pyt...

Website · Source · Documentation

https://www.osgeo.org/projects/

Africa-BB-Maps – Geospatial Open Source Projects

Loader
A loader for geographic data in GML and KML (that needs some preparation before ...
Website · Source · Documentation

mapfish
Create reports that contain maps!
Website · Source · Documentation

MapGuide Open Source
MapGuide Open Source is a web-based platform that enables users to develop and d...
Website · Source · Documentation

mappyfile
A Python library to create, parse, modify, and format MapServer Mapfiles....
Website · Source · Documentation

Mesh Data Abstraction Library (MDAL)
Mesh Data Abstraction Library (MDAL) is a translator library for more than 15 un...
Website · Source · Documentation

MobilityDB
An open source geospatial trajectory data management & analysis platform...
Website · Source · Documentation

Open Data Cube
The Open Data Cube is a Python library and suite of supporting applications that...
Website · Source · Documentation

Opticks
Opticks is an expandable remote sensing and imagery analysis software platform t...
Website · Source

OSGeo4W
OSGeo4W is a binary distribution of a broad set of open source geospatial softwa...
Website · Source · Documentation

OSSIM
OSSIM is an open source, C++ (mostly), geospatial image processing library used ...
Source

OWSLib
OWSLib is a Python package for client programming with Open Geospatial Consortiu...
Website · Source · Documentation

Portable GIS
GIS on a USB stick, for windows
Website · Source · Documentation

PROJ-JNI
PROJ-JNI provides a Java Native Interface for PROJ C/C++ library....
Website · Source · Documentation

Pronto Raster
Pronto Raster is a C++ library for calculations with raster data. The library is...
Website · Source · Documentation

rasdaman
Scalable datacube analytics
Website · Source · Documentation

TEAM Engine
The Test, Evaluation, And Measurement (TEAM) Engine is a testing facility that e...
Website · Source · Documentation

TorchGeo
TorchGeo: datasets, samplers, transforms, and pre-trained models for geospatial ...
Website · Source · Documentation

XYZ / MAPP
Open source presentation, controller, domain, and service layers for cloud nativ...
Website · Source · Documentation

https://www.osgeo.org/projects/

Africa-BB-Maps – Geospatial Open Source Projects

Bezitopo
A land surveying CAD package under development

Website · Source

CoastalME
CoastalME (Coastal Modelling Environment) is a Free Open Source and Software for...

Website · Source · Documentation

DigiAgriApp
DigiAgriApp is a software solution aimed at anyone with cultivated land....

Website · Source · Documentation

eodash
Publish and integrate Earth Observation data in a dashboard application through ...

Website · Source · Documentation

EOxServer
EOxServer is a Python application and framework for presenting Earth Observation...

Website · Source · Documentation

ESA-NASA WorldWind
WorldWind is a free, open source API for a virtual globe. WorldWind allows devel...

Website · Source

First Draft GIS
First Draft GIS is an Artificial Intelligence that makes the first draft of a ma...

Website · Source · Documentation

Flexurba
Flexurba is an open-source R package to flexibly reconstruct the Degree of Urban...

Website · Source · Documentation

Geomajas - OSGeo Heritage Project
Note: This project is an OSGeo Heritage Project – it is no longer maintain...

Source

GeoMesa
GeoMesa is an open-source, distributed, spatio-temporal database built on a numb...

Website · Source · Documentation

Geopaparazzi
Geopaparazzi is a tool developed to do very fast qualitative engineering/geologi...

Website · Source · Documentation

geOrchestra
geOrchestra is the free, modular, interoperable & secure Spatial Data Infras...

Website · Source · Documentation

GeoTrellis
GeoTrellis is a geographic data processing library designed to work with large g...

Website · Source · Documentation

GeoWave
GeoWave is a software library that connects the scalability of distributed compu...

Website · Source · Documentation

GET-IT - Geoinformation Enabling ToolkIT starterkit®
The Geoinformation Enabling ToolkIT starterkit® (GET-IT) is the software suite f...

Website · Source · Documentation

GIFramework Maps
GIFramework Maps is a .NET based web mapping application designed and developed ...

Website · Source · Documentation

Giro3D
Giro3D is an open-source JavaScript framework for visualizing and interacting wi...

Website · Source · Documentation

Gisquick
Let's share GIS much quicker!

Website · Source · Documentation

https://www.osgeo.org/projects/

Africa-BB-Maps – Geospatial Open Source Projects

HOT Tasking Manager
The purpose of the Tasking Manager is to divide a large mapping project into sma...

Website · Source · Documentation

JTS Topology Suite
JTS is an open source spatial library defining geometry, spatial relationships, ...

Website · Source · Documentation

Kaoto
Kaoto is an integration editor to create and deploy workflows in a visual, low-c...

Website · Source · Documentation

pdal
The Point Data Abstraction Library (PDAL) provides command line tools and a libr...

Website · Source · Documentation

PerfectTIN
Converts point clouds to TINs

Source

py3dtiles
Python library and command-line for 3dtiles

Website · Source · Documentation

Koop
An Open Geospatial ETL Engine so you can leave geospatial data where it lives an...

Website · Source · Documentation

Leaflet
Open-source JavaScript library for mobile-friendly interactive maps

Website · Source · Documentation

LERC Limited Error Raster Compression
LERC is an open-source image or raster format which supports rapid encoding and ...

Website · Source · Documentation

QField
Get your QGIS fieldwork done efficiently and comfortably.

Website · Source · Documentation

R-Spatial
A set of R packages for handling and analysing spatial data, built upon OSGeo co...

Website · Source · Documentation

RasterFrames
RasterFrames® enables analysts, data scientists and EO specialists to easily...

Website · Source · Documentation

Masterportal
Masterportal is an open source geoviewer (WebGIS) compliant to OGC standards. It...

Website · Source · Documentation

MOSS
Map Overlay and Statistical System (MOSS) The Map Overlay and Statistical System...

Website · Source · Documentation

MovingPandas
Python library for movement trajectory data exploration and analysis.

Website · Source · Documentation

SFCGAL
SFCGAL is a C++ wrapper library around CGAL (Computational Geometry Algorithms L...

Website · Source · Documentation

Tegola
Tegola is a high performance Mapbox Vector Tile server written in Go. In a nutsh...

