Spatial Data Infrastructure Development And Standardization Activities

- Particularly in Africa -

By:

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Presentation Outline

- Introduction
- Development of SDI Concept
- Key Components of SDI
- SDI Development and Standardization Activities

GI – Geo-Information

2.0 GI and Its Importance in Sustainable Development

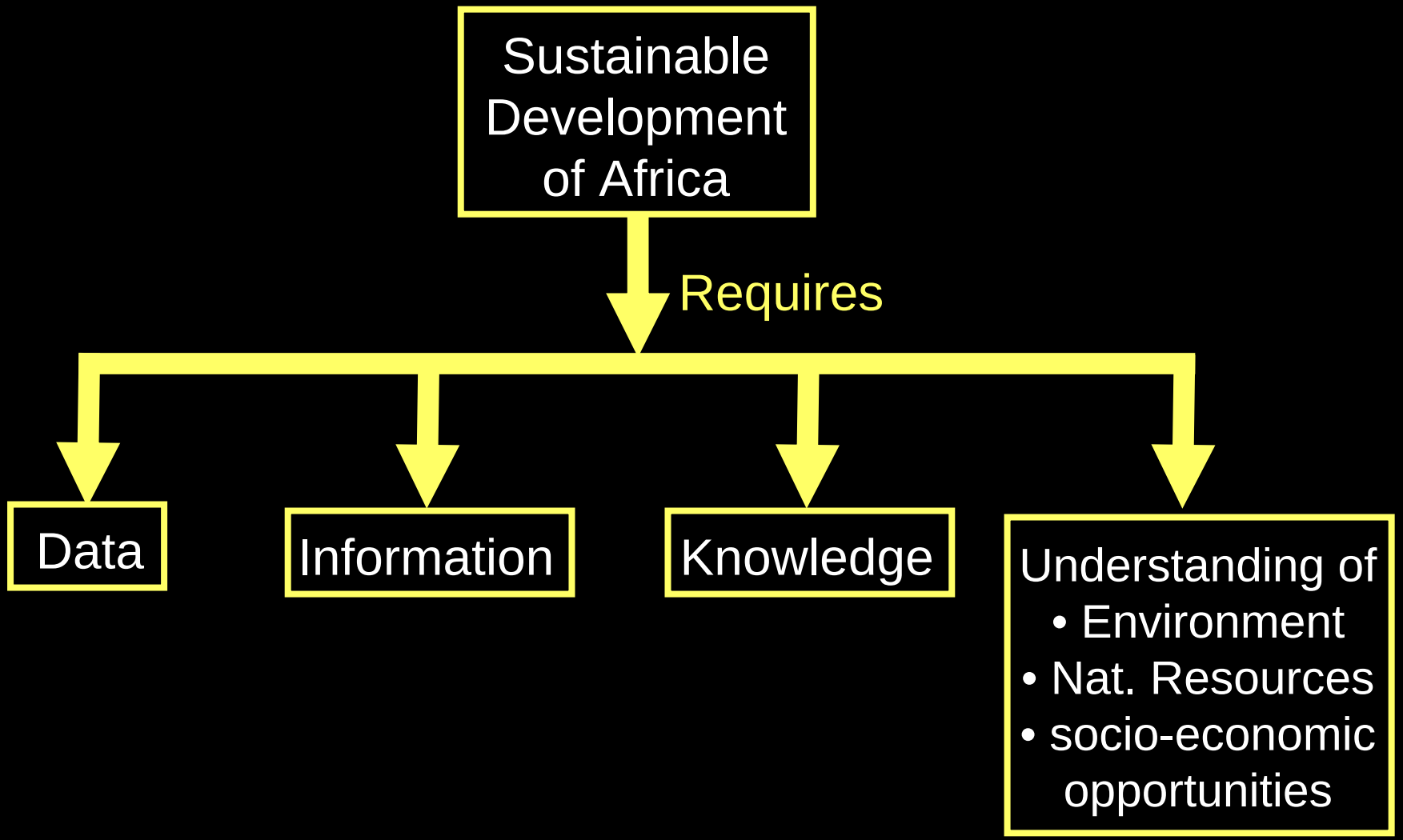
- Sound and rational economic planning and decision making requires comprehensive and integrated data and information

- About 80% of the data and information used in planning and decision making relates to geographic space, typically involving locations or positional data

- Positional data that is geo-referenced is referred to as Geo-spatial data or Geo-Information and is usually presented in the form of maps to facilitate easy understanding

