

INFRA-ESTRUTURAS DE DADOS ESPACIAIS E A DIRECTIVA INSPIRE



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I Simpósio Brasileiro de Infraestrutura de Dados Espaciais:
10 anos da INDE

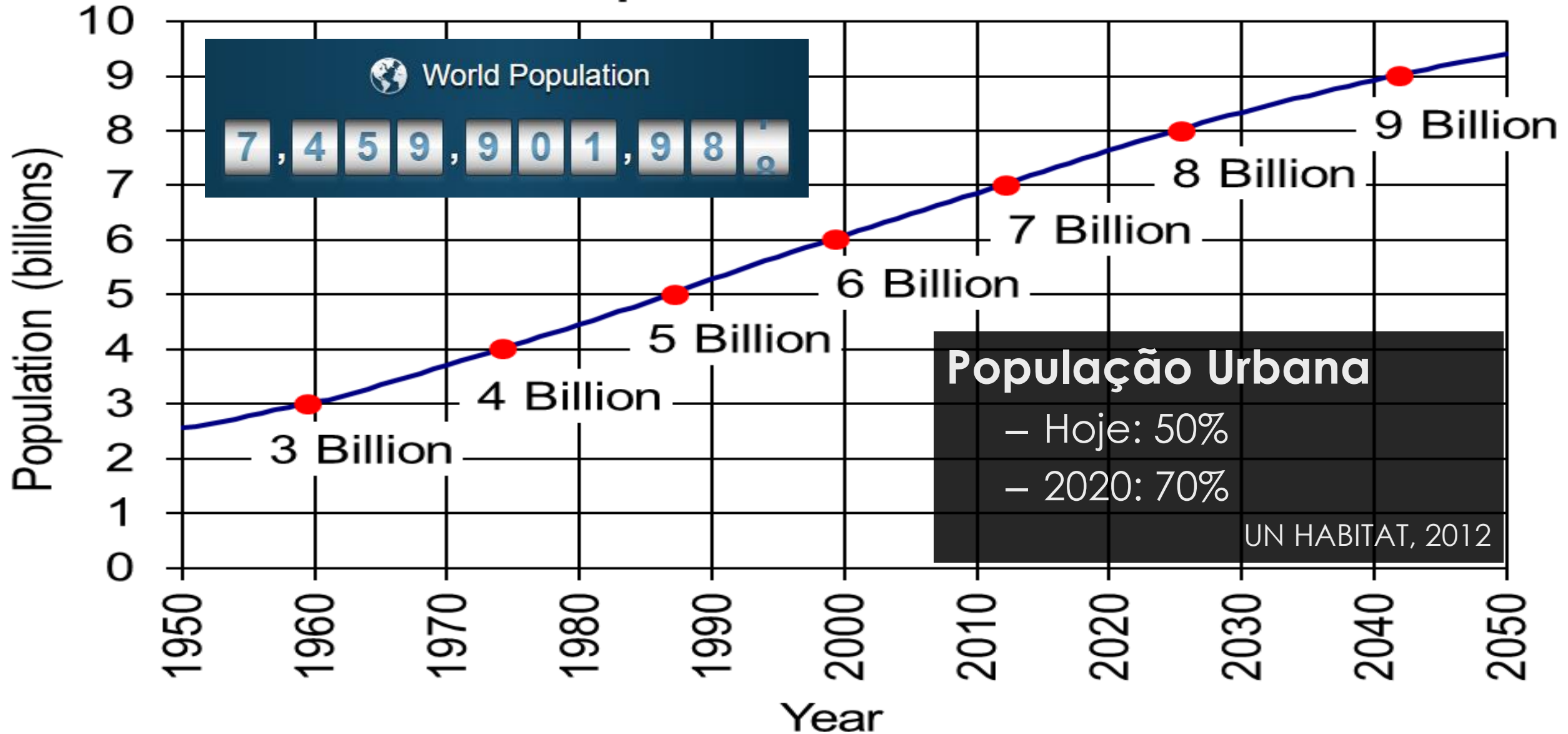
Rio de Janeiro, Novembro 2018

- 1 CONTEXTO
- 2 INFRA-ESTRUTURAS DE DADOS ESPACIAIS
- 3 INSPIRE
- 4 SOLUÇÕES
- 5 NOTAS FINAIS



CONTEXTO

World Population: 1950-2050



Source: U.S. Census Bureau, International Data Base, July 2015 Update.





1 CONTEXTO

Sustentabilidade

- Conceito chave
- Visão integrada do território

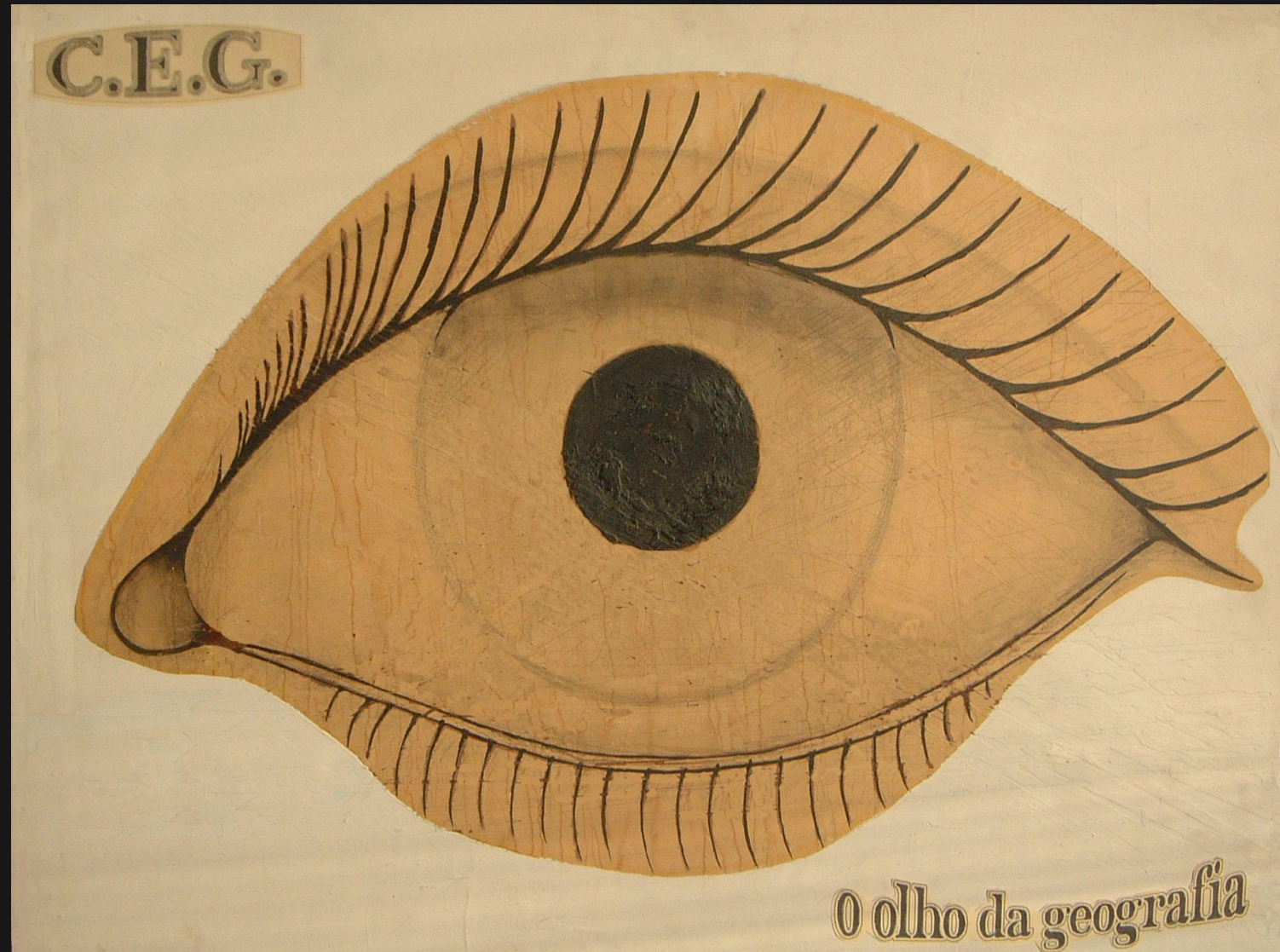


1 CONTEXTO

Dados fiáveis

Sistemas fiáveis

- Aquisição
- Gestão
- Análise
- Visualização
- Disseminação



Fly To Local Search Directions

e.g. 37.407229, -122.107162

Search input field

Search

My Places

- Chicago
 - Traffic Cameras
 - Ledo's Pizza
 - Superdawg
 - Buckingham Fountain
 - Sports and Entertainment
 - Sears Tower
 - Museum of Science and Indust
 - Midway Airport
 - Belt Railway Company of Chica



Layers

- Layers
 - terrain
 - borders
 - roads
 - Populated Places
 - Geographic Features
 - Keyhole Community BBS
 - Railroads
 - Water
 - Earthquakes
 - Volcanoes