Website · Source

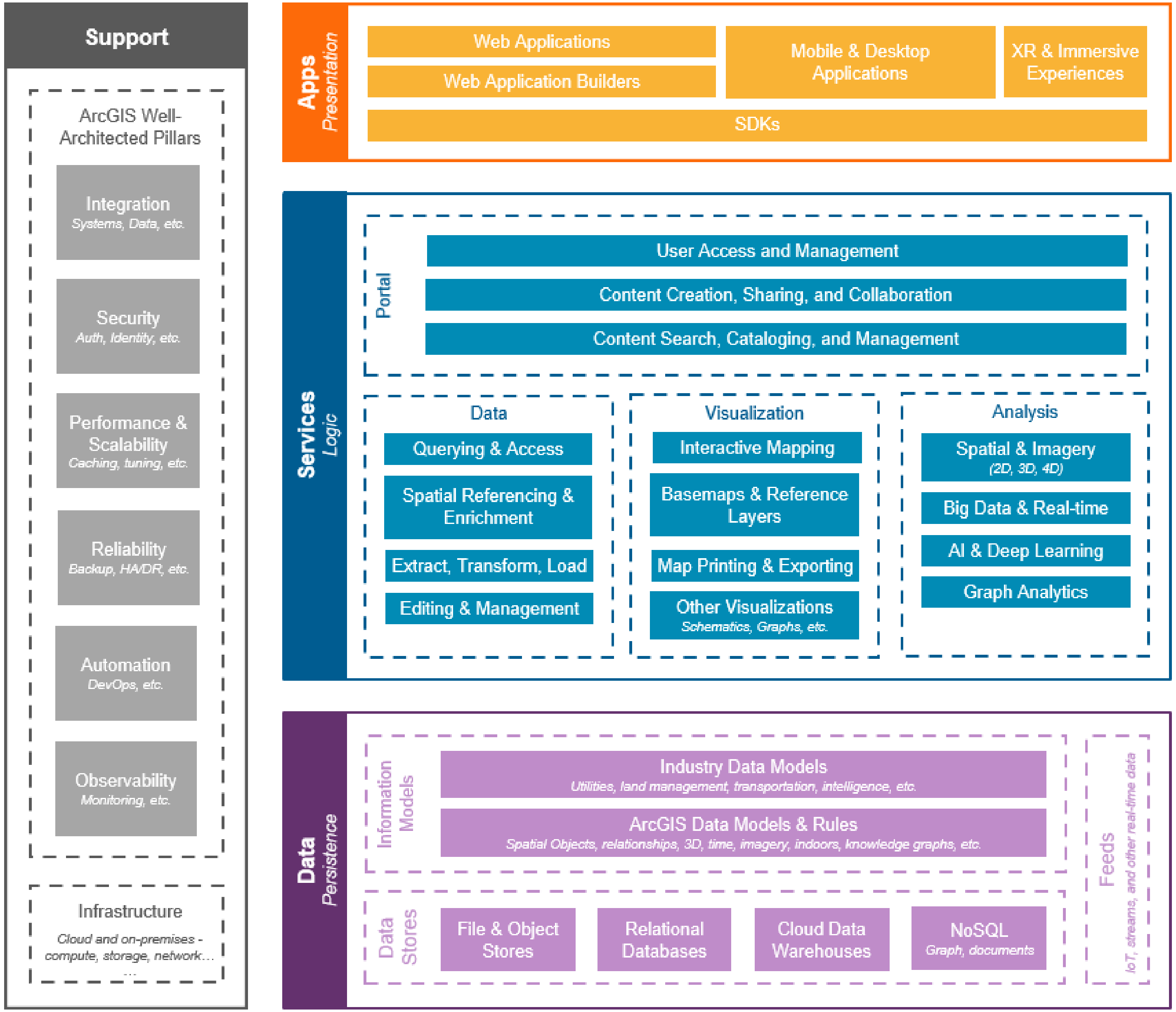
Terra Draw
Terra Draw is an open source JavaScript library for drawing and editing geometri...