GI – Geo-Information

Importance of GI in Africa



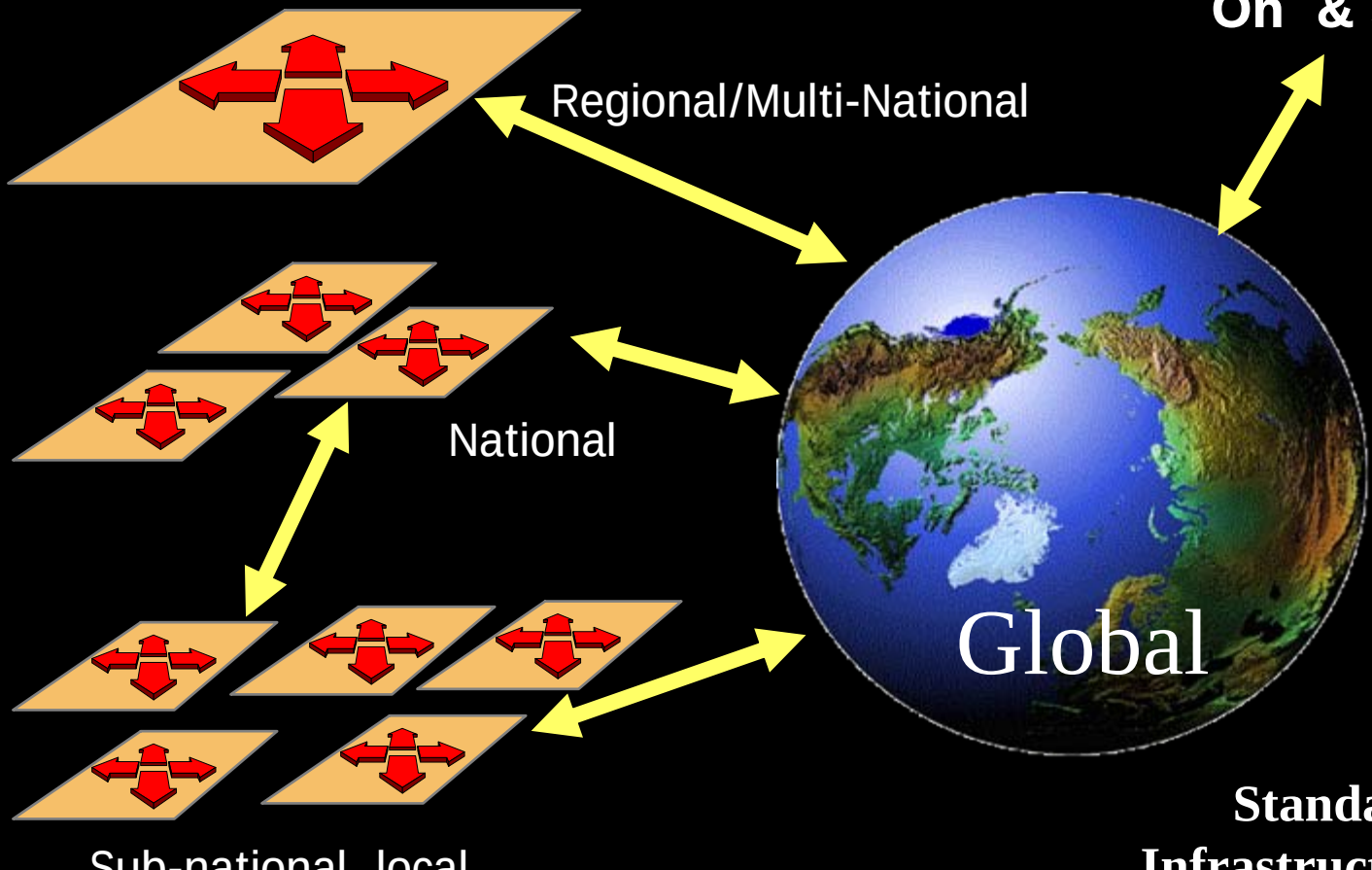
GI – Geo-Information

3.0 Development of SDI

Spatial Data Infrastructure (SDI) can be defined as an "umbrella" of policies, standards, and procedures under which organizations and technologies interact to foster More efficient use, management and production of Geo-spatial data

