

WORLD METEOROLOGICAL ORGANIZATION

Weather – Climate - Water

WMO Information System (WIS)

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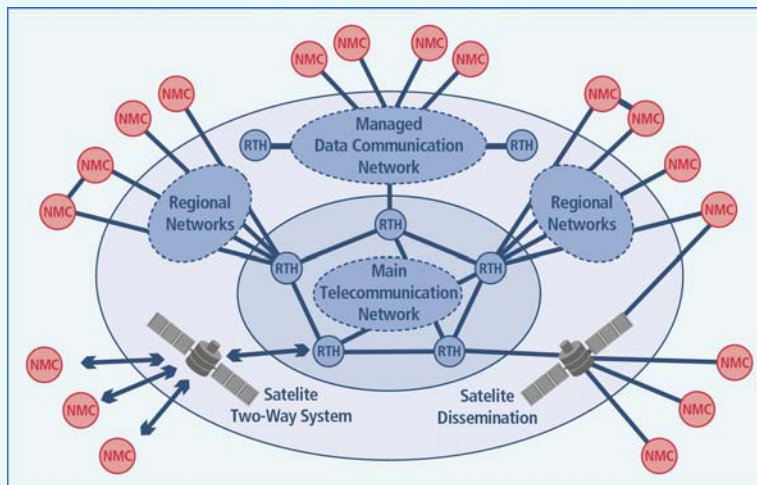
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Current situation: GTS

WWW GTS



Regional/Specialized
Meteorological Centres

Meteorological and R&D
Satellite Operator Centres

interconnects

National
Meteorological
Centres

World
Meteorological
Centres

Shortfalls of the current situation:

- **Data exchange**
 - o Multiplicity of procedures
 - o Limited connectivity
 - o Very limited "pull"-service
- **Data management**
 - o Multiplicity of data formats
 - o Lack of or uncoordinated metadata & catalogues
 - o No data discovery

WIS Vision

WIS provides the **RIGHT INFORMATION** to the **RIGHT PLACE** at the **RIGHT TIME** through:

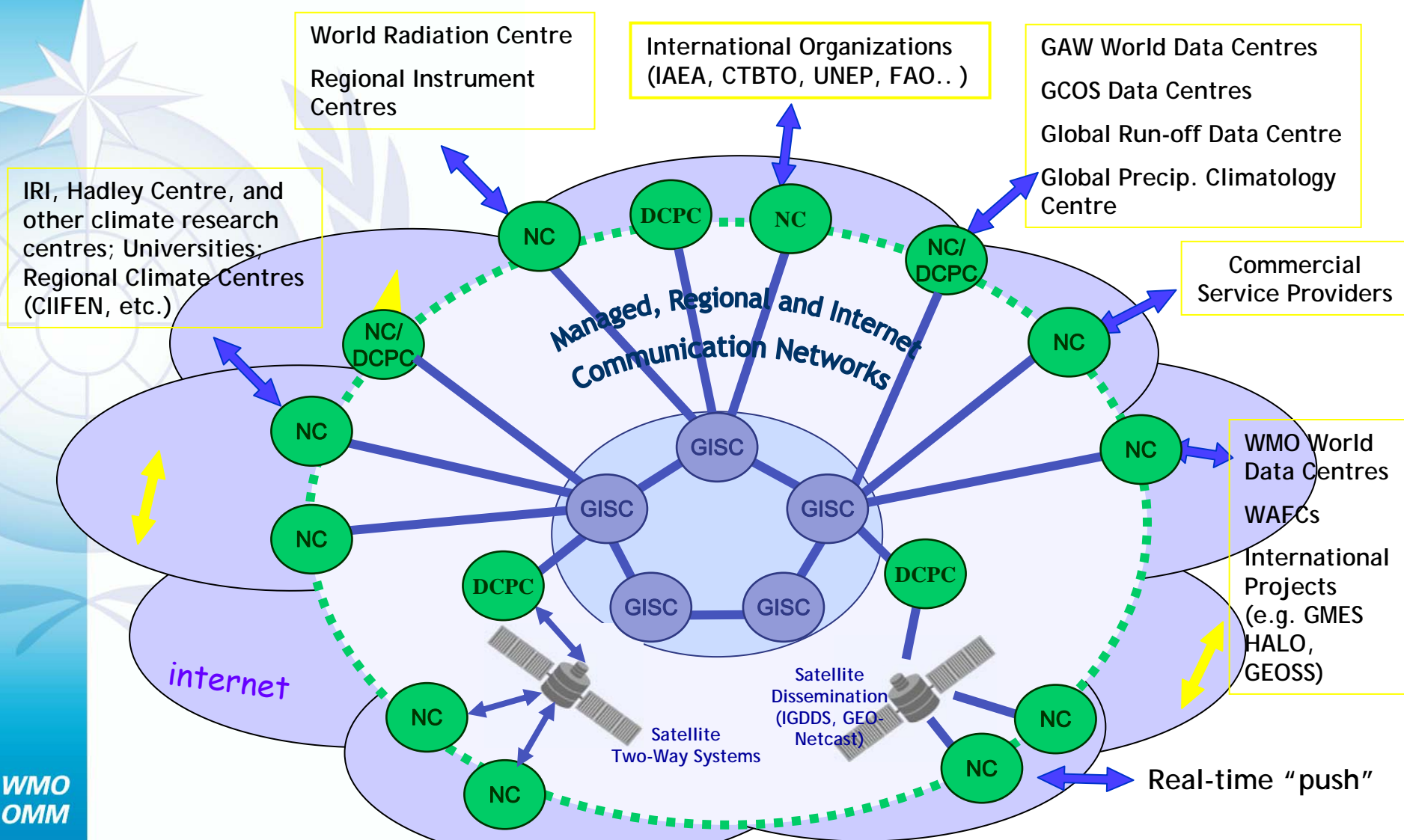
- **Real-time collection and dissemination:**
 - o Real-time "push" through dedicated telecommunication for operation-critical data
- **Data discovery and retrieval service:**
 - o "Pull" through the Internet (HTTP, FTP,...)
- **Timely delivery of data and products:**
 - o Delayed mode "push" through dedicated telecommunication means and public data networks, especially the Internet
- **Unified procedures**
 - o More efficient data exchange
- **Coordinated and standardized metadata**
 - o Data interoperability between programmes
 - o Improved data management
 - o ISO 191xxx series

Structure of WIS

Functional centres interconnected by data communication networks:

- **National Centres (NC)**
 - Links national data providers and users to regional and global data exchange nodes
- **Data Collection and Production Centres (DCPC)**
 - Provides for regional and mission-oriented exchange of data and products
 - Supports information push and pull
- **Global Information System Centres (GISC)**
 - Provides for 24/7 reliable global exchange services
 - Collects and provides metadata
 - Supports data and information discovery and retrieval