Website · Source · Documentation

https://www.osgeo.org/projects/

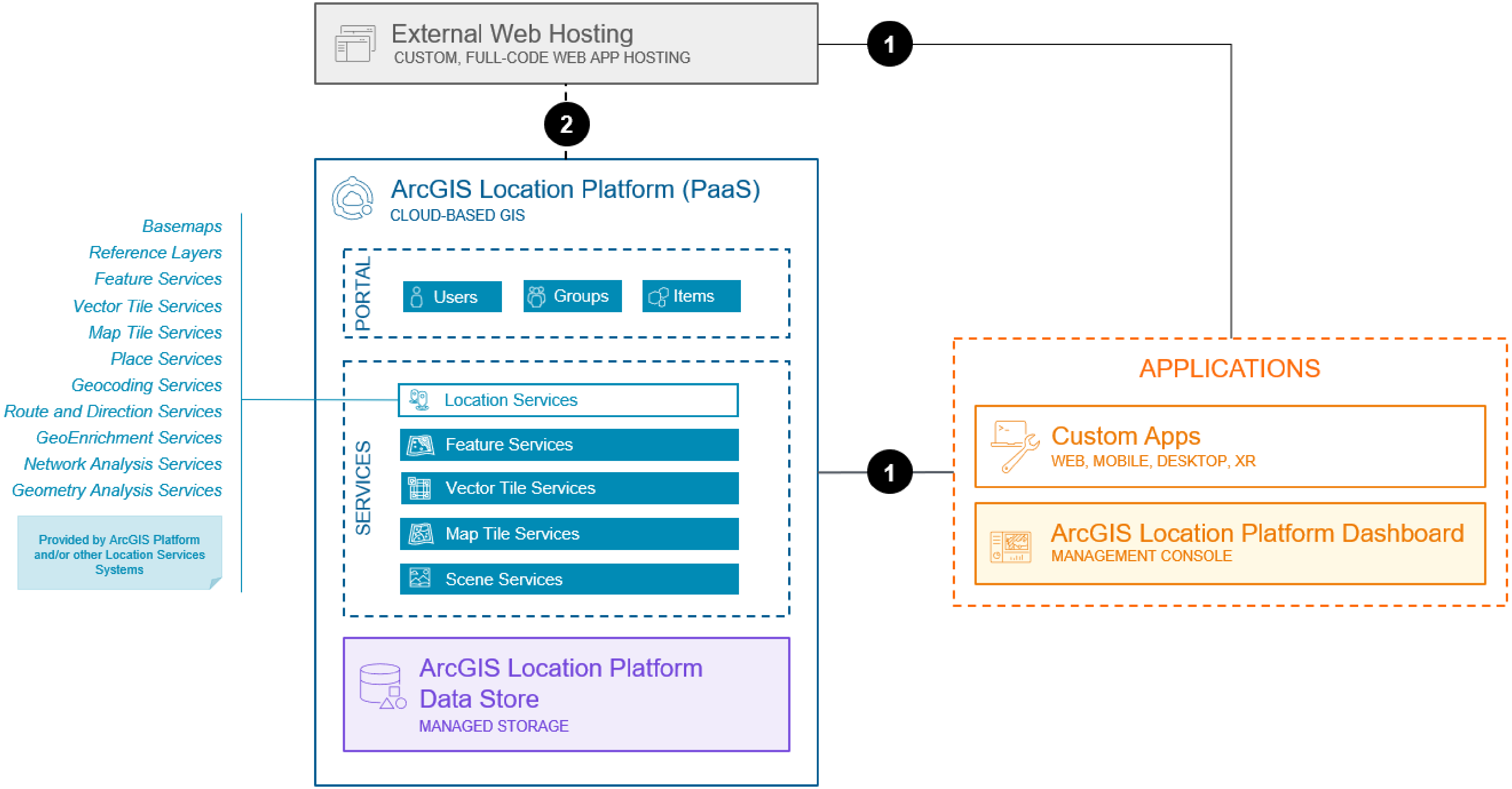
Geospatial
ArcGIS Enterprise

Africa-BB-Maps – ArcGIS Architecture



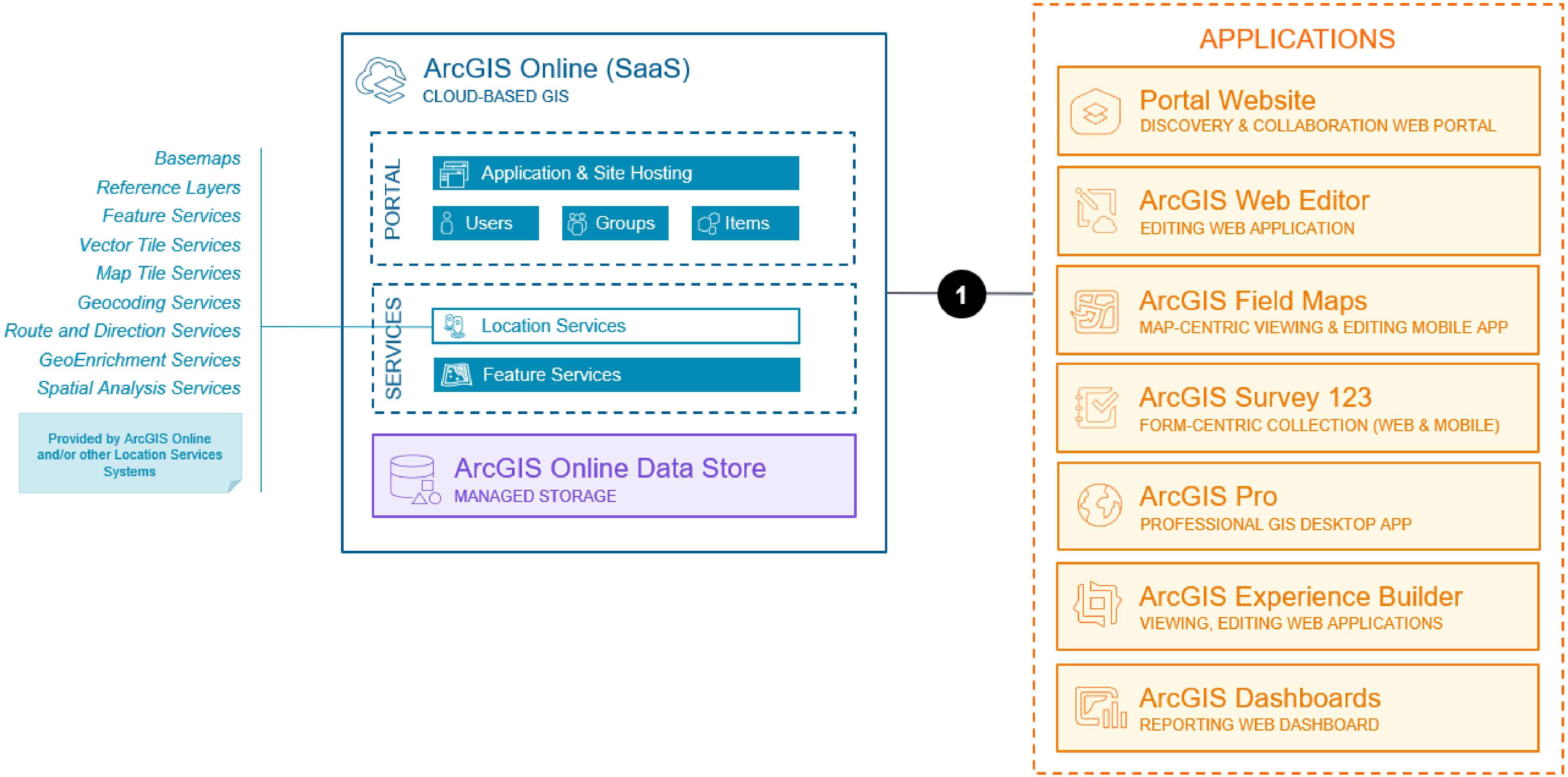
Source: Esri

Africa-BB-Maps – ArcGIS PaaS



Source: Esri

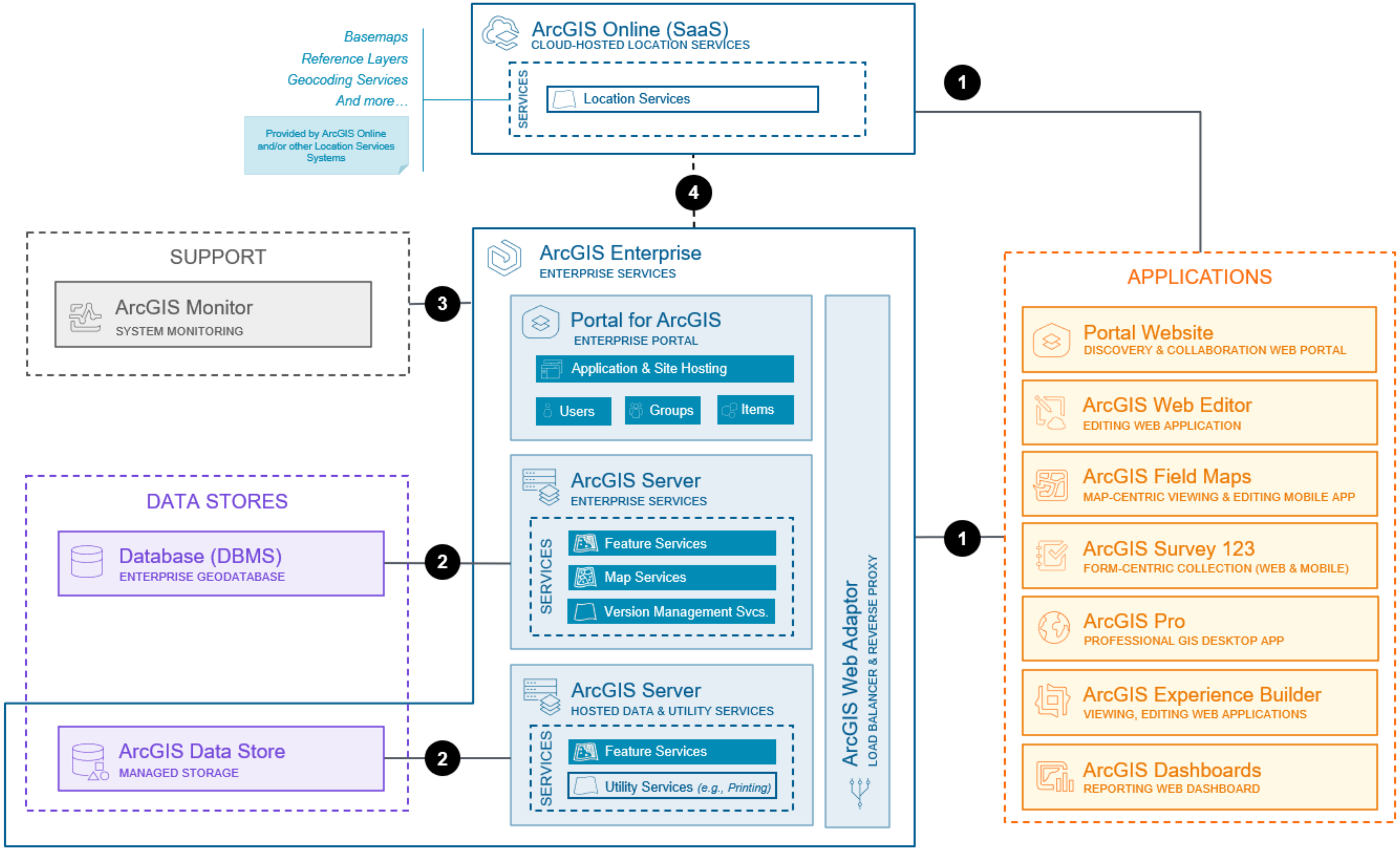
Africa-BB-Maps – ArcGIS SaaS



Global Gateway

Source: Esri