Spatial Data Infrastructures

The big picture view



User Applications drawing On & supporting SDIs

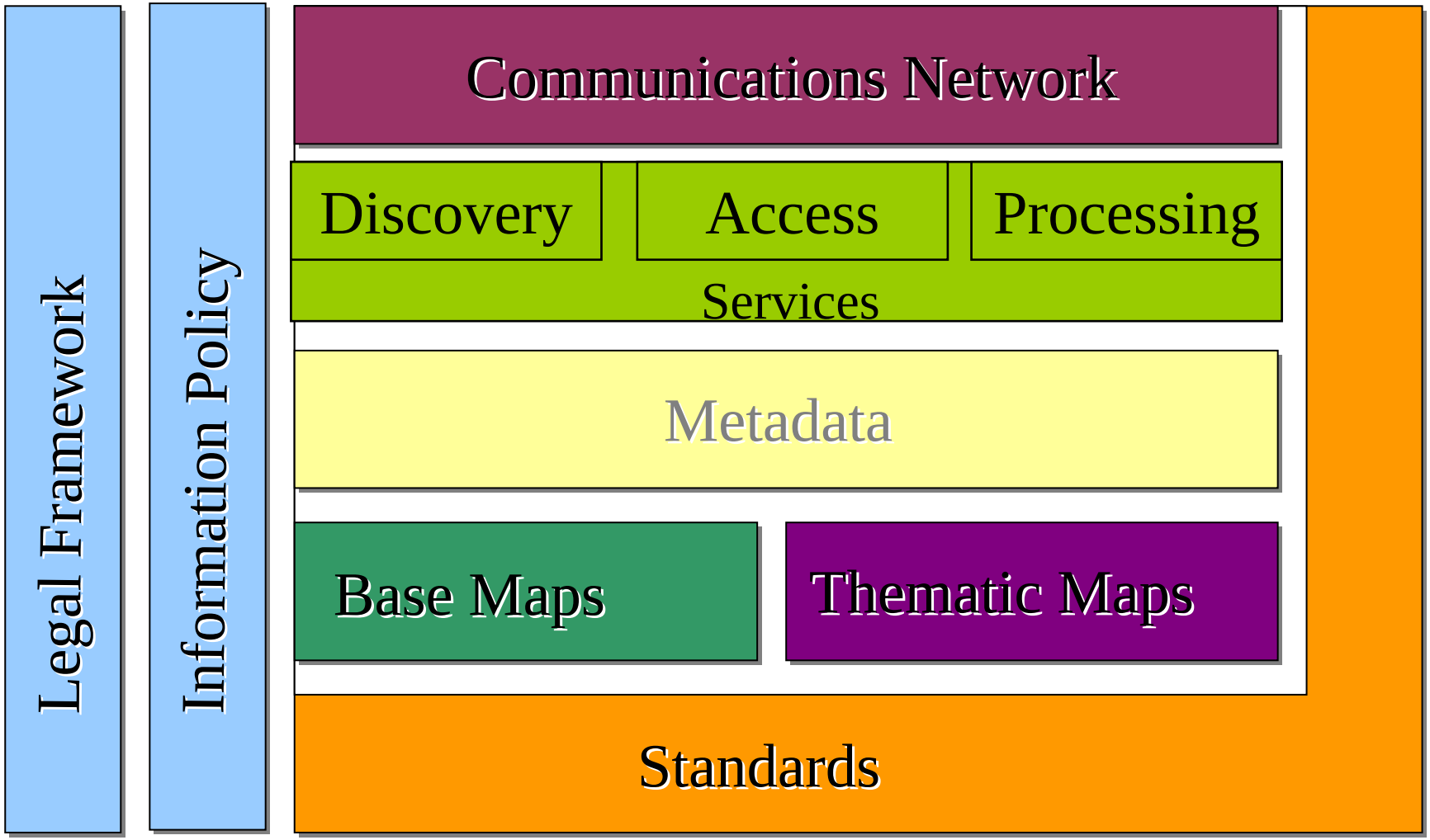
Digital Earth
GDIN
E-Gov
UN Programs
Global Atlas
Geography Network
… many others

Standards supporting Infrastructure & Applications

ISO, OGC, FGDC/NSDI, National

Source: Henry Tom

Key Components of SDI



Here’s one overview of the pieces of the NSDI

The first task is to inventory who has what data of what type and quality

A standardised form of metadata was published in June 1994 by the FGDC. An international standard is due in 2002.

Metadata

Metadata

- Provides documentation of existing internal geospatial data resources within an organisation *(inventory)*
- Permits structured search and comparison of held spatial data by others *(catalog)*
- Provides end-users with adequate information to take the data and use it in an appropriate context *(documentation)*