WIS



WIS Data Policies

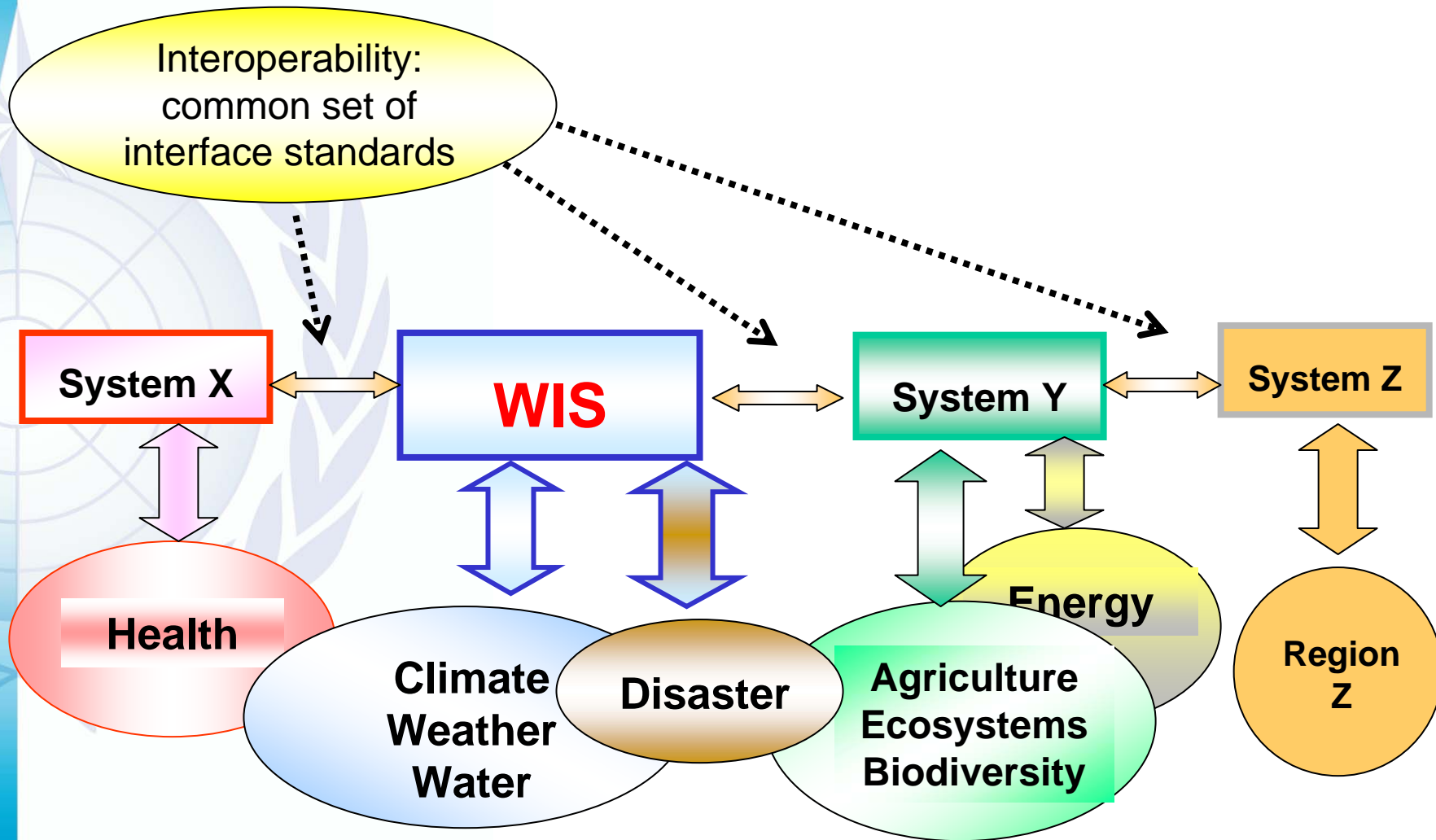
WIS complies with WMO data policies

- Res. 40 (Cg-XII) (meteo) and Res. 25 (Cg-XIII) (hydro)
- Categories: essential (“without”) and additional (“with” conditions); no implications on data for research and education; Commitment to GEOSS w.r.t. essential data