Africa-BB-Maps – ArcGIS IaaS/On-Premises



Source: Esri

Global Gateway

Arcep BENIN

ITU

Geospatial
Open Data

Africa-BB-Maps – Geospatial Open Data

‘Open Data applies the principles of ***free and open*** to geospatial data’

Africa-BB-Maps – Geospatial Open Data (Global)

https://www.openstreetmap.org

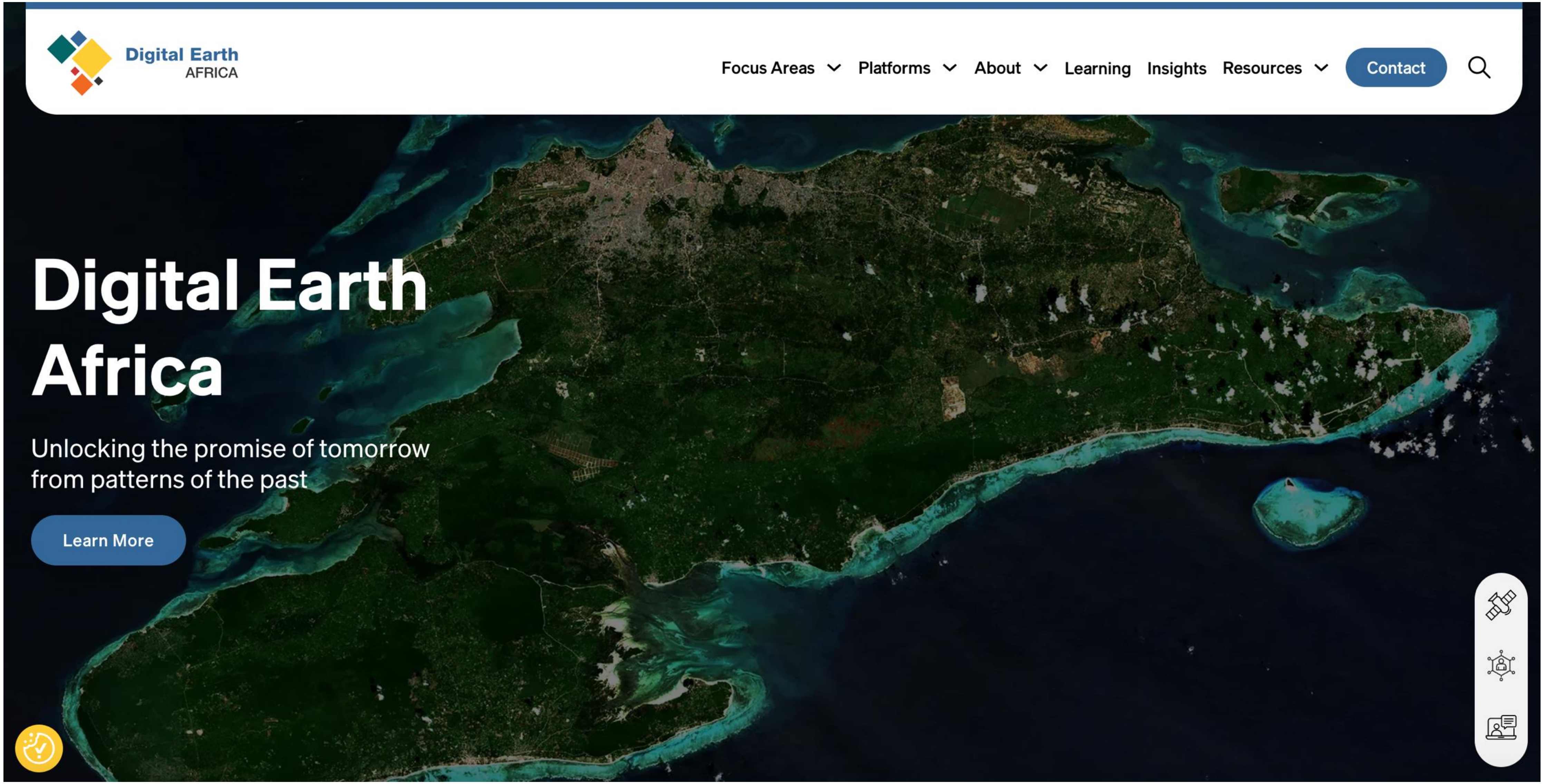
Africa-BB-Maps – Geospatial Open Data (Global)