Metadata describes existing data holdings for order, retrieval, or local use

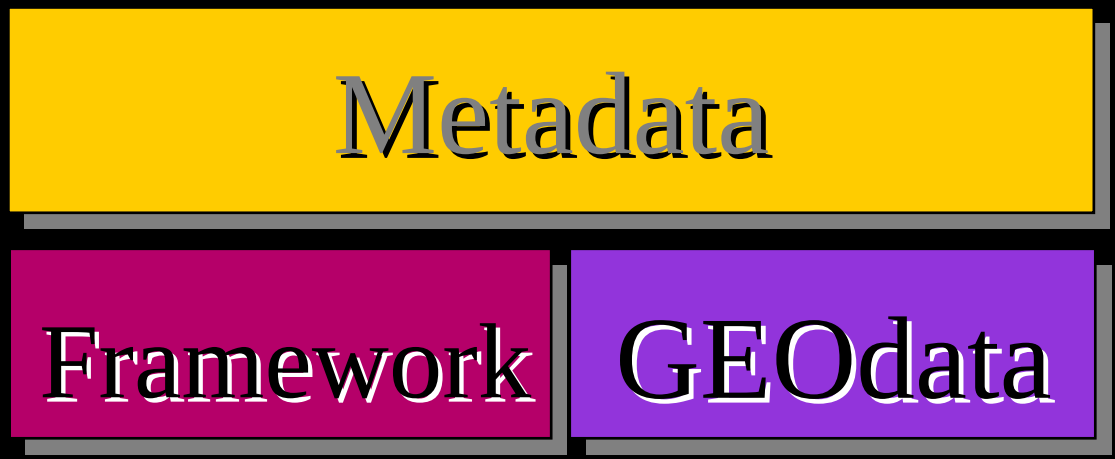
Metadata should be used to describe all types of data, emphasis on ‘truth in labeling’

Metadata

Geospatial Data

Special-use thematic layers are built and described as available geospatial data

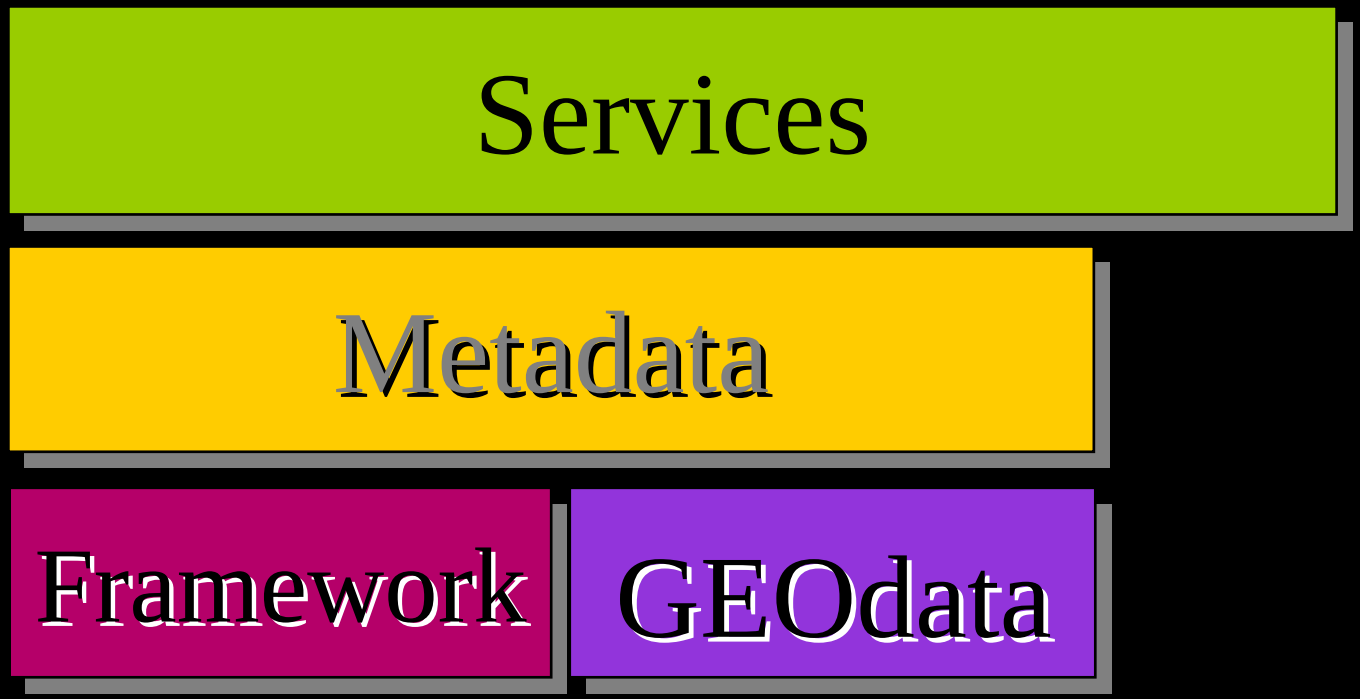
Common data layers are being defined in the ***Framework*** activity