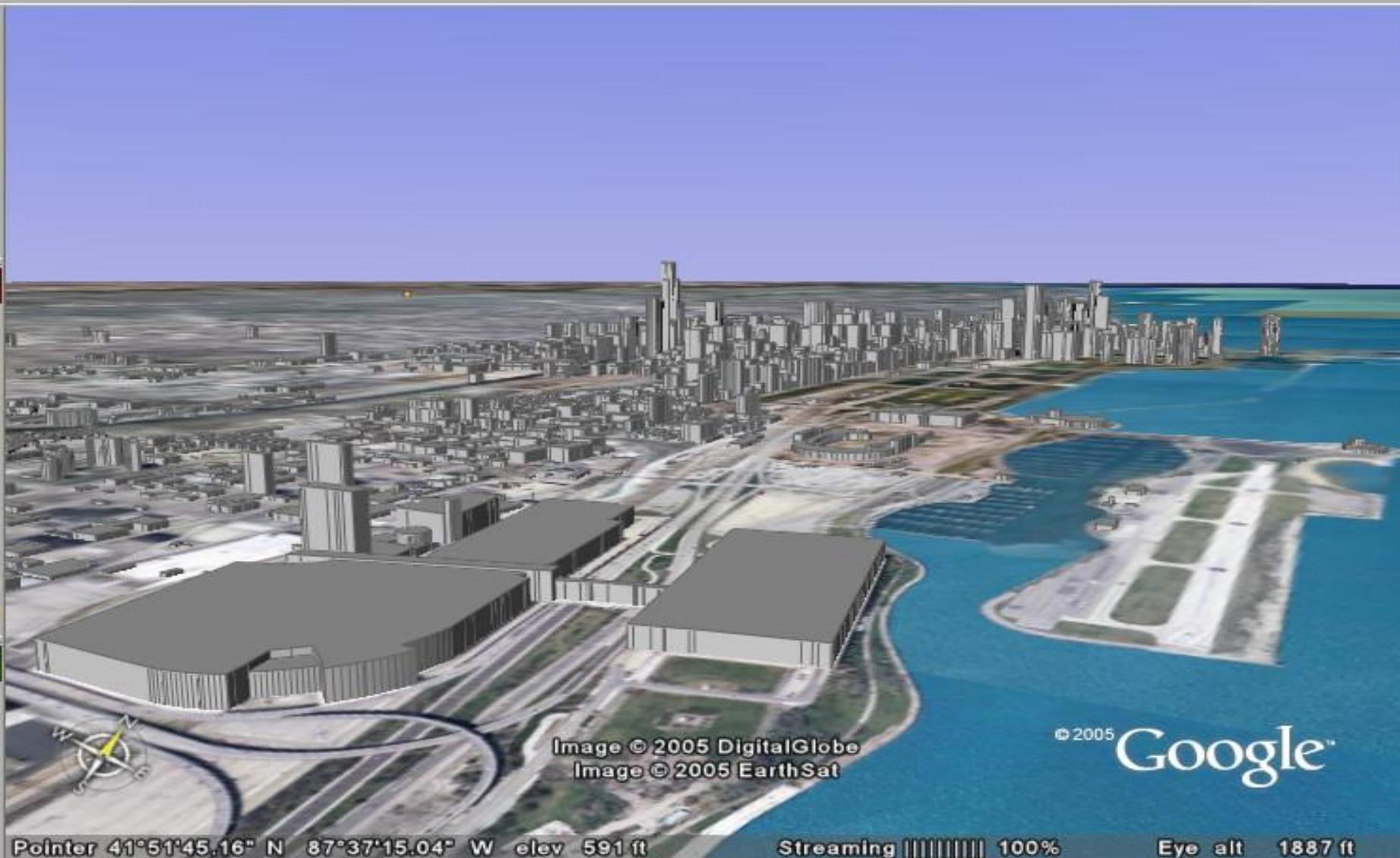


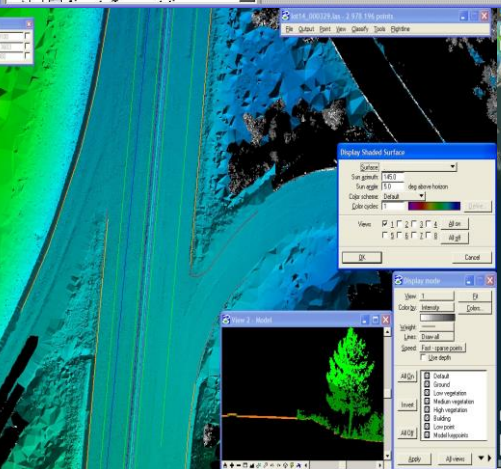
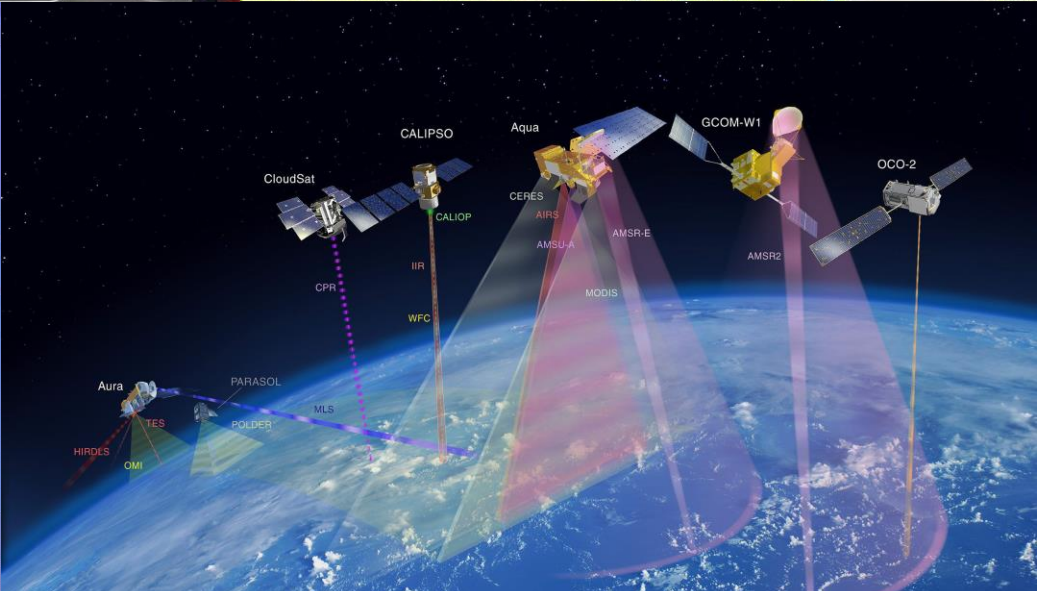
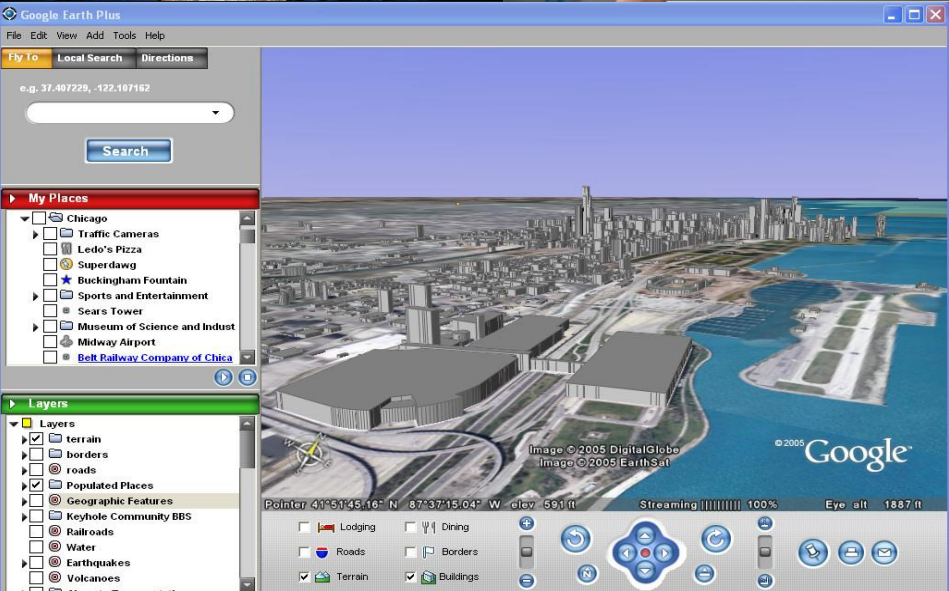
Image © 2005 DigitalGlobe
Image © 2005 EarthSat

© 2005 Google

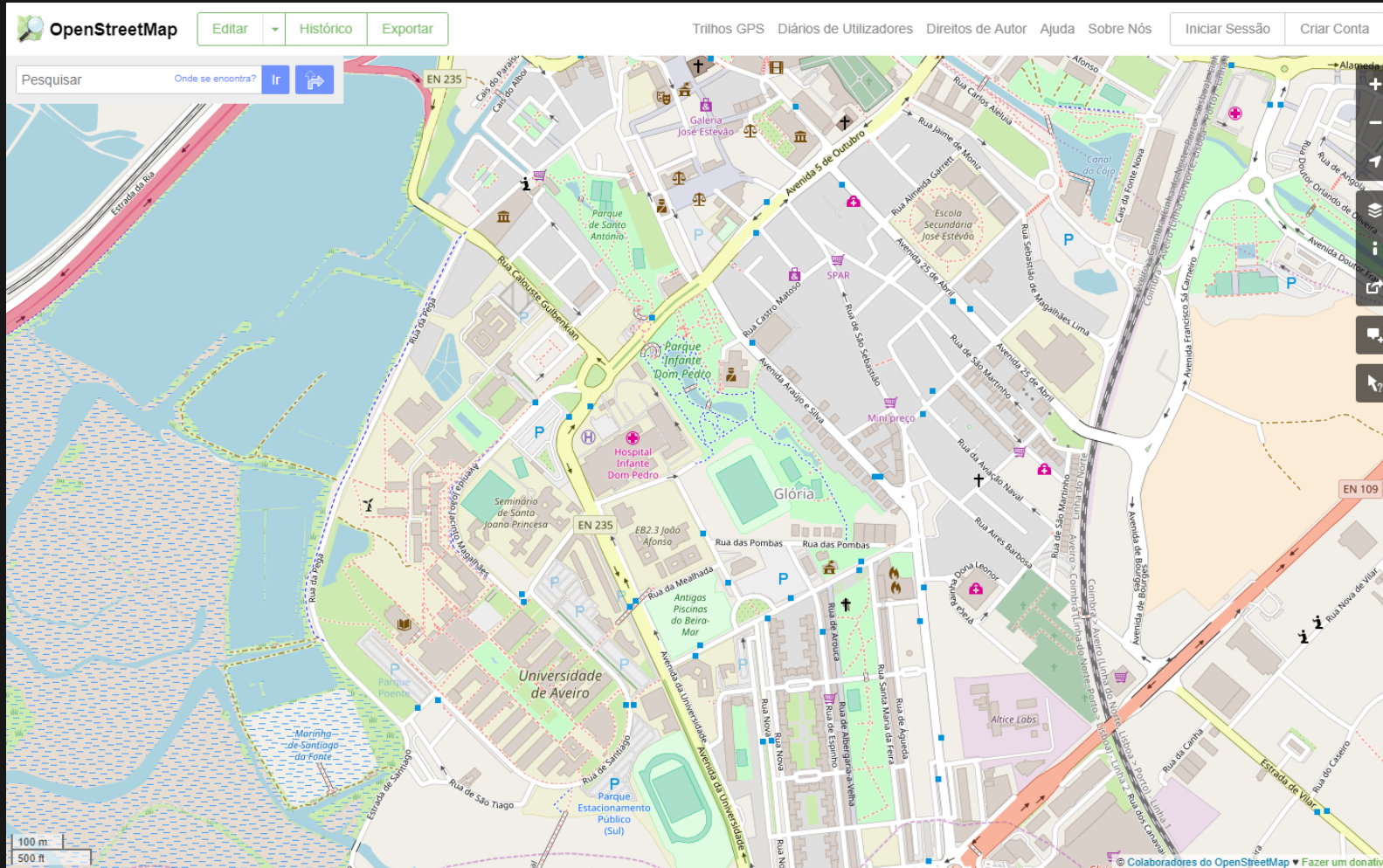
Pointer 41°51'45.16" N 87°37'15.04" W elev 591 ft Streaming 100% Eye alt 1887 ft

- Lodging
- Dining
- Roads
- Borders
- Terrain
- Buildings

Navigation controls including zoom in (+), zoom out (-), compass, directional pad, and other interface buttons.



1 OPEN STREET MAP



Put your community on The Map!

A project called OpenStreetMap is making a free street-level map of the entire world. Volunteers from this area have already begun mapping the roads and rivers in your community, but now they need your help to add details of street names and local amenities such as restaurants, hospitals and cinemas.



So why not just use Google Maps (or the like)?
There are many places on the internet where you can look at maps without charge, but that's all they usually allow you to do - you cannot re-use the map, modify it, publish it on your own web site or print it in a leaflet. To do any of that, you would have to obtain a license, which usually costs money. And if you spot a mistake in your area, the process to get it corrected is lengthy.
OpenStreetMap is different in that the map data is available to everyone, for whatever purpose they want (it's "open" or "free-as-in-freedom"). Anyone can put in the locations and names of roads, footpaths, railway stations, or whatever else is important to them. And people can immediately respond to changes on the ground, so the data is the most up-to-date information available. Maps created from the data are available to browse on the internet (just like other online maps), but they can also be downloaded and used for any purpose. And if you don't like the way the provided maps look, you can download the data and create your map, your way.