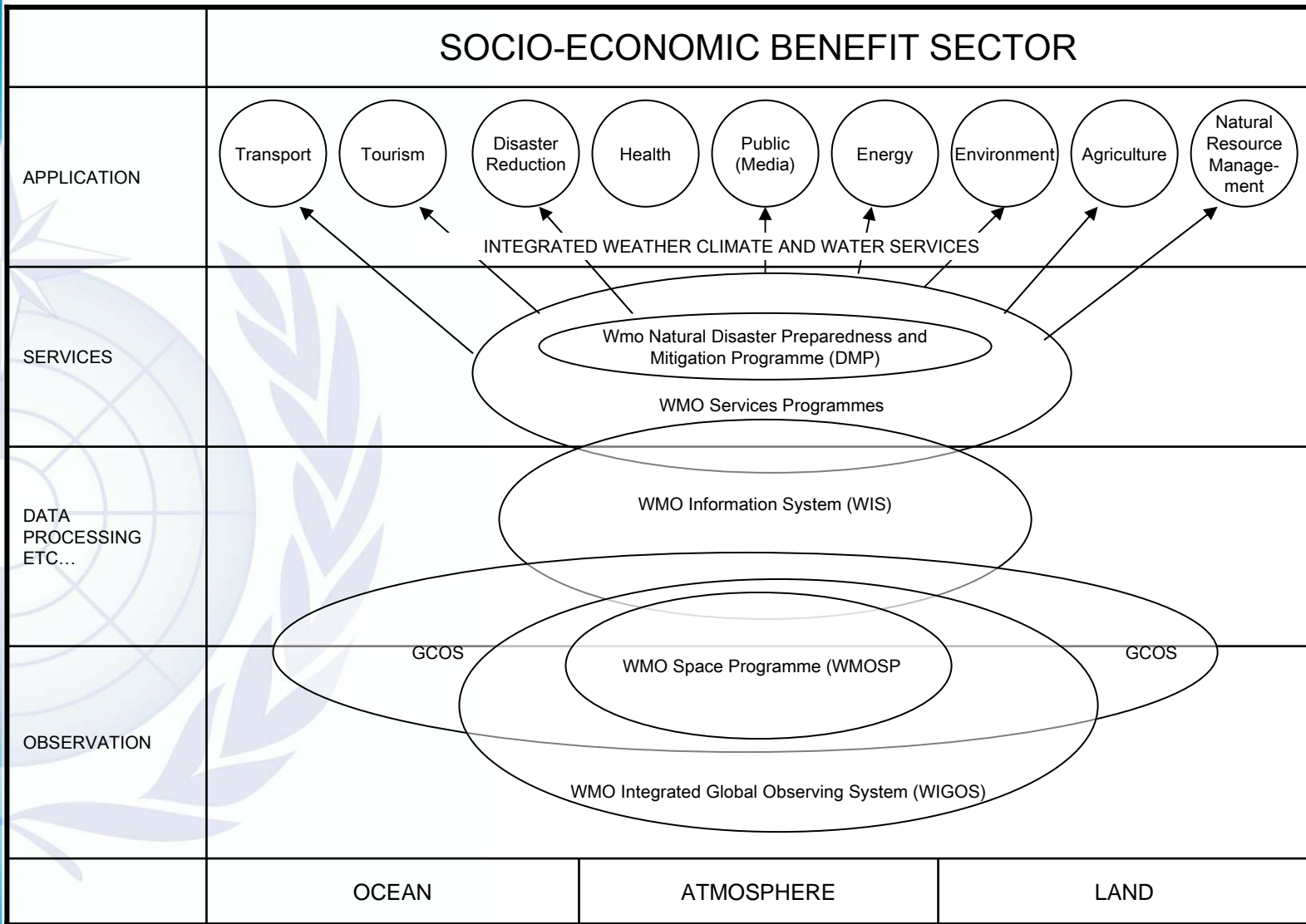
WIS will follow evolution of WMO data policies

- Procedures for managing of access rights, control of data retrieval, registration and identification of users, etc can be defined, as and when required
- Anonymous downloading is technically possible, but depends on whether a NC permits that feature
- Has no system-inherent features that would violate international legal frameworks

GEO "Information System of Systems"