copernicus

Europe's eyes on Earth

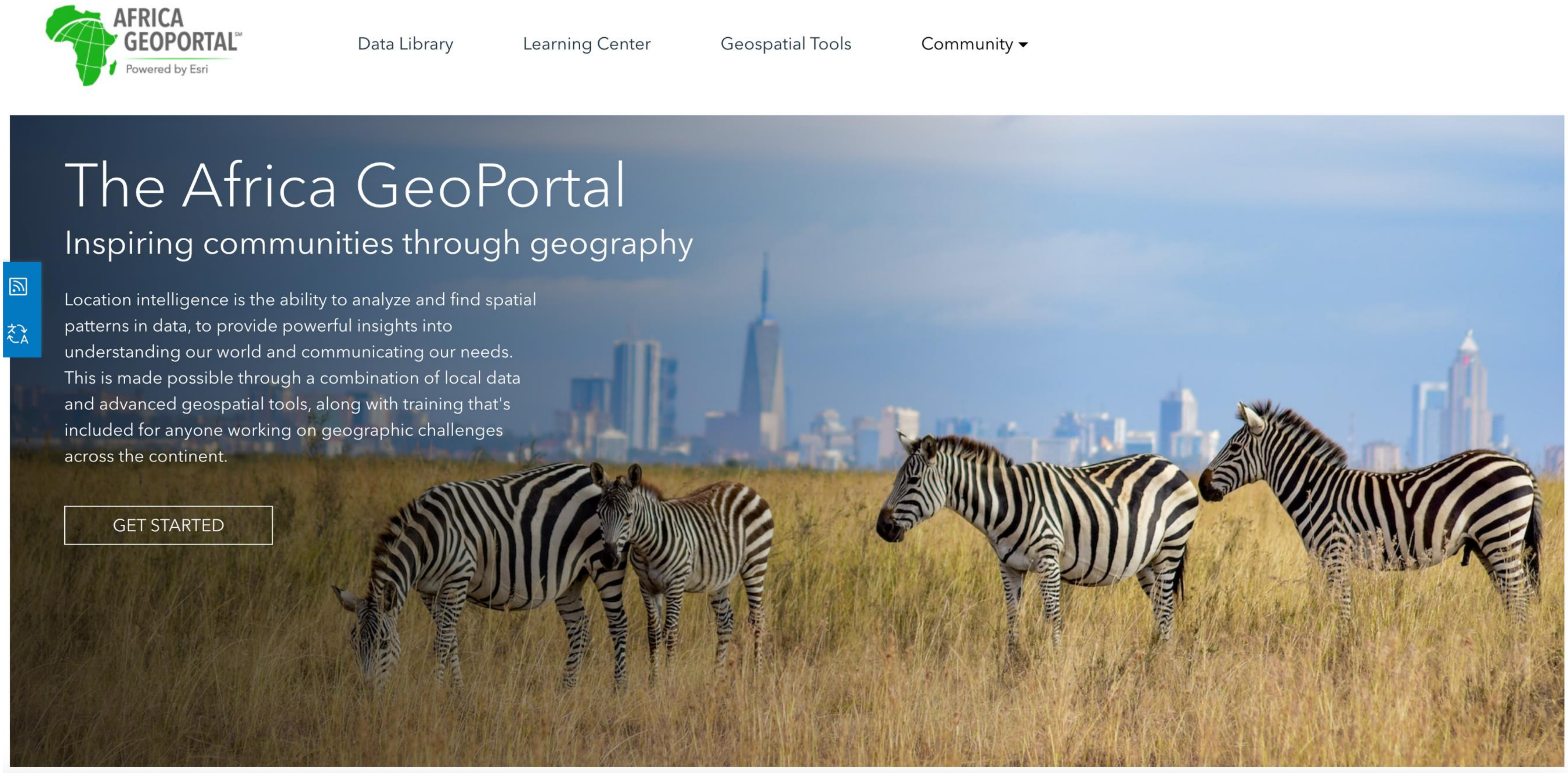
https://www.copernicus.eu/en/access-data/conventional-data-access-hubs

Africa-BB-Maps – Geospatial Open Data (Africa)



https://digitalearthafrica.org/en_za

Africa-BB-Maps – Geospatial Open Data (Africa)



https://www.africageoportal.com

Africa-BB-Maps – Geospatial Open Data (Benin)

AFRICA GEOPORTAL
Powered by Esri

Data Library | Learning Center | Geospatial Tools | Community

Service status unknown
We are unable to access the secure service as it requires additional authorization. Downloads and map functionality are currently unavailable for the item.