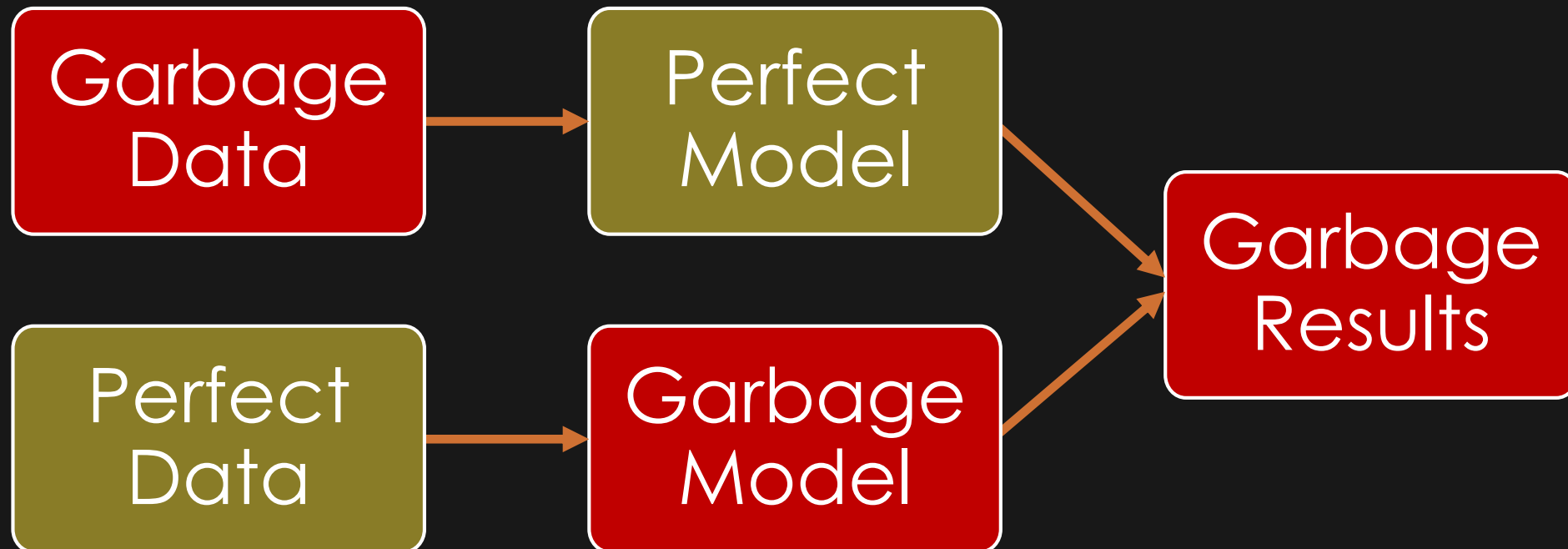
So what do I need to participate in OpenStreetMap?
Tools such as GPS receivers and digital cameras are useful for advanced mapping, but simply having access to the internet will allow you to contribute by checking/editing the maps and to add that all-important local information.
The only real requirement is that the information is 'first hand' from observation or local knowledge and that it is not copied from restricted sources (such as printed maps or online services).



This area is currently being mapped!
Visit <http://www.OpenStreetMap.org> to find out more



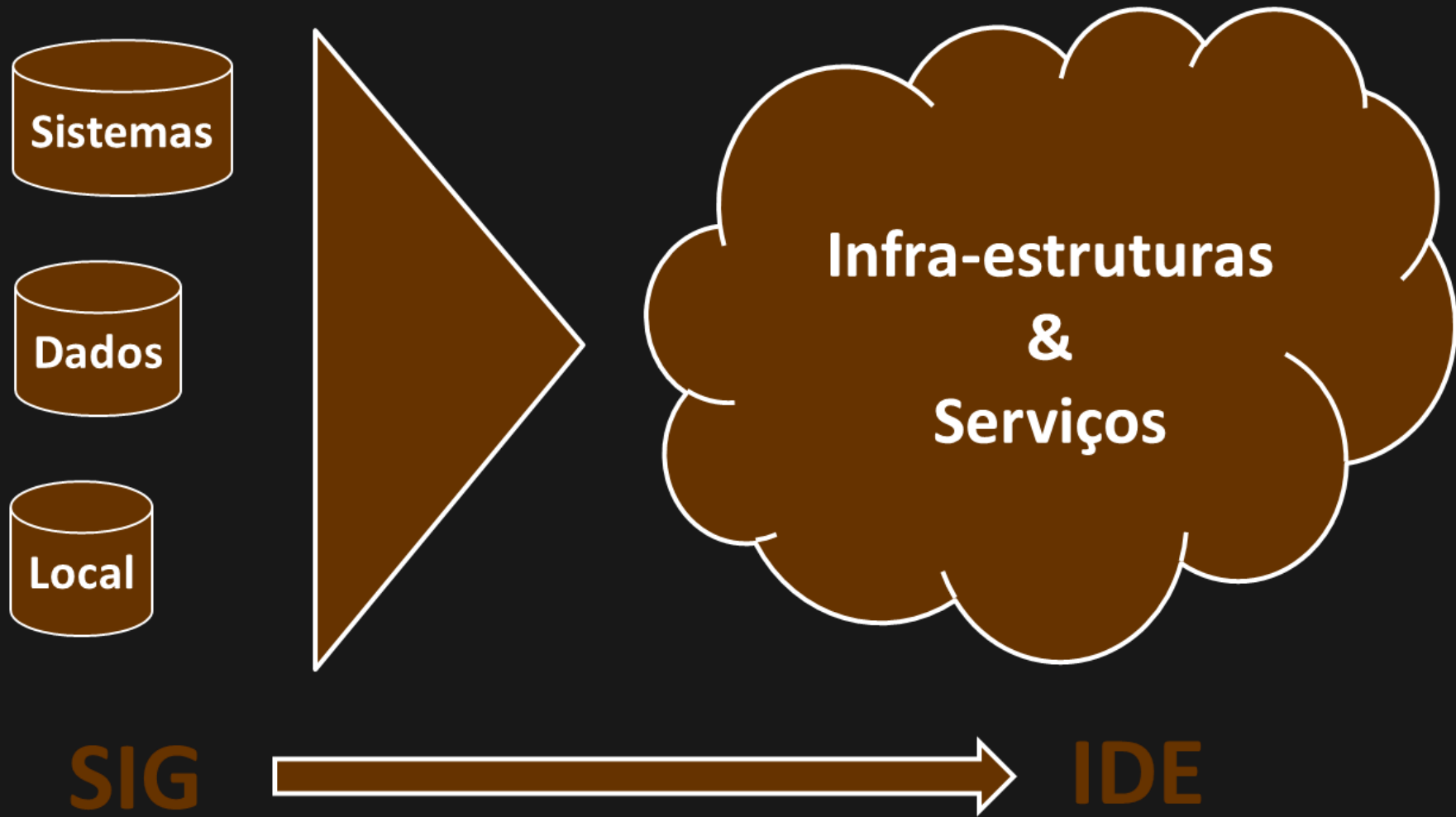
1 GARBAGE IN, GARBAGE OUT



2

INFRA-ESTRUTURAS DE DADOS ESPACIAIS

2 NOVOS PARADIGMAS



2 DISPONIBILIDADE, ACESSIBILIDADE E QUALIDADE



2 INFRA-ESTRUTURAS DE DADOS ESPACIAIS

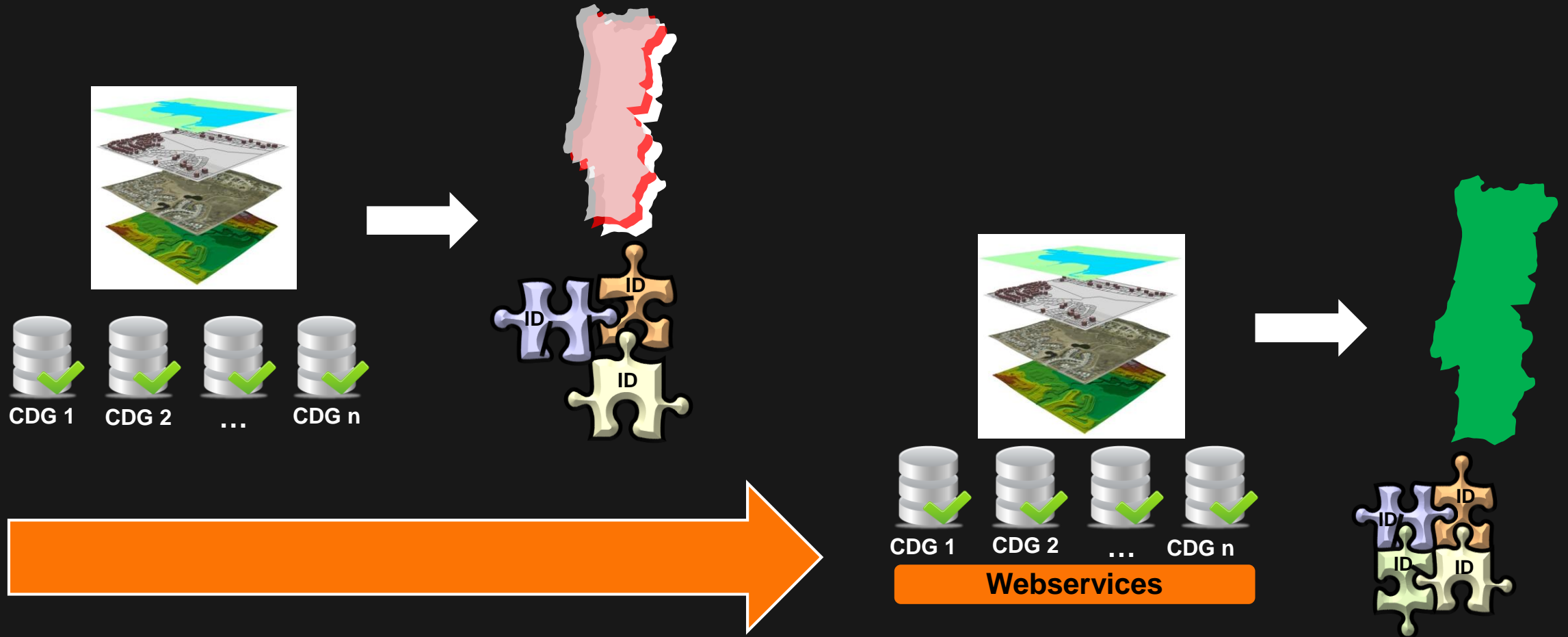
The term “Spatial Data Infrastructure” (SDI) is often used to denote the relevant base collection of **technologies**, **policies** and **institutional arrangements** that facilitate the **availability of and access to spatial data**.

GSDI (2004) The SDI Cookbook V.2

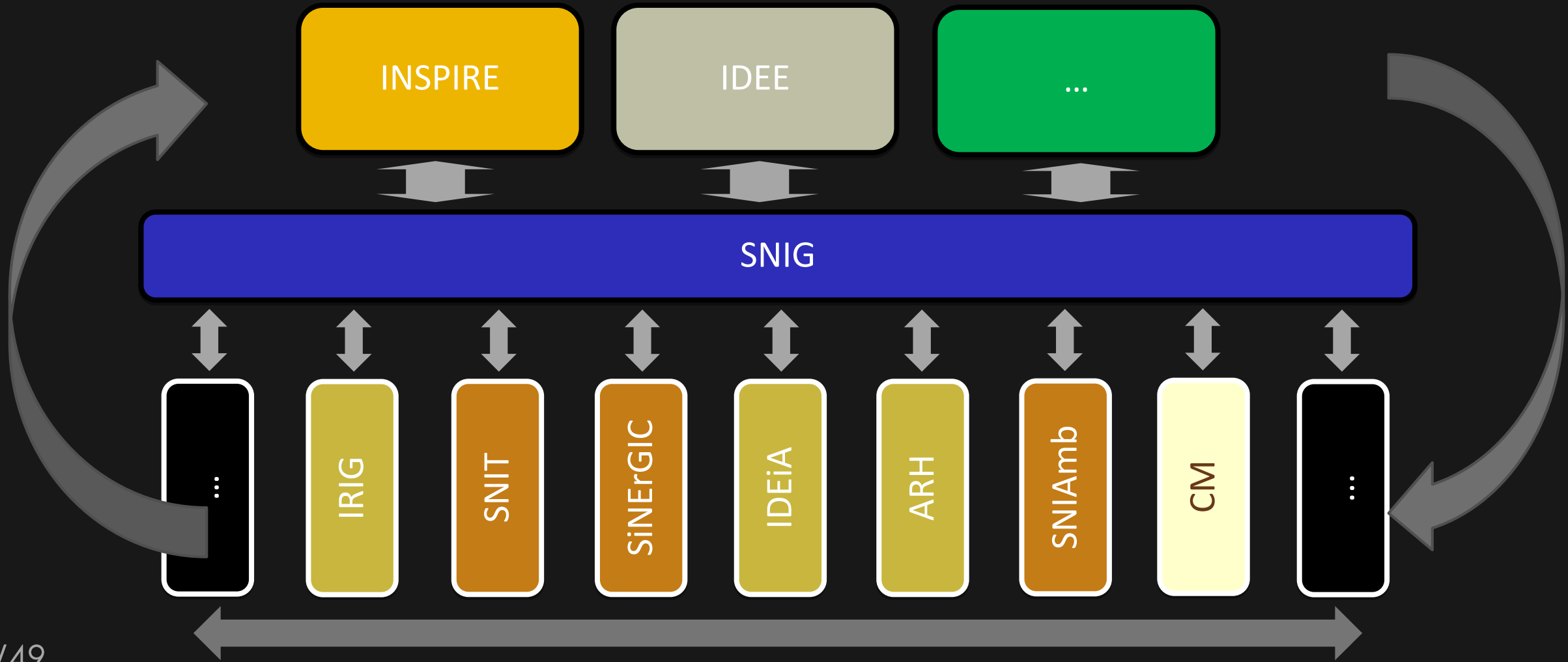
Os dados não devem somente existir !!