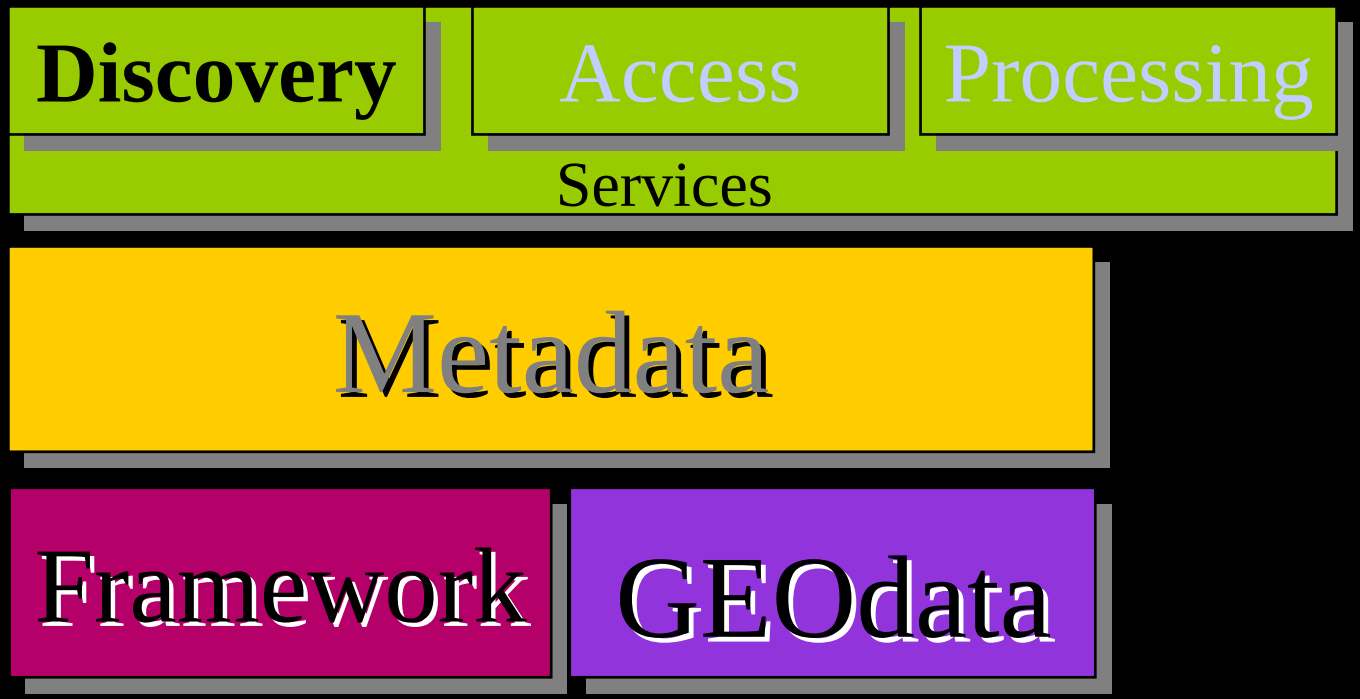
Framework supports...

- Community development of sets of spatial features, feature representation, and attribution to a lowest common denominator
- Participant collecting, converting, or associating information to common Framework feature specifications
- Multiple representations of real-world features at different scales and times by feature identifier and generalisation

Spatial Data Infrastructures include services to help discover and interact with data



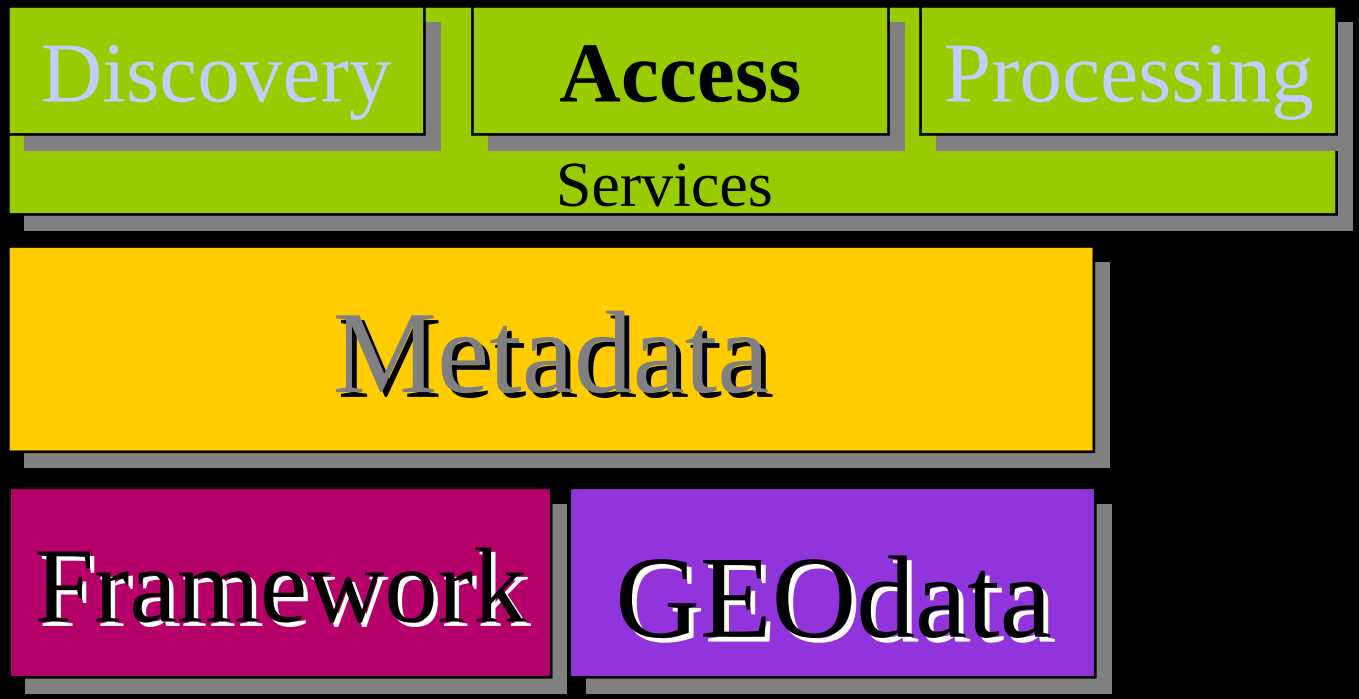
An important common service in SDI is that of discovering resources through metadata