Benin Department Boundaries

Authoritative

ArcGIS Data and Maps
Esri

Summary

Benin Department Boundaries provides a 2023 boundary with a total population count.

Benin Department Boundaries provides a 2023 boundary with a total population count. The layer is designed to be used for mapping and analysis. It can be enriched with additional attributes using data enrichment tools in ArcGIS Online.

The 2023 boundaries are provided by Michael Bauer Research GmbH. These were published in October 2023. A new layer will be published in 12-18 months.

Details

Map
Feature Service

7 April 2025 at 18:13:18 CEST
Date Updated

20 September 2023 at 17:35:58 CEST
Published Date

Public

https://www.africageoportal.com

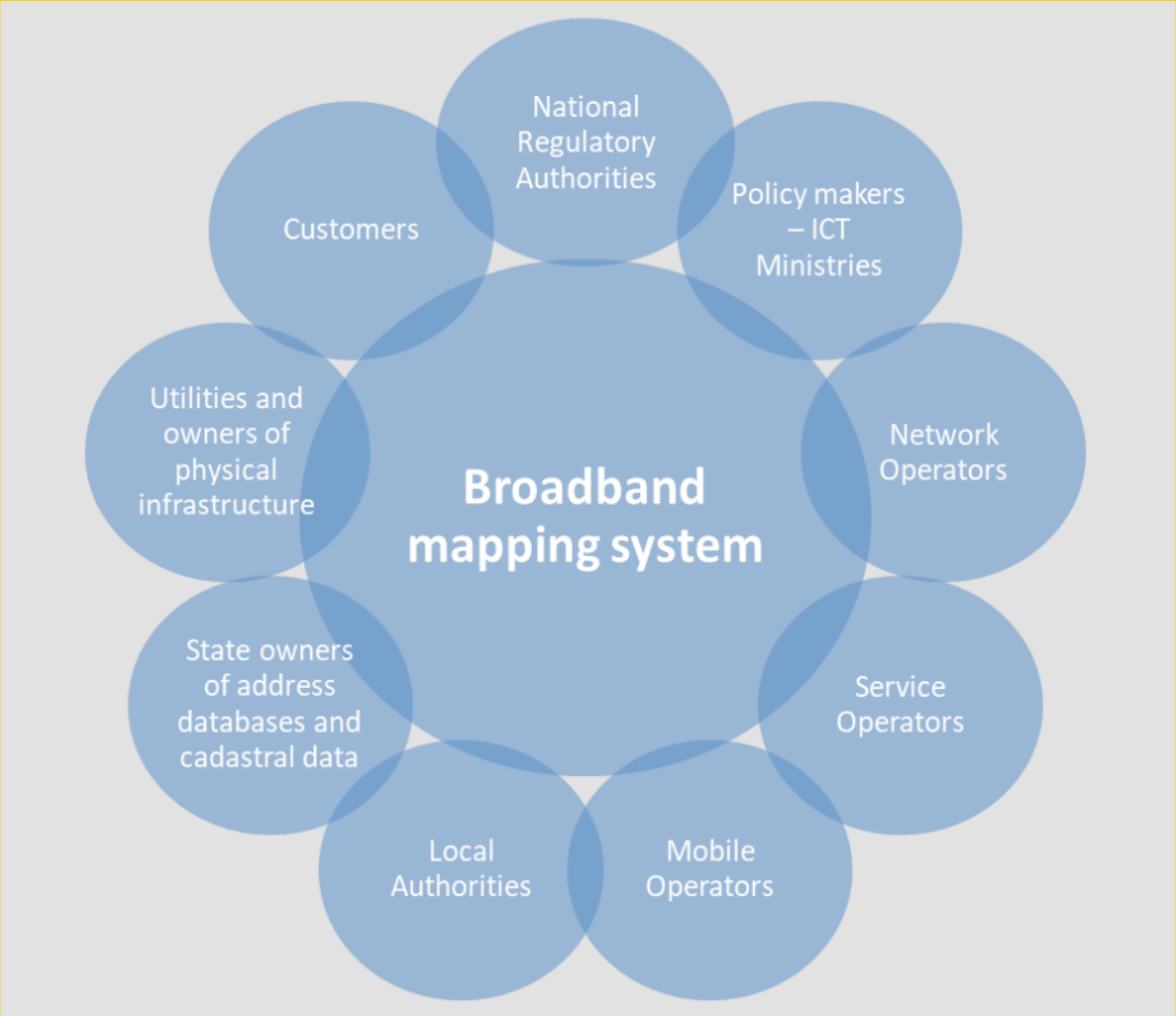
Merci!

Q&R

Pause Déjeuner

SESSION 6: Analyse approfondie des politiques : Présentation des travaux d'analyse à venir

Moderation: Mr. Elind Sulmina, Project Officer, Africa-BB-Maps, ITU


National Regulatory Authorities
Policy makers – ICT Ministries
Customers
Utilities and owners of physical infrastructure
Broadband mapping system
Network Operators
State owners of address databases and cadastral data
Service Operators
Local Authorities
Mobile Operators

Première partie

Section	Title
1	INTRODUCTION
1.1	Contexte général
1.2	Context spécifique
1.3	Énoncé du problème
1.4	Objet des lignes directrices
1.5	Avertissement / Clause de non-responsabilité

Stratégies, politiques et environnements réglementaires pour la cartographie du haut débit

2.1	Facteurs stratégiques et politiques pour la cartographie du haut débit
2.2	cadre réglementaire pour la cartographie
2.2.1	Example - Les lignes directrices de l'UE sur les aides d'État pour le haut débit (2013)
2.2.2	Example - La directive sur la réduction des coûts du haut débit (2014)
2.2.3	Le Code européen des communications électroniques (2018)
2.3	L'expérience européenne dans le domaine des mécanismes de règlement des différends
2.3.1	Propositions d'améliorations et évolutions réglementaires
2.3.2	Exigences politiques et réglementaires minimales pour la mise en œuvre d'un système de cartographie du haut débit au niveau national
2.3.3	Politiques aux niveau régional

Mise en place du projet et exigences techniques pour la cartographie du haut débit