- onde estão?
- são adequados aos objetivos?
- podem ser integrados?
- condições de acesso?

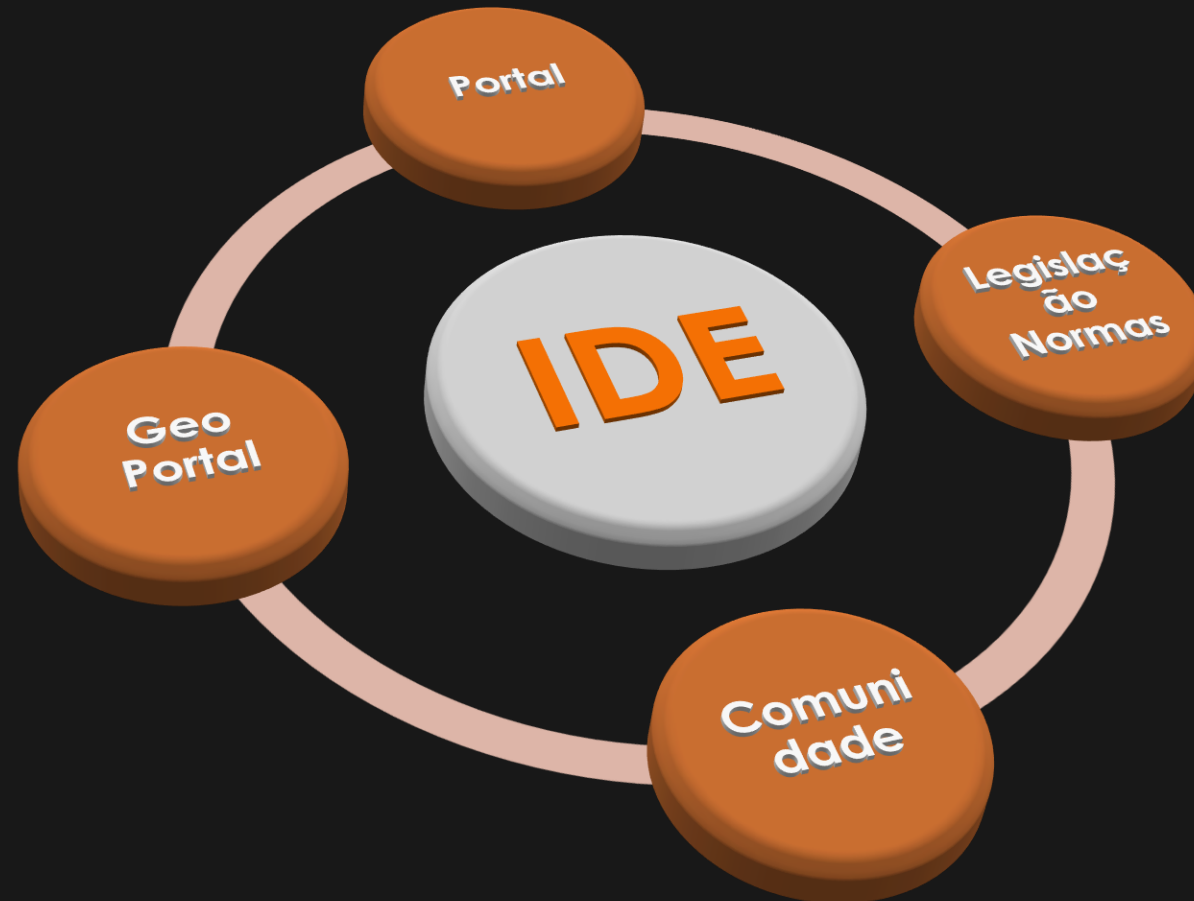
2 INTEGRAÇÃO



2 INFRA-ESTRUTURAS DE DADOS ESPACIAIS



2 COMPONENTES DAS IDE

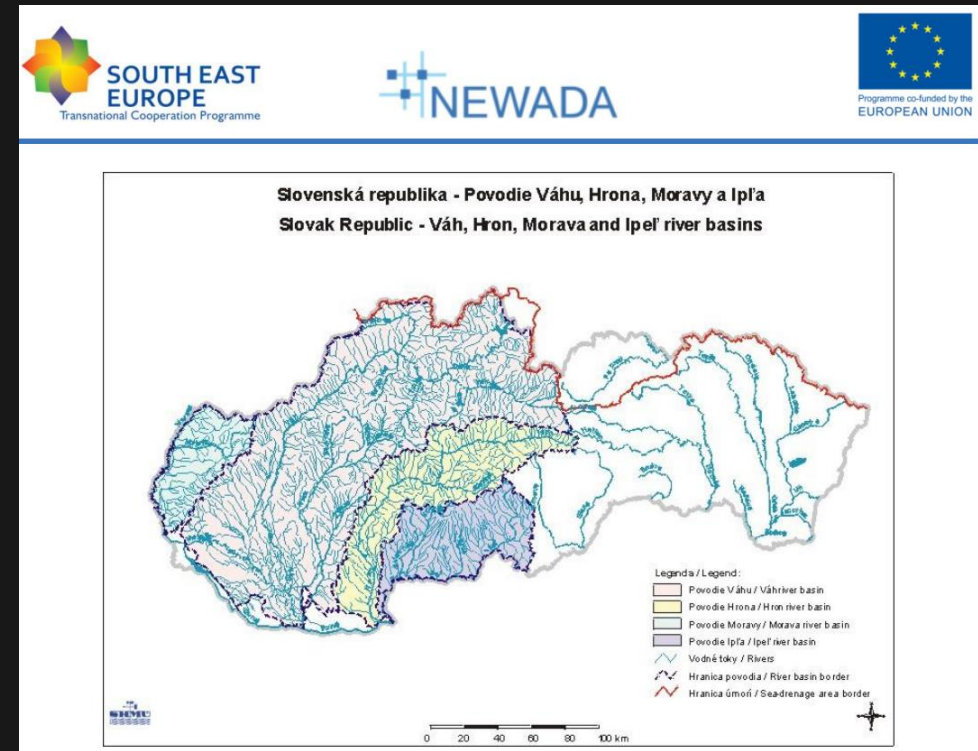




INSPIRE

3 INFRASTRUCTURE FOR SPATIAL INFORMATION IN EUROPE – **DIRECTIVA INSPIRE**

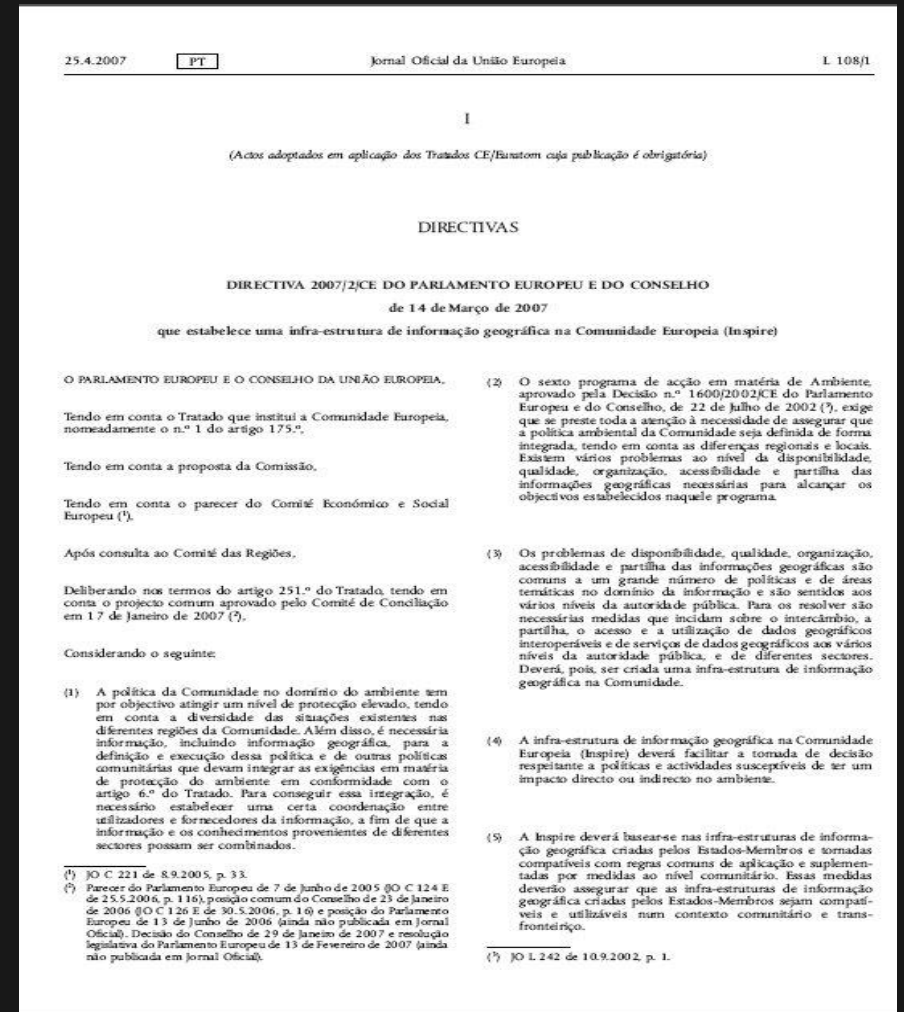
- Iniciativa lançada no final de 2001
- Informação geográfica fundamental de qualidade e normalizada
- Formulação, implementação, monitorização e avaliação das políticas comunitárias
- Ambiente + Ciência + Economia + ...