This Discovery Service is the core function of the ***Clearinghouse*** for geospatial information

- Search for spatial data through fields and full-text in the metadata
- Links through to full data access, where available
- Supports uniform, distributed search through a single user interface to all servers worldwide
- A free advertising mechanism to provide world access to your holdings under the principle of “truth-in-labeling”

A second class of services provides standardised access to geospatial information



This may be made via static files on ftp or via online data streaming services. These services deliver ‘raw’ data, not maps.

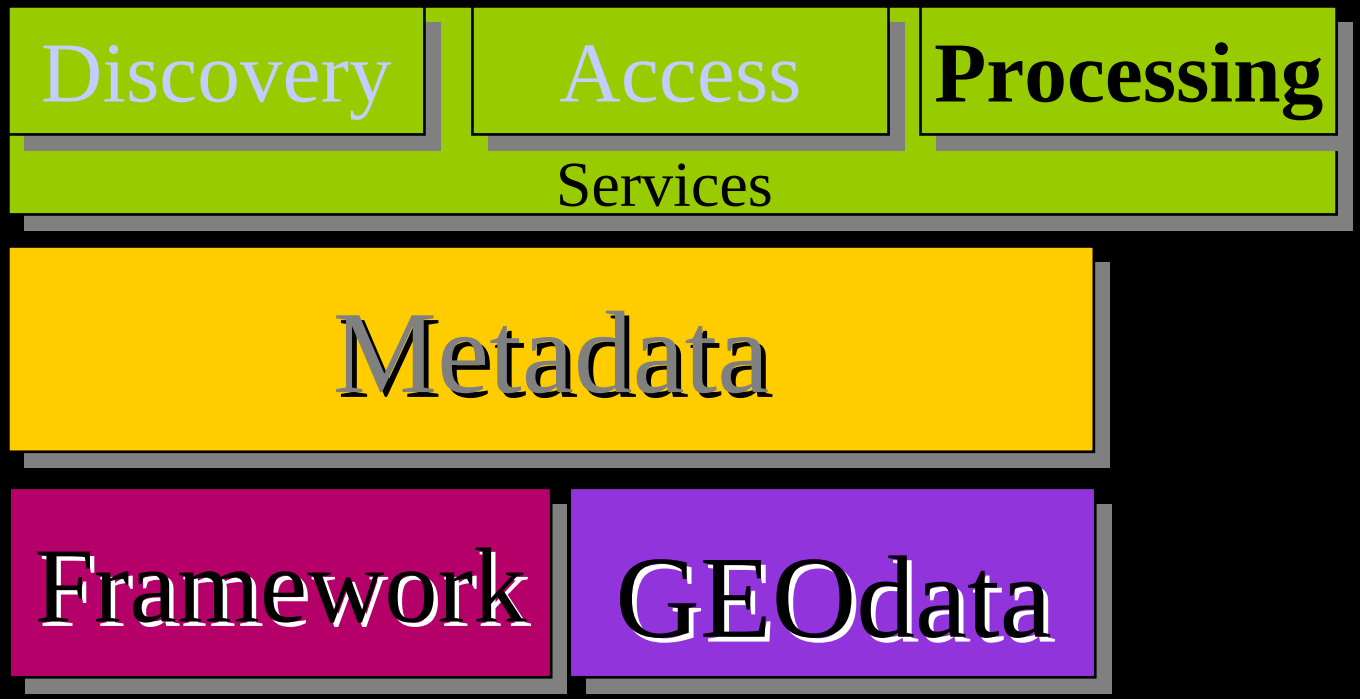
Data Access Concepts

- Standardisation of data access implies several things:
  - Definition of model used for the data to be exchanged
  - Adoption of an exchange or encoding format
  - Agreement on data access protocol(s)
- Organisations should strive to identify the mode(s) of operation to simplify data exchange