3.1	Cadre et objectifs du projet
3.1.1	Project framework and objectives
3.2	Exigences techniques et organisationnelles minimales pour la mise en œuvre d’un système de cartographie du haut débit

Mise en place du projet et exigences techniques pour la cartographie du haut débit - Gestion de projet / Défis courants

4.1	Qualité des données
4.1.1	Confidentialité des données
4.1.2	Sources de données
4.1.3	Réglementation
4.1.4	Coûts pour les parties prenantes
4.1.5	Stakeholder costs

4.2 Facteurs généraux de réussite
4.2.1 Stakeholder involvement
4.2.2. Définition claire des types de cartographie
4.2.3. Internal sponsorship
4.2.4 Efficient reporting tool
4.2.5 Reporting support

4.3 Durabilité à long terme
4.3.1 Investissement dans les outils de reporting
4.3.2 Adaptabilité et développement des outils de collecte
4.3.3 Outils de visualisation
4.3.4 Tools' promotion
4.3.5 Data application
4.3.6 Open-source solutions
4.3.7 Change management

Liste de vérification – politiques publiques et réglementations

1. Définir la justification et les objectifs de la cartographie du haut débit au niveau national.
2. Identifier les institutions et parties prenantes concernées ainsi que leurs rôles.
3. Inclure la justification et le mandat dans les documents stratégiques (par ex. plans haut débit, stratégies TIC).
4. Fournir une plateforme pour un engagement et une consultation à long terme avec toutes les parties prenantes (opérateurs, administrations régionales et locales, etc.).

Liste de vérification – politiques publiques et réglementations

5. Analyser le cadre législatif et proposer des réformes si nécessaire

5. Partage des infrastructures (cartographie des infrastructures)
6. Affectation des financements publics (cartographie des services)
7. Objectif de la carte
8. Obligation pour l'autorité de fournir la carte
9. Obligation pour les parties prenantes de fournir des informations

6. S'assurer que l'ANR (ou autre Autorité compétente) dispose du mandat, du budget et des ressources humaines nécessaires pour mettre en œuvre les dispositions légales.
7. Définir des définitions techniques communes et des méthodes pour réaliser l'exercice de cartographie du haut débit. Consulter les parties prenantes.
8. Planifier des évaluations régulières de la cartographie et de son utilité pour atteindre ses objectifs ; ajuster la carte et toute disposition normative associée, si nécessaire, en fonction des évaluations, changements d'objectifs ou du cadre juridique/réglementaire, tous les 4 à 5 ans, afin de garantir leur pertinence.

2 SESSIONS: Dialogue de co-création sur l'architecture, les sources de données et les contraintes techniques et politiques necessaires

Moderation: Mr. Dana Jon Kamason, Project Manager, Africa-BB-Maps, ITU

2 SESSIONS: Dialogue de co-création sur l'architecture, les sources de données et les contraintes techniques et politiques necessaires

Technical Group 2

Data Management

Domaine:

- Gouvernance des données
- Normalisation
- Mécanismes de collecte
- Mécanismes de partage
- Gestion et assurance qualité

Technical Group 1

Data Quality & Verification

Key Area:

- Vérifications de validation des données
- Vérification indépendante des données de couverture (tests de conduite, audits, crowdsourcing)
- Utilisation d'outils SIG pour assurer la cohérence
- Recommandations pour des ensembles de données nationaux fiables

Policy Group 1

Policy & Regulatory Framework for Data Quality

Key Area:

- Défis de coordination entre les fournisseurs de données et l'ARCEP
- l'Propriété et confidentialité des données
- Limitations institutionnelles
- Harmonisation nationale et régionale

Présentation des résultats

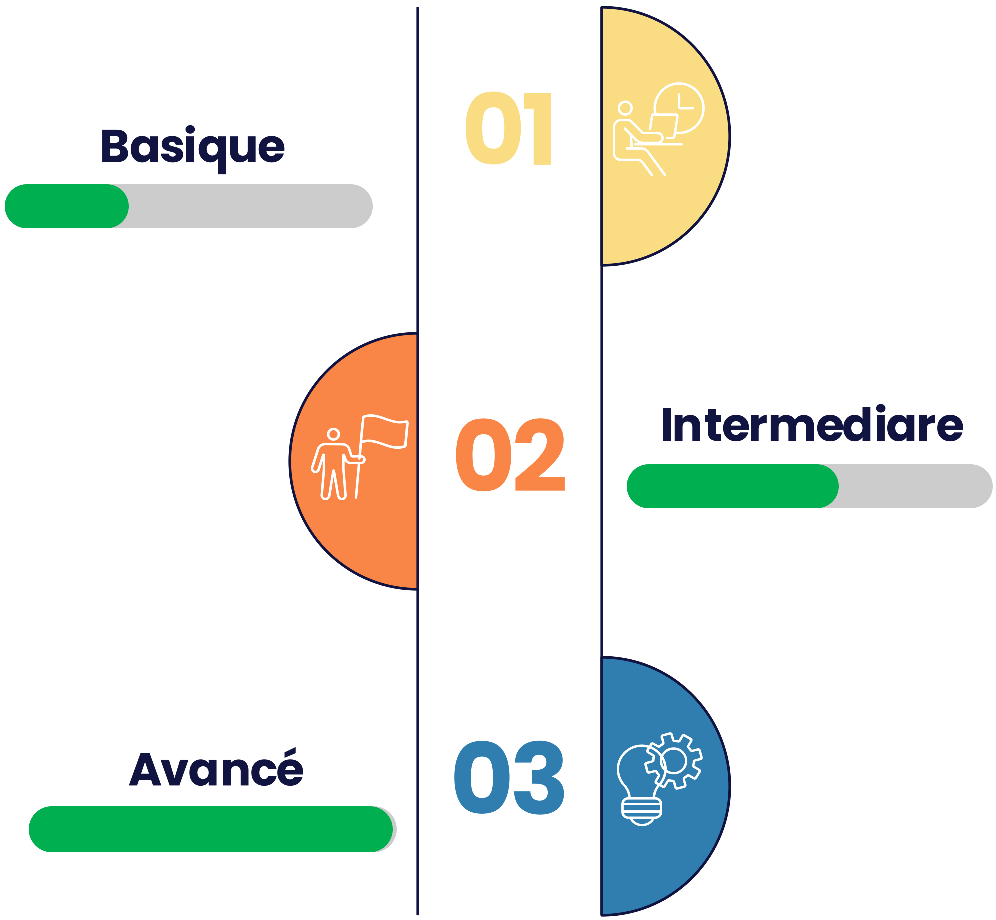
SESSION 10: Feuille de route nationale – Calendrier final, programme de formation et prochaines étapes