<http://inspire.jrc.ec.europa.eu>

3 DIRECTIVA INSPIRE

- Directiva 2007/2/EC do Parlamento Europeu e do Conselho de 207/03/14
- Em vigor desde 15 de Maio de 2007
- Abrange:
 - 27+1 países da União Europeia
 - 4 países EFTA (Islândia, Liechtenstein, Noruega e Suíça)
 - 3 países observadores (Macedónia, Sérvia e Turquia)



<http://inspire.jrc.ec.europa.eu>

3 INSPIRE – PRINCÍPIOS

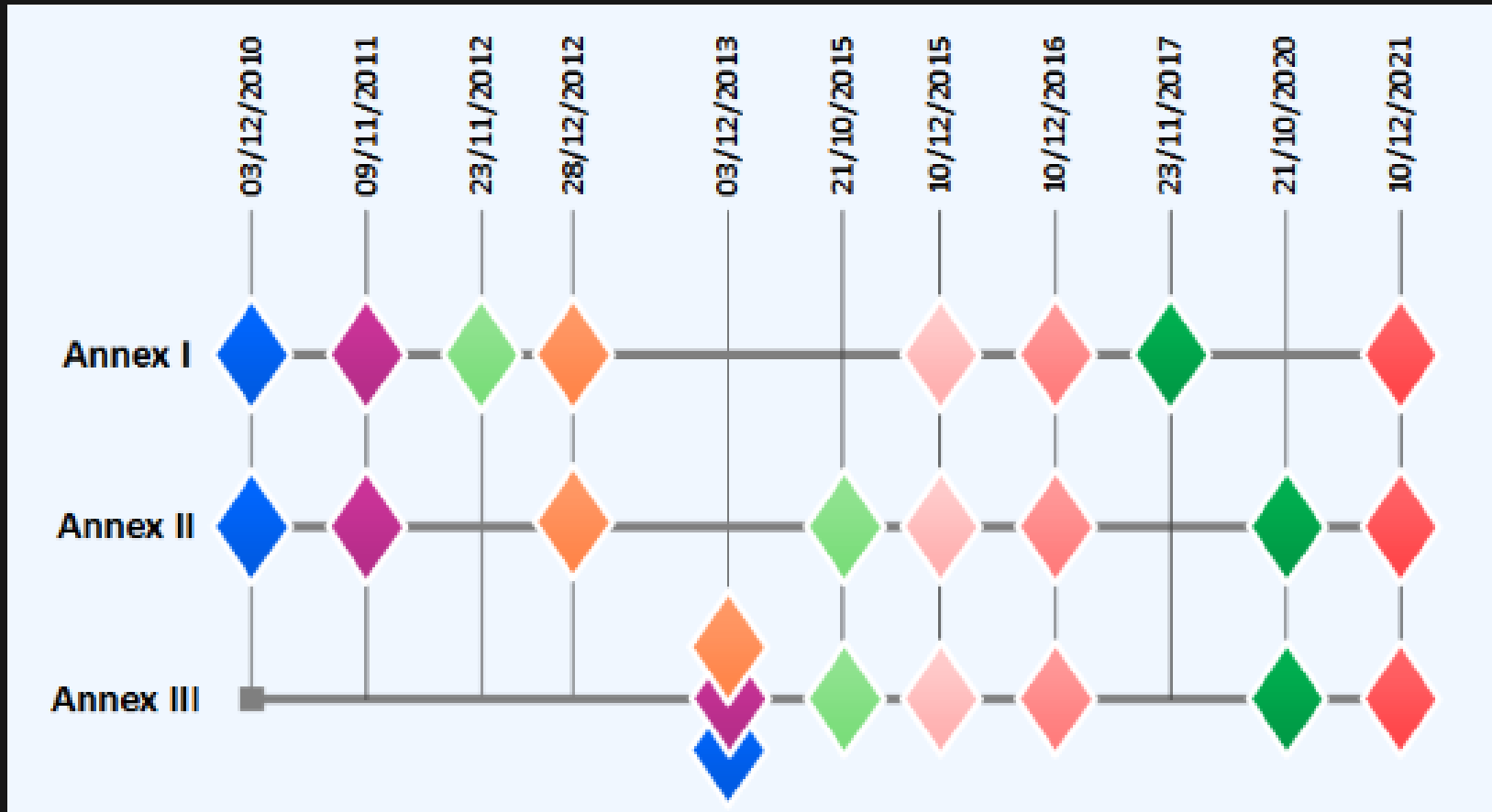
1. **Documentar** a informação geográfica existente
2. Contribuir para a definição de **padrões** (*standards*) e harmonização da informação existente
3. **Criar** nova informação multi-sectorial
4. Estabelecer **serviços em rede** para publicar, descobrir, avaliar, visualizar e aceder a informação geográfica
5. Estabelecer um quadro de **licenciamento** para partilhar informação entre organismos públicos

3 INSPIRE – TEMAS

Anexo I	Anexo II	Anexo III	
Sistemas de Referência	Altimetria	Unidades Estatísticas	Zonas de Risco Natural
Quadrículas Geográficas	Ocupação do Solo	Edifícios	Condições Atmosféricas
Toponímia	Ortoimagens	Solo	Características Geometeorológicas
Unidades Administrativas	Geologia	Uso do Solo	Características Oceanográficas
Endereços		Saúde Humana e Segurança	Regiões Marinhas
Cadastro		Serviços de utilidade Pública e do Estado	Regiões Biogeográficas
Redes Transporte		Instalações de Monitorização do Ambiente	Habitats e Biótopos
Hidrografia		Instalações Industriais e de Produção	Distribuição de Espécies
Sítios Protegidos		Instalações Agrícolas e Aquícolas	Recursos Energéticos
		Distribuição da População – Demografia	Recursos Minerais
		Zonas de Gestão, Restrição, Regulamentação e Unidades de Referência	



3 INSPIRE – CALENDÁRIO



- Metadata
- Visualização
- Descarregamento
- Invocação de serviços (dados novos)
- Invocação de serviços (todos os dados)
- Conformidade c/ Anexo V
- Conformidade c/ Anexo VI
- Conformidade c/ Anexo VII

3 INSPIRE – GOVERNANÇA E GESTÃO

- INSPIRE Coordination Team (CT)
 - DG Environment – Policy
 - Joint Research Centre – Technical
- **INSPIRE Committee** (IC)
- National Contact Points (NCP)



③ INSPIRE – GOVERNANÇA E GESTÃO

- INSPIRE **M**aintenance and **I**mplementation **G**roup
 - **MIG** – Policy
 - **MIG** – Tech
 - Peritos
- INSPIRE *stakeholders*
 - Spatial Data Interest Communities (SDIC)
 - Legally Mandated Organisation (LMO)

3 INSPIRE – DADOS & SERVIÇOS

INSPIRE GEOPORTAL
Enhancing access to European spatial data

European Commission > INSPIRE > Geoportal > INSPIRE Thematic Viewer

Home | Priority Data Sets Viewer | INSPIRE Thematic Viewer | Harvesting status | Find out more about

INSPIRE Data Sets - EU & EFTA Country overview

Show: Downloadable Viewable

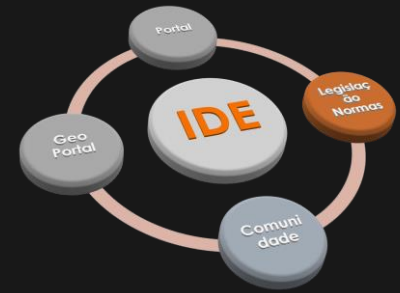
142137 Metadata records

5937 Downloadable Data Sets

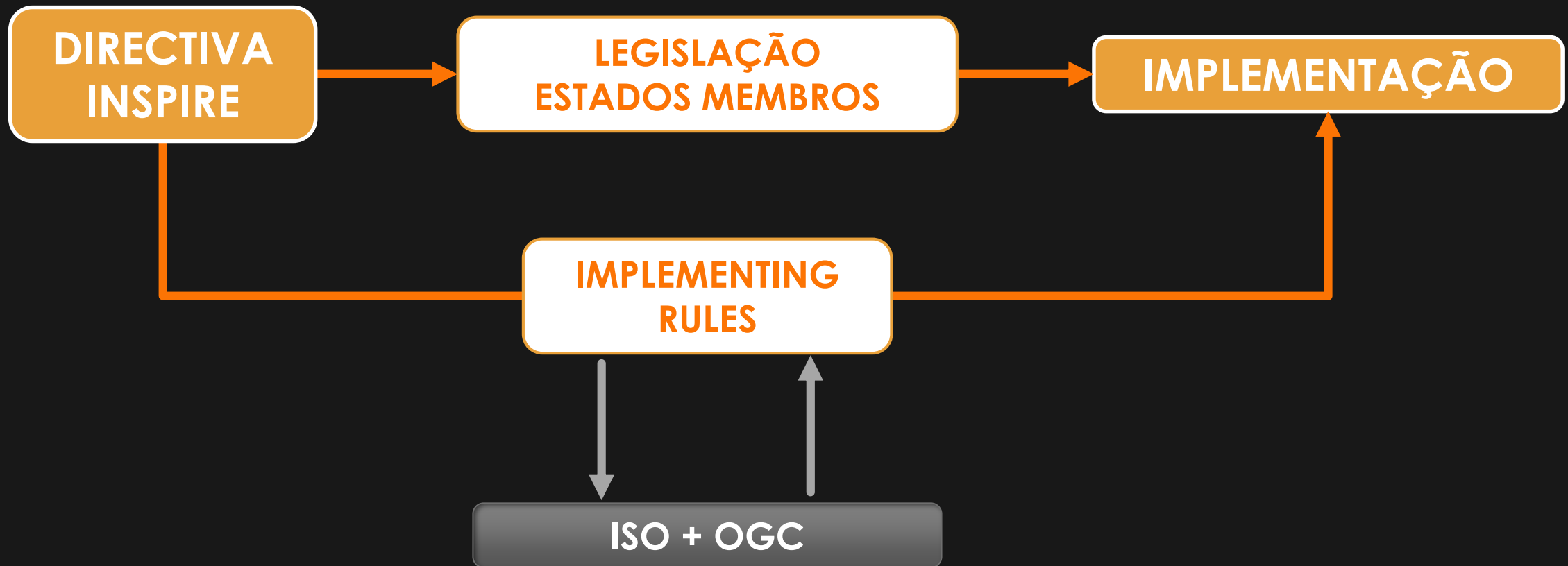
Leaflet | Credits: © OpenStreetMap contributors | EC-GISCO, © EuroGeographics for the administrative boundaries (disclaimer)

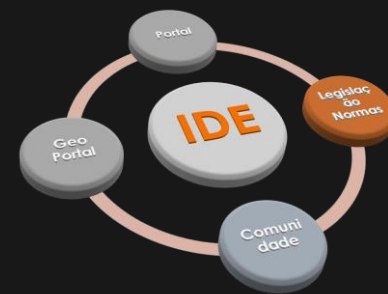
Austria	738 537 570	Finland	591 29 45
Belgium	527 136 389	France	36987 1682 12291
Bulgaria	29 0 0	Germany	26783 2770 6768
Croatia	122 3 4	Greece	41 1 34
Cyprus	42 31 40	Hungary	108 0 1
Czech Republic	151 13 90	Iceland	141 7 0
Denmark	190 13 9	Ireland	54 4 0
Estonia	73 12 23	Italy	20154 0 387

Latvia	140 0 4	Portugal	852 84 204
Liechtenstein	70 11 15	Romania	115 12 7
Lithuania	2 0 0	Slovakia	220 5 12
Luxembourg	236 113 167	Slovenia	95 6 8
Malta	158 129 151	Spain	218 134 145
Netherlands	213 73 130	Sweden	278 14 148
Norway	204 2 4	Switzerland	200 2 4
Poland	31619 52 17	United Kingdom	20786 62 315



3 INSPIRE – LEGISLAÇÃO E NORMAS





3 INSPIRE – LEGISLAÇÃO E NORMAS

Legislation

- Commission Regulation (EU) No 1312/2014 of 10 December 2014 amending Regulation (EU) No 1089/2010 implementing Directive 2007/2/EC of the European Parliament and of the Council as regards interoperability of spatial data services 11.12.2014
- COMMISSION REGULATION (EU) No 1253/2013 of 21 October 2013 amending Regulation (EU) No 1089/2010 implementing Directive 2007/2/EC as regards interoperability of spatial data sets and services 10.12.2013
- COMMISSION REGULATION (EU) No 102/2011 of 4 February 2011 amending Regulation (EU) No 1089/2010 implementing Directive 2007/2/EC of the European Parliament and of the Council as regards interoperability of spatial data sets and services 05.02.2011
- COMMISSION REGULATION (EU) No 1089/2010 of 23 November 2010 implementing Directive 2007/2/EC of the European Parliament and of the Council as regards interoperability of spatial data sets and services 08.12.2010