Data Access Examples

- Administrative boundary data conforming to the GlobalMap data model, packaged as Vector Product Format (VPF), made accessible over ftp
- Panchromatic 10m, single-band, rectified imagery to a specific coordinate reference system, packaged as GEOTIFF with LZW compression, made accessible on CD-ROM

A third class of services provides additional processing on geospatial information



Processing Services

- These include capabilities that extend and enhance the delivery of data through processes applied to raw data:
  - Web Mapping Services
  - Symbolisation
  - Coordinate Transformation
  - Analysis or topologic overlay services

Types of geospatial standards

- **Data Classification**

  e.g., Vegetation Classification
- **Data Content**

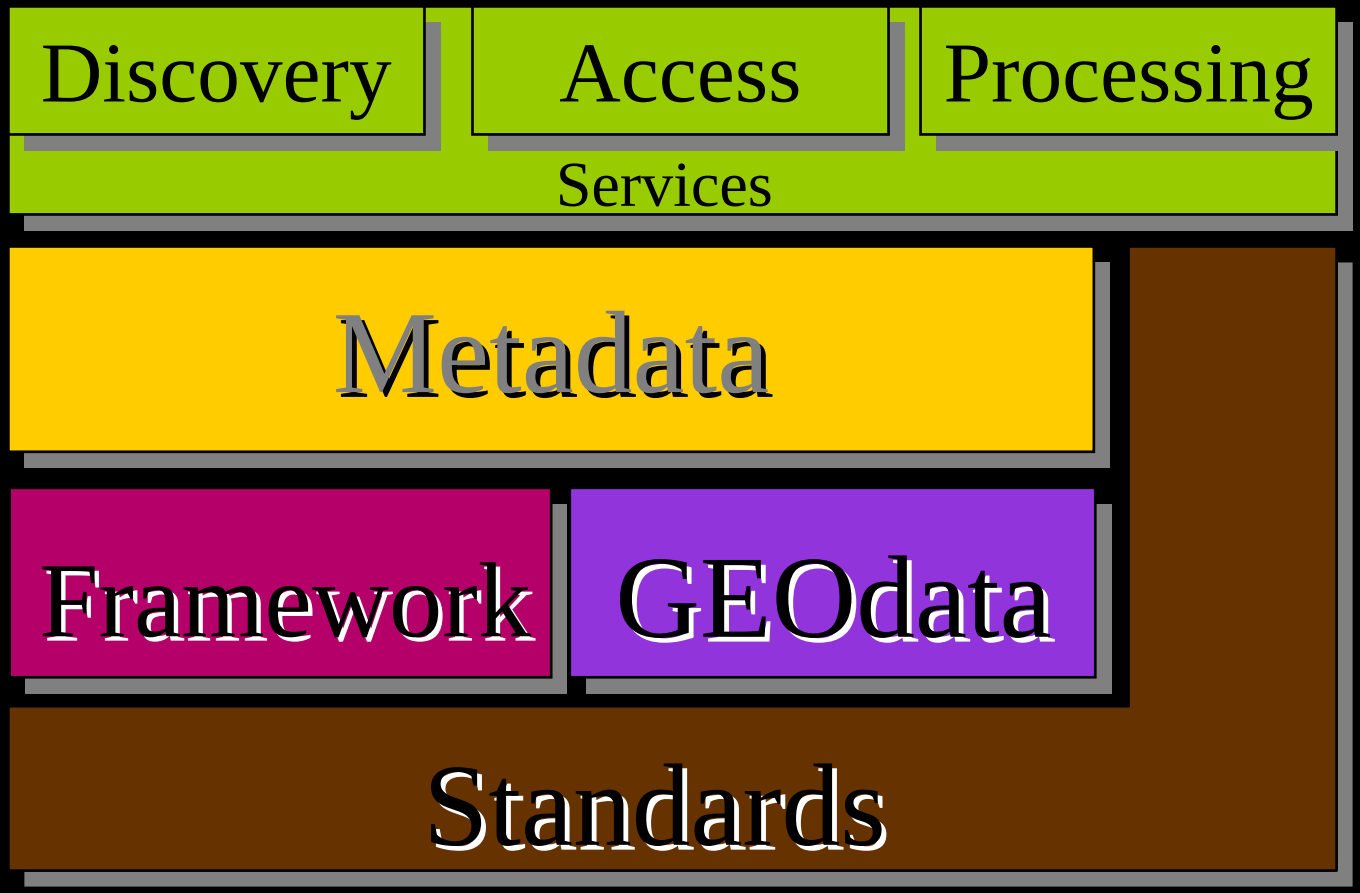
  e.g., Digital Geospatial Metadata, Spatial Schema
- **Data Symbology or Presentation**