Moderation: Mr. Dana Jon Kamason, Project Manager, Africa-BB-Maps, ITU

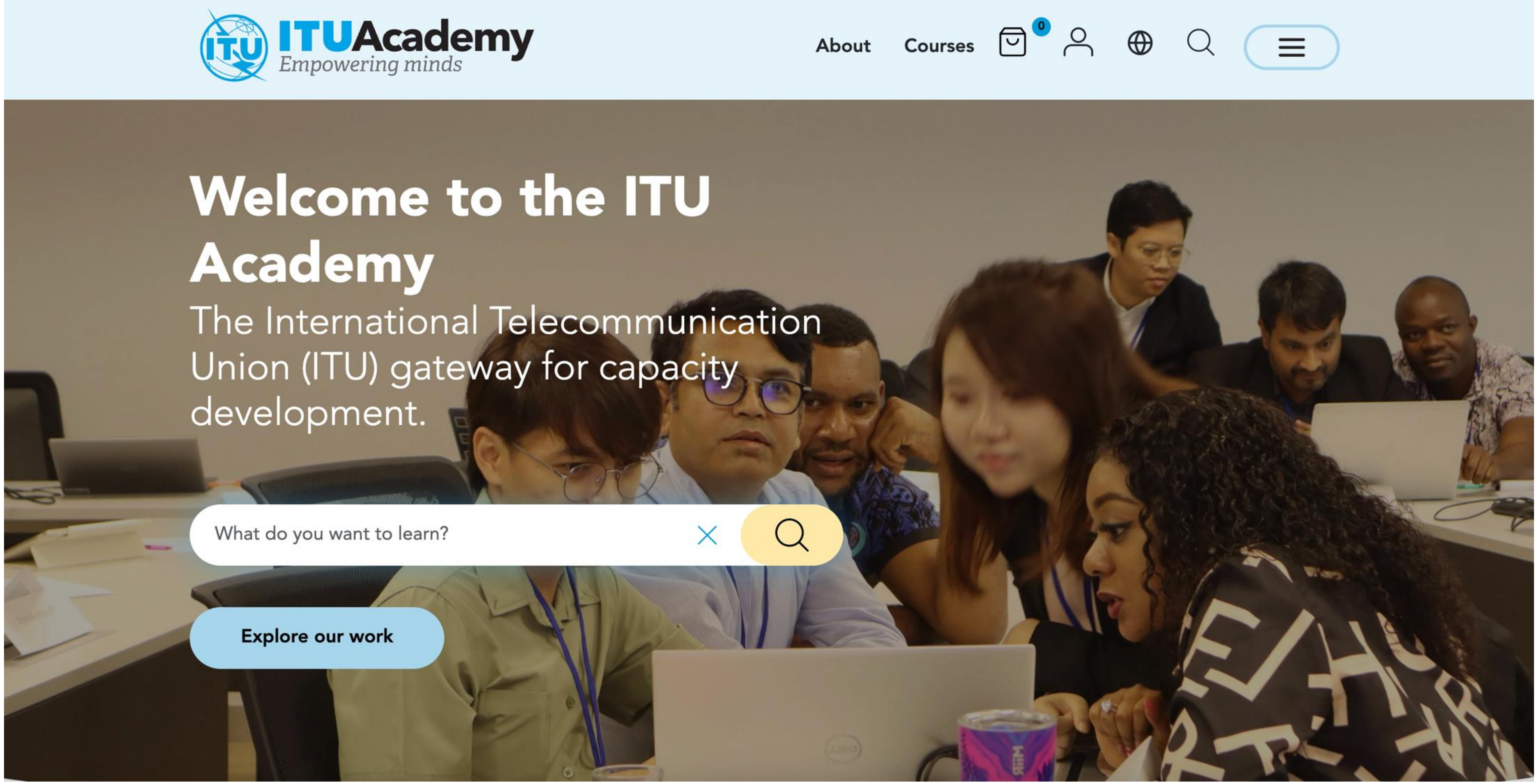
Africa-BB-Maps – Le role de ARCEP en tant que chef d'orchestre

Africa-BB-Maps – Feuille de route pour le développement des capacités au Benin

SIG, Politiques, Donées



Africa-BB-Maps – Plateforme de mise en œuvre du développement des capacités



https://academy.itu.int/

Global Gateway

Africa-BB-Maps – Capacity Development Framework (2026-2028)

	SIG	POLITIQUE	DATA
Format	Cours en ligne en auto-apprentissage Cours dirigés par un instructeur Ateliers en présentiel Formation des formateurs	Webinaires Policy Labs Régionaux EU Study Visits Ateliers Structurés	Cours en ligne à rythme libre Cours dirigés par un instructeur Ateliers en présentiel Conférences
Approche	Pratique concrète Application pratique Progression accélérée des compétences	Apprentissage par les Pairs Exposition aux pratiques de l'UE Regulation basée sur des preuves	Pratiques de gestion des données fondées sur les normes Analytique appliquée Parties prenantes locales
Public cible	Experts SIG Équipes techniques	Experts on politque et régulation	Gestionnaires de données Analystes
Partenaires d'implémentation	UIT, Experts Commerciaux, Acteurs Locaux		

Expected Outcomes

Expertise durable en SIG, politiques et données

2026 - 2028

Africa-BB-Maps – Prochaines étapes pour le Benin

Fondation
& Préparation

2025

Déploiement du
système & Renforcement
des capacités

2026

Opérationnalisation &
Alignement des politiques

2027

Durabilité &
Leadership régional

2028

Identifier

Améliorer

Innover

Gérer

Merci !

Q&R

Cérémonie de clôture

Cérémonie de clôture

Mr Ali Drissa Badiel

ITU Area Representative for Western Africa, ITU Regional office for Africa

Directeur

Arcep