Technical Guidelines Annex I

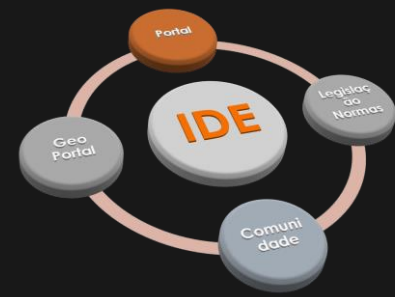
- INSPIRE Data Specification on Addresses – Technical Guidelines 3.1 17.04.2014
- INSPIRE Data Specification on Administrative Units – Technical Guidelines 3.1 17.04.2014
- INSPIRE Data Specification on Cadastral Parcels – Technical Guidelines 3.1 17.04.2014
- INSPIRE Data Specification on Coordinate Reference Systems – Technical Guidelines 3.2 17.04.2014
- INSPIRE Data Specification on Geographical Grid Systems – Technical Guidelines 3.1 17.04.2014
- INSPIRE Data Specification on Geographical Names – Technical Guidelines 3.1 17.04.2014
- INSPIRE Data Specification on Hydrography – Technical Guidelines 3.1 17.04.2014
- INSPIRE Data Specification on Protected Sites – Technical Guidelines 3.2 17.04.2014
- INSPIRE Data Specification on Transport Networks – Technical Guidelines 3.2 17.04.2014

Technical Guidelines Annex II & III

- INSPIRE Data Specifications – All v3.0 Technical Guidelines for Annexes II & III 13.12.2013
- INSPIRE Data Specification on Agricultural and Aquaculture Facilities – Technical Guidelines 10.12.2013
- INSPIRE Data Specification on Area Management/Restriction/Regulation Zones and Reporting Units – Technical Guidelines 10.12.2013
- INSPIRE Data Specification on Atmospheric Conditions and Meteorological Geographical Features – Technical Guidelines 10.12.2013
- INSPIRE Data Specification on Bio-geographical Regions – Technical Guidelines 10.12.2013
- INSPIRE Data Specification on Buildings – Technical Guidelines 10.12.2013
- INSPIRE Data Specification on Elevation – Technical Guidelines 10.12.2013
- INSPIRE Data Specification on Energy Resources – Technical Guidelines 10.12.2013
- INSPIRE Data Specification on Environmental Monitoring Facilities – Technical Guidelines 10.12.2013
- INSPIRE Data Specification on Geology – Technical Guidelines 10.12.2013
- INSPIRE Data Specification on Habitats and Biotopes – Technical Guidelines 10.12.2013
- INSPIRE Data Specification on Human Health and Safety – Technical Guidelines 10.12.2013
- INSPIRE Data Specification on Land Cover – Technical Guidelines 10.12.2013
- INSPIRE Data Specification on Land Use – Technical Guidelines 10.12.2013
- INSPIRE Data Specification on Mineral Resources – Technical Guidelines 10.12.2013
- INSPIRE Data Specification on Natural Risk Zones – Technical Guidelines 10.12.2013
- INSPIRE Data Specification on Oceanographic geographical features – Technical Guidelines 10.12.2013
- INSPIRE Data Specification on Orthoimagery – Technical Guidelines 10.12.2013
- INSPIRE Data Specification on Population Distribution – Technical Guidelines 10.12.2013
- INSPIRE Data Specification on Production and Industrial Facilities – Technical Guidelines 10.12.2013
- INSPIRE Data Specification on Sea Regions – Technical Guidelines 10.12.2013
- INSPIRE Data Specification on Soil – Technical Guidelines 10.12.2013
- INSPIRE Data Specification on Species Distribution – Technical Guidelines 10.12.2013
- INSPIRE Data Specification on Statistical Units – Technical Guidelines 10.12.2013
- INSPIRE Data Specification on Utility and Government Services – Technical Guidelines 10.12.2013

Framework Documents

- Guidelines for the encoding of spatial data 08.04.2014
- Guidelines for the use of Observations & Measurements and Sensor Web Enablement-related standards in INSPIRE Annex II and III data specification development 08.04.2014
- INSPIRE Generic Conceptual Model 08.04.2014
- INSPIRE Data Specifications – Base Models – Activity Complex 05.04.2013
- INSPIRE Data Specifications – Base Models – Coverage Types 05.04.2013
- INSPIRE Data Specifications – Base Models – Generic Network Model 05.04.2013



3 INSPIRE – Portal

INSPIRE KNOWLEDGE BASE
Infrastructure for spatial information in Europe

European Commission > INSPIRE

Home Learn Implement Participate Use Toolkit

INSPIRE Video

The INSPIRE Directive: a brief desc... Ver mais tarde Partilhar

INSPIRE Conference

INSPIRE CONFERENCE 2018

#INSPIRE_EU2018

Antwerp
18-21 September

Latest News

17/10/2018
Deadline extended for Survey on INSPIRE Data Sharing

20/09/2018
New INSPIRE Geoportal launched

24/07/2018
Extended mandates for the control body and submitting organisations of the INSPIRE registers and register federation

All News

Events

27/11/2018
EG/EuroSDR Workshop "Use of INSPIRE Data: Past experiences and scenarios for the future"

18/09/2018
INSPIRE Conference 2018

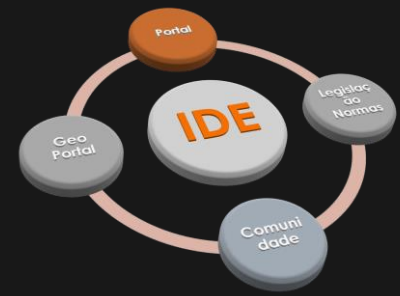
06/06/2018
INSPIRE Good Practice: GeoDCAT-AP

All Events

Tweets

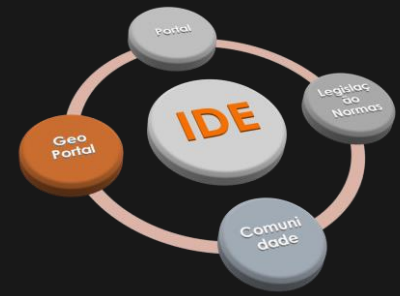
INSPIRE_EU @INSPIRE_EU 1 day 4 hours ago
Thanks @kekei_sg for presenting our @EU_ScienceHub work on API solutions for Digital Government #APIs4DGov... <https://t.co/Rb2rVEO2Vc>

INSPIRE_EU @INSPIRE_EU 1 day 8 hours ago
RT @KleemannMarc: @OpenNRW Top! Endlich kann man #opendata und #Geodateninfrastrukturen einfach verbinden. Es profitieren beide Seite... <https://t.co/ymnckbJSFH>



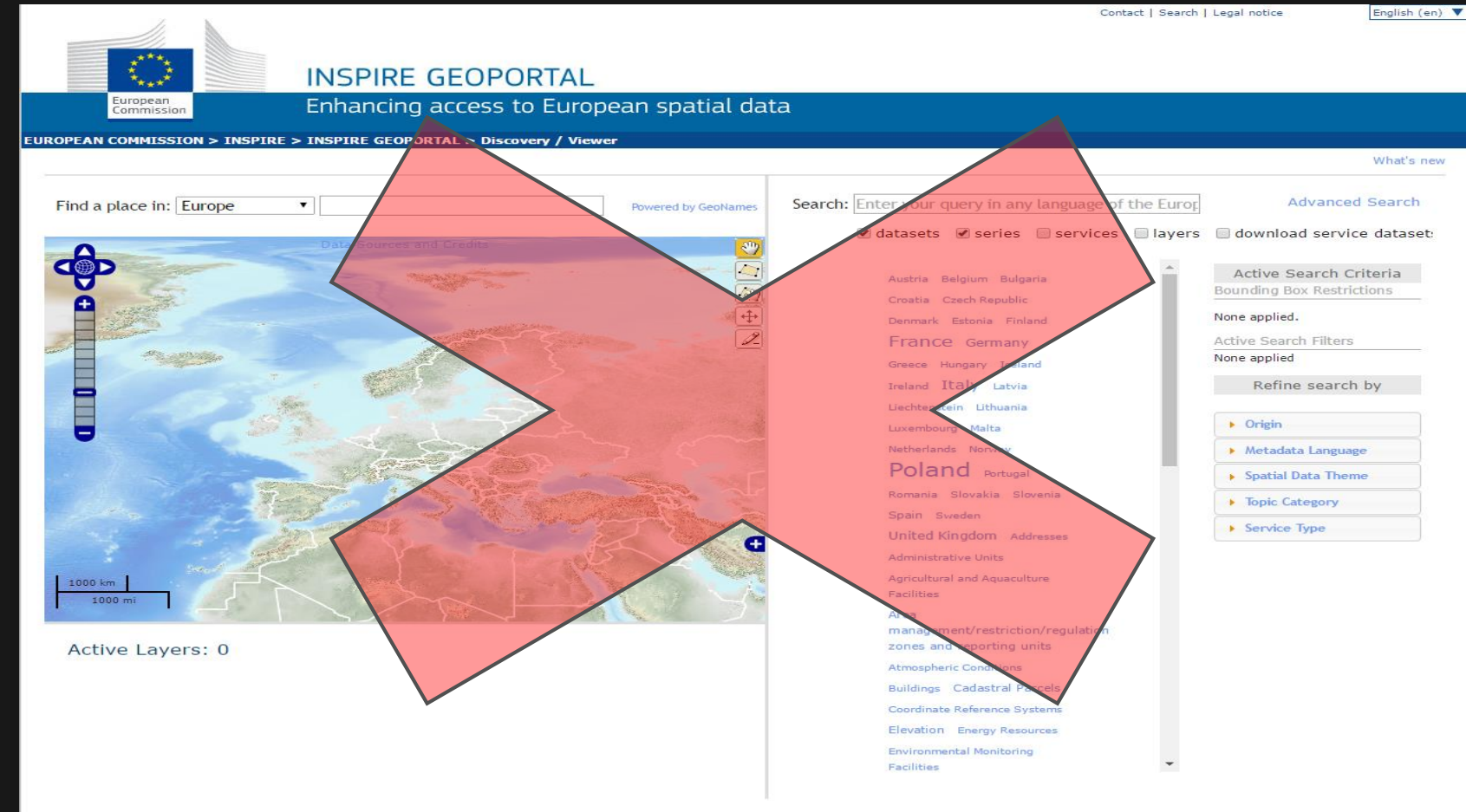
3 INSPIRE – Portal

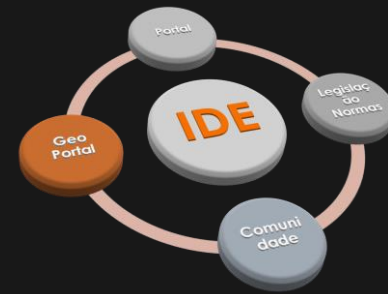
					
INSPIRE LIBRARY	INSPIRE ROADMAP	INSPIRE GEOPORTAL	INSPIRE IN YOUR COUNTRY	INSPIRE THEMATIC CLUSTERS	FIND YOUR SCOPE
					
INSPIRE REGISTRY	INSPIRE LEGISLATION	INSPIRE THEMES	INSPIRE IN PRACTICE	INSPIRE VALIDATOR	INSPIRE TRAINING



3 INSPIRE – Geoportals

- Versão anterior
- Baseada em catálogo básico e viewer





3 INSPIRE – Geoportals

Priority Data Sets Viewer



The application displays the availability and provides access to the selected priority data sets used for environmental reporting. It allows filtering by environmental domain, environmental legislation and country.