  e.g., Digital Geologic Map Symbolization
- **Data Transfer**
- **Data Services (Web Mapping, Feature)**
- **Data Usability**

  e.g., Geospatial Positioning Accuracy

Standardisation makes SDI work

Standards touch every SDI activity



Standards include specifications, formal standards, and documented practices

Geographical Services Standards

Data Description

- ISO 19115 - International Standard for geographic data
- FGDC – Federal Geographic data Committee
- Dublin Core

Metadata Search

- OGC Protocols - Open Geospatial Consortium Specifications (Catalog Services for the Web)
- Z39.50 Protocol with GEO profile

Data Access

- OGC specifications (access to Web Map, Feature and Coverage Services)
- ArcIMS

Roles of standards bodies

Software interfaces (Implementation Specifications)

OpenGIS Consortium

Endorsed practices and specifications

Other NSDIs

NSDI

ISO TC 211

National Standards

(Abstract standards)

Regional Initiatives

- European Umbrella Organization for Geographic Information
- Permanent Committee on GIS Infrastructure for Asia and the Pacific
- Permanent Committee on Infrastructure Development for the Americas
- **Permanent Committee on GIS Infrastructure for Africa (potential)**
- Geographic Information Network in Europe (GINIE)
- Committee on Development Information (CODI) for Africa
- Geographic Information or Sustainable Development (GISD)

National Spatial Data Infrastructure Initiatives by Country

- Argentina
- Australia
- Bolivia
- Bermuda
- Canada
- Chile
- China
- Colombia
- Costa Rica
- Cuba
- Cyprus
- Ecuador
- Finland
- France
- Germany
- Greece
- Guatemala
- Honduras
- Hungary
- India
- Italy
- Indonesia
- Jamaica
- Japan
- Kiribati
- Malaysia
- Mexico
- Mongolia
- Nepal
- Netherlands
- New Zealand

National Spatial Data Infrastructure Initiatives by Country

- Nicaragua
- Northern Ireland
- Pakistan
- Panama
- Peru
- Poland
- Portugal
- Republica Dominica
- Russian Federation
- Salvador
- South Africa
- Sweden
- Trinidad Y Tobago
- United Kingdom
- United States
- Uruguay
- Venezuela

- ……and other nations which have recently embarked on SDI development

SDI Activities in Africa

- South Africa
- Botswana
- Zimbabwe
- Namibia
- Zambia
- Uganda
- Nigeria
- Ethiopia
- Lesotho
- Swaziland
- Egypt
- Algeria
- Morocco
- Tunisia

SDI Activities in Africa (Cont….

- Promotion of SDI at continental level is spearheaded by UNECA through the CODI initiative
- At Sub-regional level SDI is promoted by political and economic groups like NEPAD, SADC, IGAD, CLISS, COMESA
- At national level SDI is spearheaded by National Mapping Organizations
- UNECA under CODI initiative has developed dynamic and online SDI Cook Book for Africa

Slow Progress in SDI in Africa Due To:

- Lack of awareness of the value of SDI
- Confusion surrounding the definition & composition of SDI
- Lack of policy and coordinating arrangements
- Lack of capacity (human and physical resources)
- Complexity of national issues such as political, cultural, and economic positions of most countries

Short Term Measures to Prepare Africa for SDI Devpt.

- Introduction of concept of information budgeting
- Identify lead person/agency to coordinate SDI devpt.
- Raise level of awareness of SDI (via Workshops, Seminars)
- Perform national reviews of spatial data needs and available data
- Develop learning materials on SDI (including e-learning)

Future of SDI and GI in Africa is Bright Due To:

- Current +ve economic growth by most countries
- Increasing democratization and good governance
- Rapid development in ICT
- Liberalization of the communication sector
- Recognition of GI as an engine of socio-economic devpt.
- Increasing introduction of GI courses in tertiary institutions
- Increasing availability of satellite data
- Decreasing software & hardware prices & availability of OSS
- Development of Internet / Web Mapping
- Increasing use of GIS a mapping & data analysis tool
- Increasing development of GI market
- Increasing public-private & north-south partnerships
- African initiative to launch a constellation of EOS
- Increasing demand of GI to meet Africa's devpt. Initiatives (MDGs, NEPAD, Blair Commission, G8 Initiative on Africa, etc)

SDI is key to Africa's Development Agenda

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