[Browse Priority Data Sets](#)

INSPIRE Thematic Viewer



The application displays the availability and provides access to all EU MS data sets falling under the scope of INSPIRE Directive filtered by data themes and countries (i.e. Annex I, II and III).

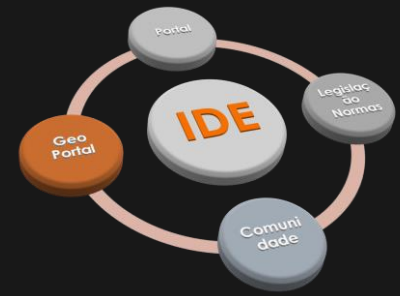
[Browse INSPIRE Thematic Data Sets](#)

INSPIRE Reference Validator

The validator application is to help data providers, solution providers and national coordinators to check whether their data sets, network services and metadata meet the requirements defined in the INSPIRE Technical Guidelines. The validation tests are based on the Abstract Test Suites agreed between Member States and the Commission in the INSPIRE Maintenance and Implementation Group.

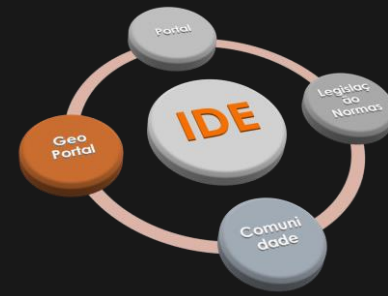
[Go to INSPIRE validator](#)














3 INSPIRE – Geoportals

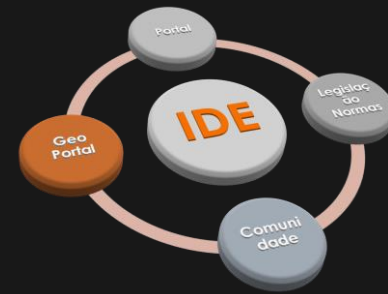
The screenshot shows the header of the INSPIRE GEOPORTAL website. On the left is the European Commission logo. The main title is 'INSPIRE GEOPORTAL' with the tagline 'Enhancing access to European spatial data'. On the right, there are links for 'About | Contact | Legal Notice' and a language dropdown menu set to 'English (en)'. Below the main title is a breadcrumb trail: 'European Commission > INSPIRE > Geoportals > INSPIRE Thematic Viewer'. At the bottom of the header is a navigation bar with links: 'Home', 'Priority Data Sets Viewer', 'INSPIRE Thematic Viewer', 'Harvesting status', and 'Find out more about'.



3 INSPIRE – Geoportals

Annex I







 Addresses Def.: Location of properties based on address identifiers,... ⓘ 📄 2310 📄 29 👁 37	 Administrative units Def.: Units of administration, dividing areas where Member... ⓘ 📄 1724 📄 73 👁 273	 Cadastral parcels Def.: Areas defined by cadastral registers or equivalent. ⓘ 📄 12499 📄 48 👁 56	 Geographical grid systems Def.: Harmonised multi... ⓘ 📄 169 📄 4 👁 21
 Geographical names Def.: Names of areas, regions, localities, cities, suburbs... ⓘ 📄 1627 📄 52 👁 54	 Hydrography Def.: Hydrographic elements, including marine areas and al... ⓘ 📄 2518 📄 183 👁 256	 Protected sites Def.: Area designated or managed within a framework... ⓘ 📄 2464 📄 293 👁 474	 Coordinate reference systems Def.: Systems for uniquely... ⓘ 📄 159 📄 2 👁 6
 Transport networks Def.: Road, rail, air and water transport networks and rel... ⓘ 📄 3220 📄 108 👁 343			

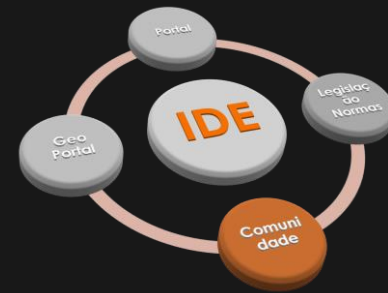


3 INSPIRE – Geoportals

Environmental Domains

Explore Member States' priority data sets grouped by the following Environmental Domains.

 Air & Noise Covers ambient air quality and cleaner air for Europe, industrial emissions... ⓘ 269 📄 104 👁️ 160	 Industry Covers industrial emissions and industrial accidents... ⓘ 68 📄 21 👁️ 37	 Waste Covers the landfill of waste, waste from extractive industries, soil... ⓘ 83 📄 27 👁️ 59
 Nature & Biodiversity Covers conservation of natural habitats and wild fauna and flora, wild birds... ⓘ 234 📄 102 👁️ 133	 Water Covers the Water Framework Directives, Urban waste water, bathing water... ⓘ 548 📄 163 👁️ 316	 Marine Covers the Marine Strategy Framework Directive, marine environmental policy... ⓘ 56 📄 28 👁️ 38



3 INSPIRE – Community Forum

INSPIRE Community Forum

News Events Pages Clusters Discussions INSPIRE More > Log in / Register

About the INSPIRE Thematic Clusters Platform

Welcome to the INSPIRE Thematic Clusters Platform

The **INSPIRE Thematic Clusters Platform** is a European Commission initiative, linked to the INSPIRE Maintenance and Implementation Framework, with the objective of supporting INSPIRE implementation in the Member States.

All infrastructures, and INSPIRE is no exception, require maintenance and evolution. The experience gained during the development of the Technical Guidelines as well as lessons learned by implementing the infrastructure, **especially in thematic domains**, need to be shared to optimise performance of the infrastructure to meet policy objectives and to increase its usability within thematic domains. To aid this further evolution of INSPIRE and to help embed it in technical practices within a range of communities, **on-line collaboration thematic platforms** have be set up for sharing theme-specific experiences.

This platform that builds upon the relevant [INSPIRE Forum](#) content and software, **is a single entry point** for INSPIRE implementers and users to share experiences, best practices, raise questions and resolve issues in **their thematic domains**.

Each of the nine INSPIRE Thematic Clusters has a **facilitator** who will lead and participate in discussions, identify and facilitate sharing of best practice and key issues, identify relevant projects and software solutions.

Search

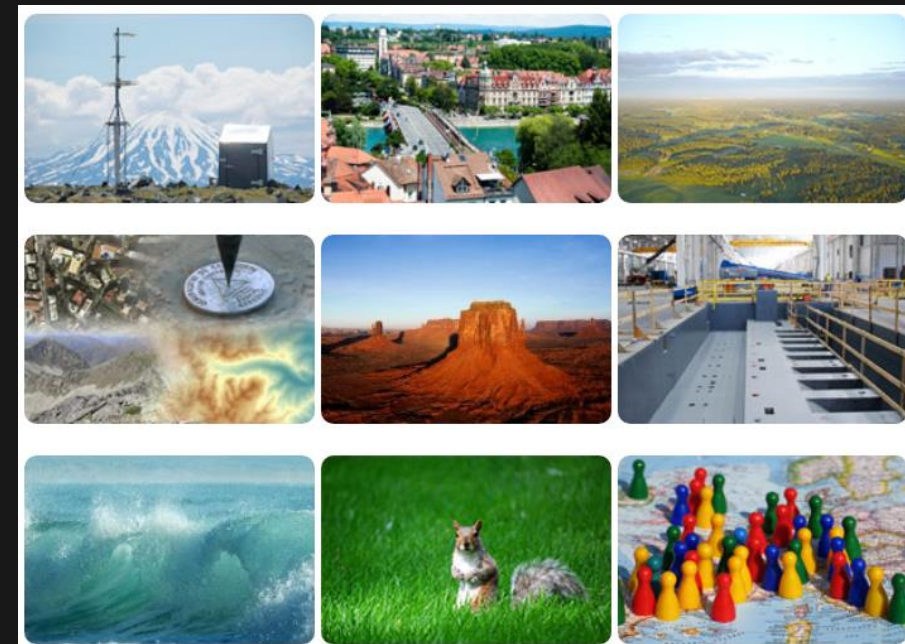
[INSPIRE Website](#)

[INSPIRE GeoPortal](#)

[INTERACTIVE Data Specifications](#)

[INSPIRE CONFERENCE 2018](#)

Thematic Clusters



3 INSPIRE – MID-TERM EVALUATION REPORT 2014

Table 4.8 Summary of investments for INSPIRE foreseen during the Extended Impact Assessment (million EUR, rounded)

INSPIRE policy measures	EU-level	National	Regional/local
Harmonisation	0.6	1.2	0.5
Metadata	0.2	1.9–2.2	33
Data Policy Framework		0.4	
Coordination and implementation, including outreach	1.1	9.6	44–88
Total investment per annum over 10 years (million EUR, rounded)	1.9	13	77–122

3 INSPIRE – MID-TERM EVALUATION REPORT 2014

Table 4.9 Summary of benefits for INSPIRE foreseen during the Extended Impact Assessment

Type of benefit	Estimates (million EUR per annum)
More efficient EIAs and SEAs	60–121
More efficient environmental monitoring and assessment	64
More cost-effective expenditure on environmental protection	192
More cost-effective implementation of the environmental <i>acquis</i>	32
More effective implementation of European projects	3–8
More effective expenditure for trans-European networks	90
Reduced duplication in data collection	25–160
Improved delivery of risk prevention policies	77–256
Improved delivery of health and environment policies	224
Total (in EUR million per annum)	770–1 150

4

NOTAS FINAIS



4 NOTAS FINAIS

Soluções adaptáveis e ágeis

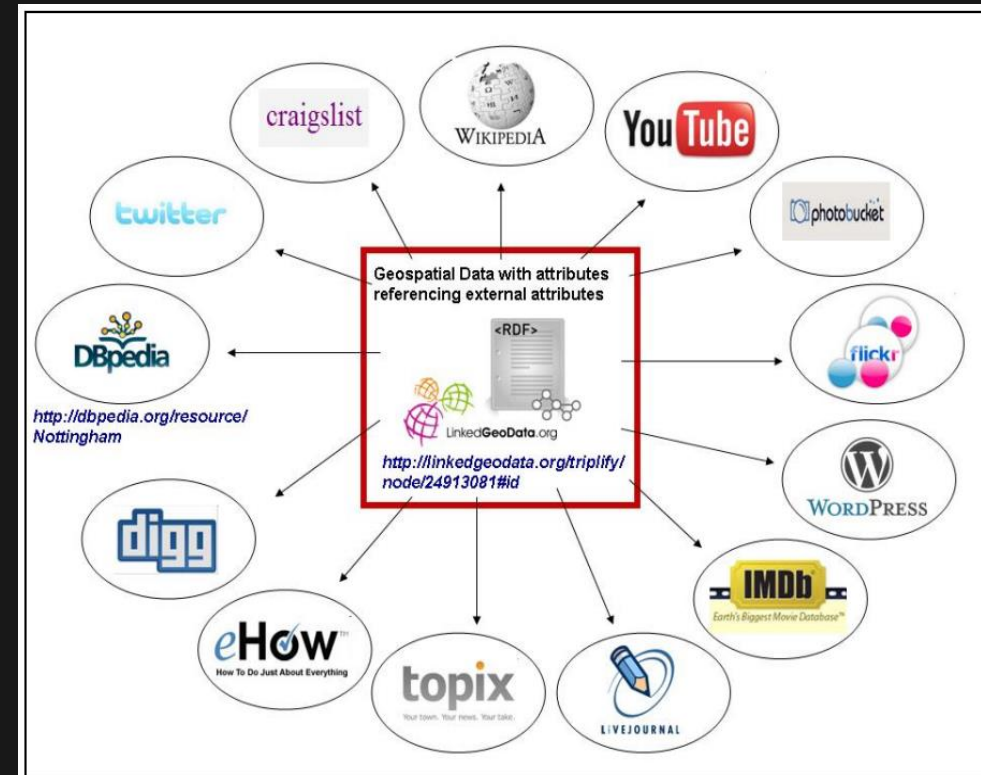
- Computação ubíqua, móvel, nuvem ...
- Sistemas abertos
- Dados abertos e *crowdsourcing*

Infra-estruturas robustas

- Infra-estruturas de dados espaciais
- Ferramentas de análise espacial

Infra-estruturas integradoras

- Centros de controlo
- *Dashboards*



4 NOTAS FINAIS

Conflitos

- Fontes múltiplas de dados
- Oficiais vs Informação Geográfica Voluntária

Constrangimentos

- Protecção de dados pessoais
- Protecção de dados sensíveis

Desequilíbrio

- Geográfico
- Social



4 POLÍTICAS PÚBLICAS

- Transversais
- Dimensão geográfica
- Formulação, Monitorização e Avaliação:
 - Dados
 - Indicadores
 - Metodologias
 - Ferramentas



4 NOVOS PARADIGMAS

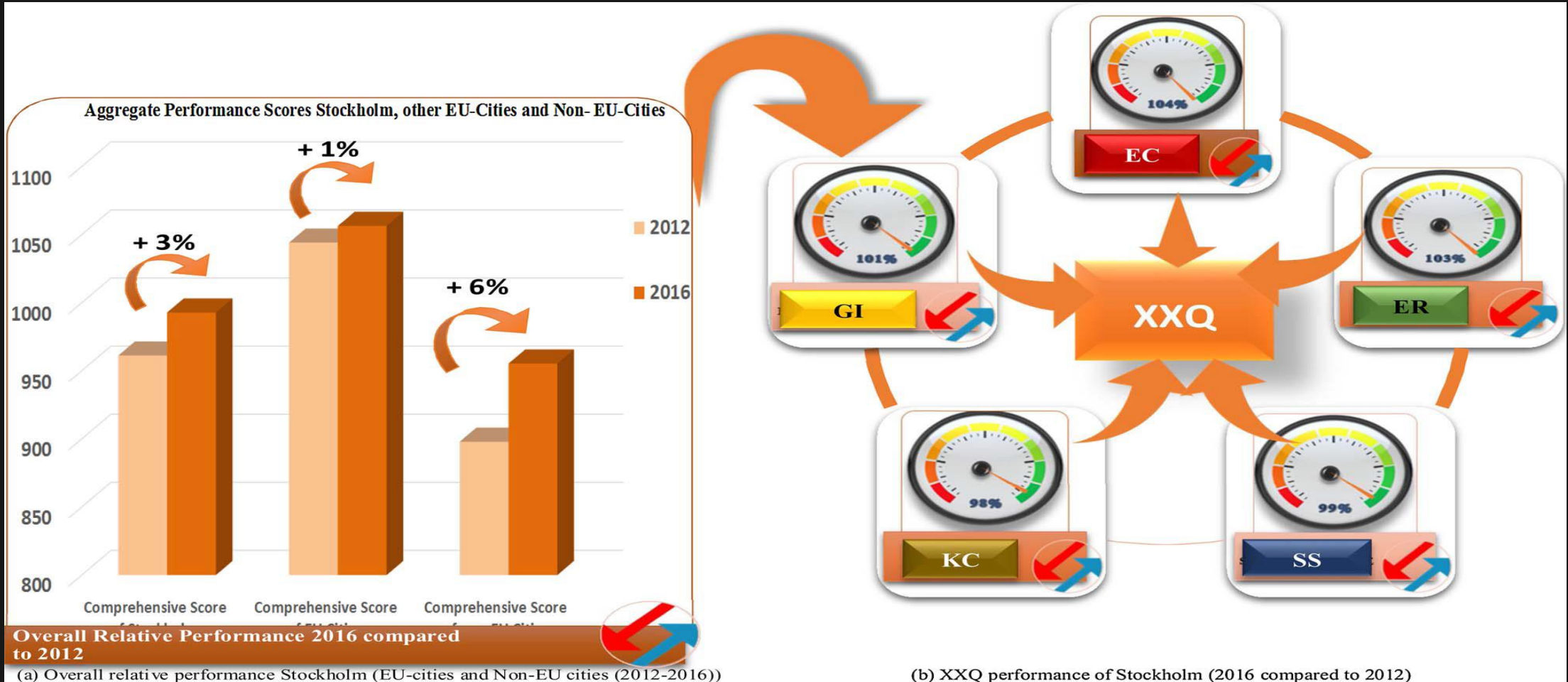
Faz todo o sentido haver:

- maior **articulação do investimento público**, por forma a assegurar a existência de conjuntos de dados geográficos estratégicos, de qualidade, bem como garantir a sua actualização
- maior **descentralização** do processo produtivo destes conjuntos de dados geográficos básicos, envolvendo os municípios
- **condições de acesso** aos conjuntos e serviços de dados geográficos estratégicos que promovam a sua efectiva utilização pública, a criação de valor acrescentado e o suporte à investigação e docência
- maior aproveitamento e integração do contributo participativo dos **Cidadãos** (directo ou indirecto / individual ou colectivo)

4 SOLUÇÕES



4 SOLUÇÕES



(a) Overall relative performance Stockholm (EU-cities and Non-EU cities (2012-2016))

(b) XXQ performance of Stockholm (2016 compared to 2012)

4 SMART...

Smart sensors

Smart devices

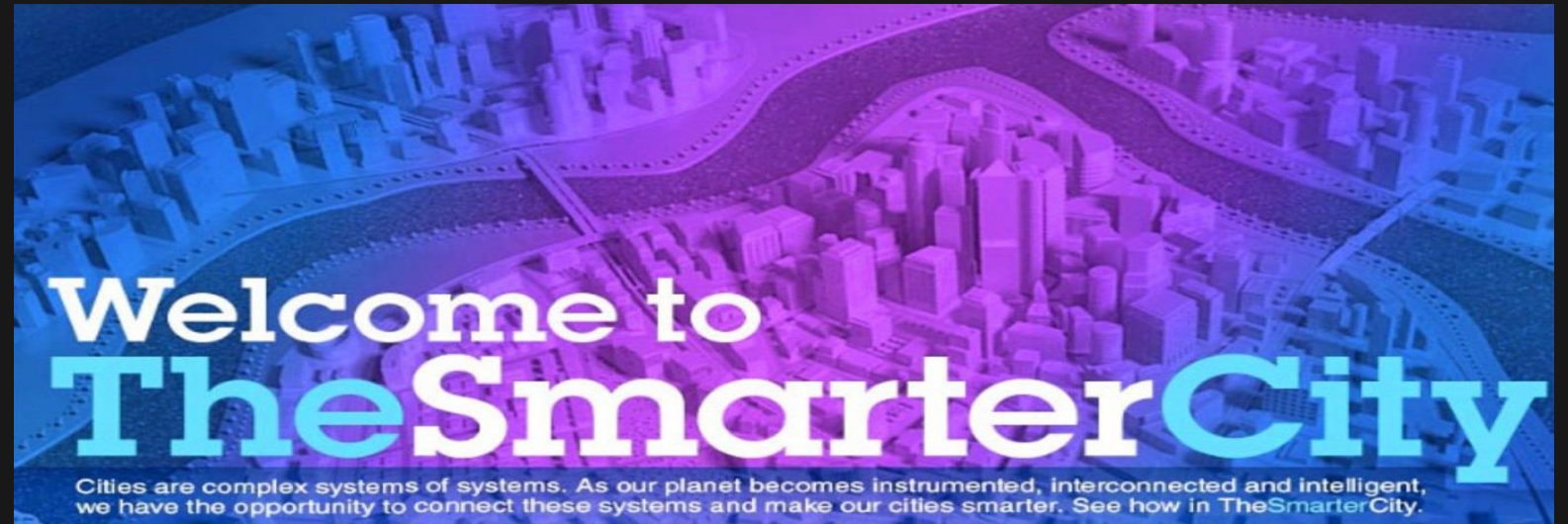
Smart systems

Smart organizations

Smart cities

Smart government

Tudo é smart...



4 SMART...

Smart sensors

Smart devices

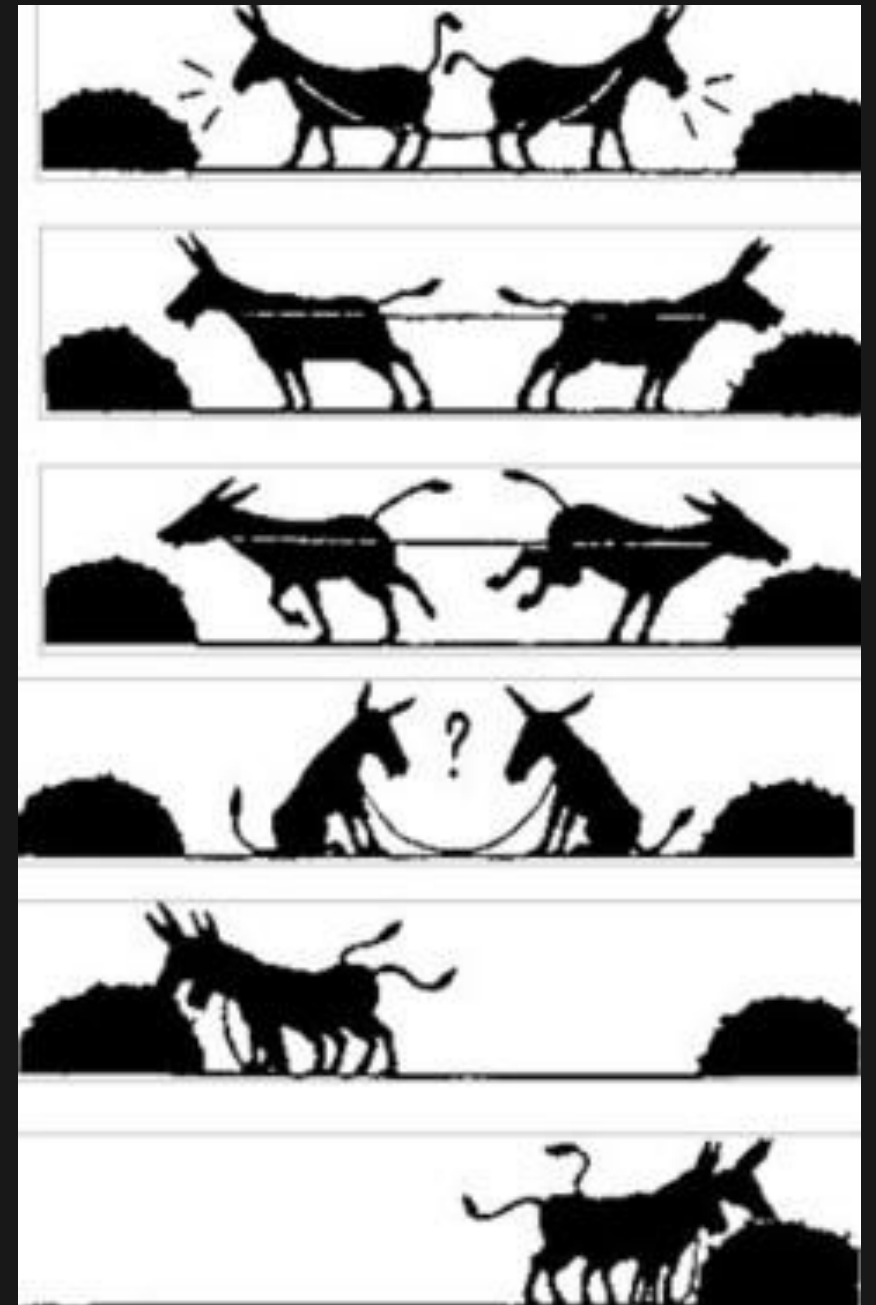
Smart systems

Smart organizations

Smart cities

Smart government

Tudo é smart...



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