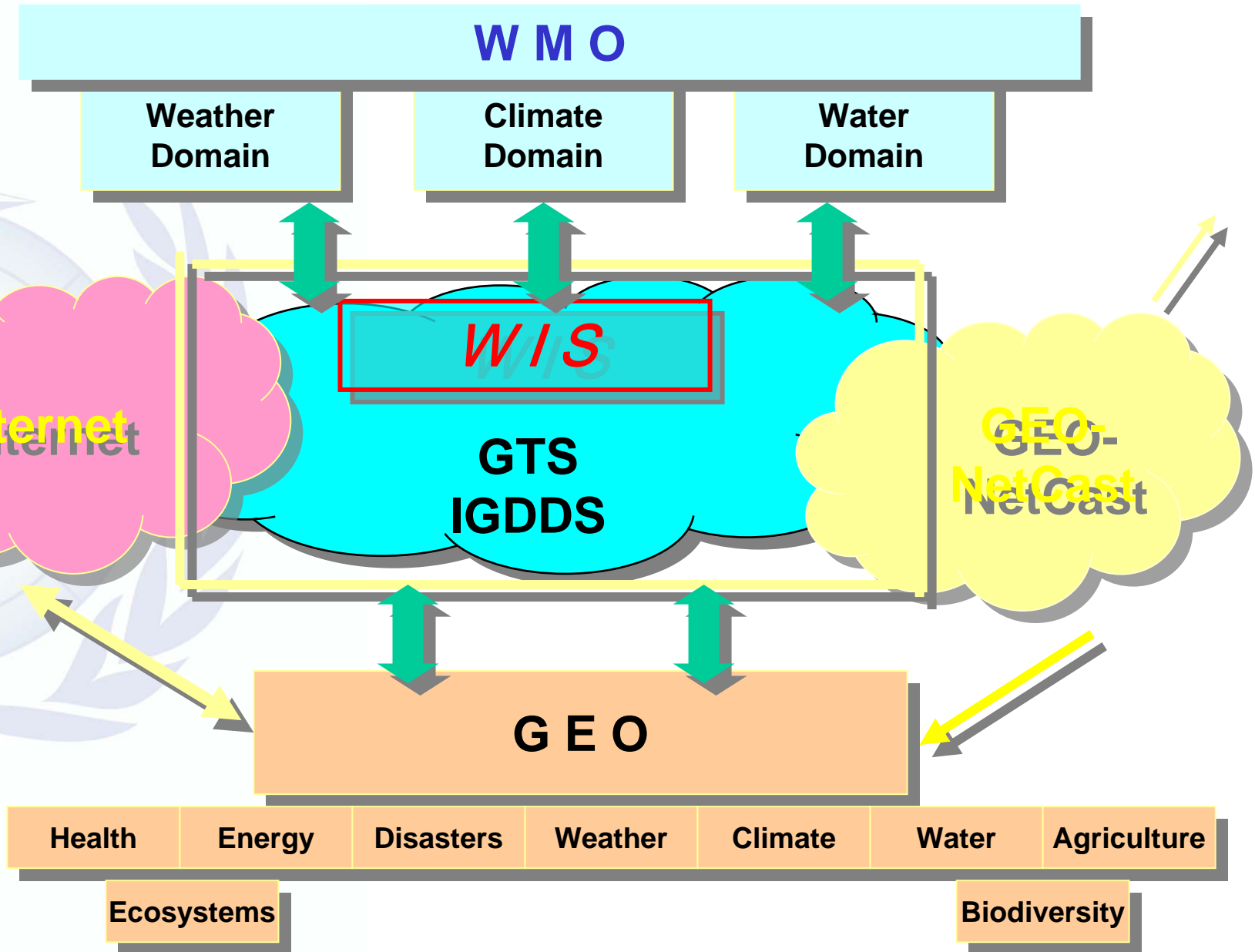


Information systems addressing thematic or regional needs



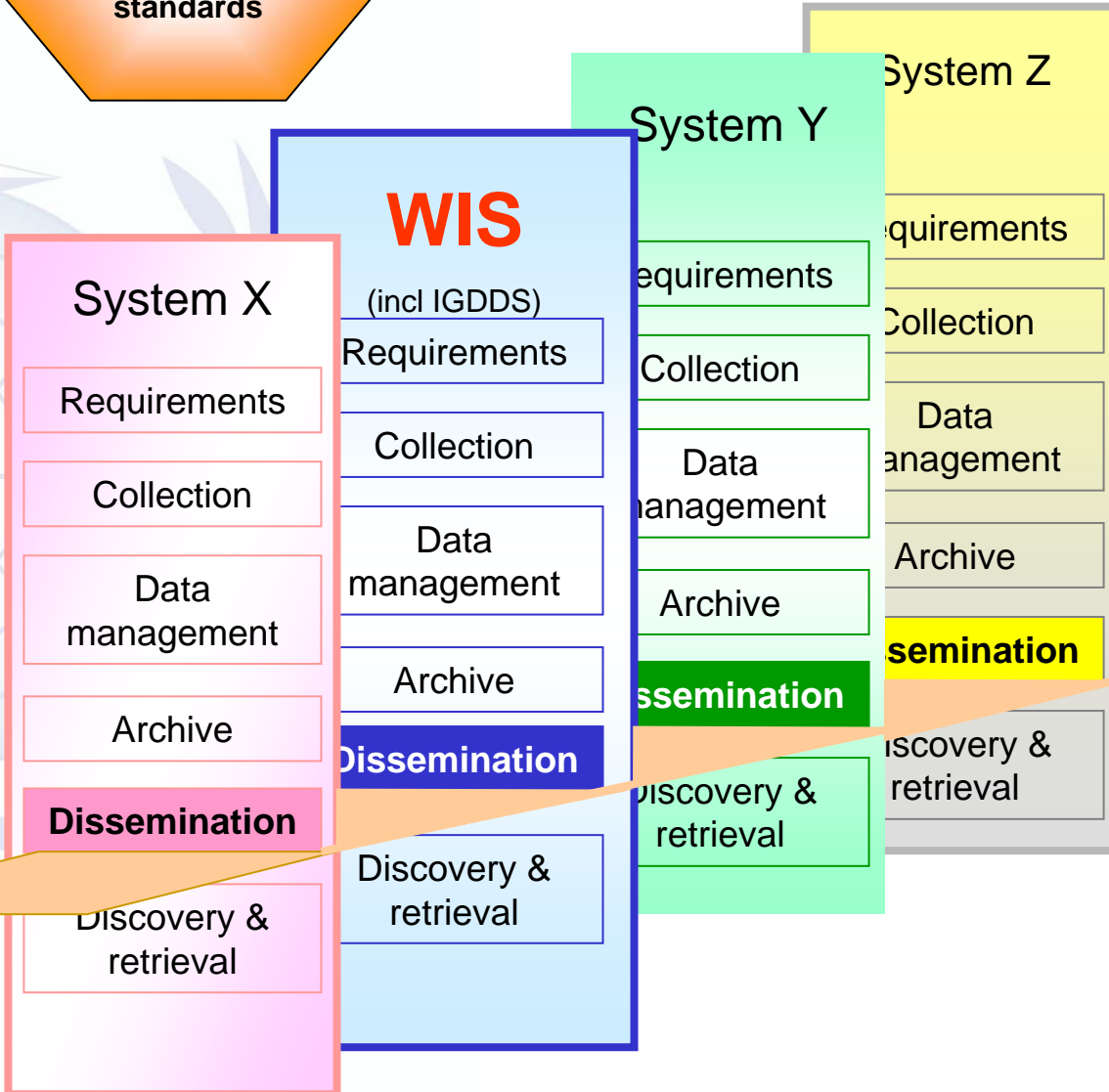
Schematic depiction of a horizontally integrated program structure providing “integrated weather, climate and water services” to a range of socio-economic benefit sector.

WIS contribution to GEO



Role of GEO-NetCast

Common set of interoperability standards



GEO-Netcast

WIS implementation

- **Phase A: GTS evolution into WIS**
 - **Phase B: Full WIS services**



WIS implementation

• Phase A: GTS Evolution into WIS

- Improve and upgrade GTS

- Improve MTN, as WIS core network with guaranteed service level and security; data communication network services, satellite-based datacast, etc.

- Establish/improve GTS interfaces of all WMO Programme centres

- Priority on their operational- and time-critical data exchange requirements
- Promote/support NMHSs in modernizing ICT equipment based on industry standards
- Promote/support new ICT to improve national data collection

WIS implementation

Key goals

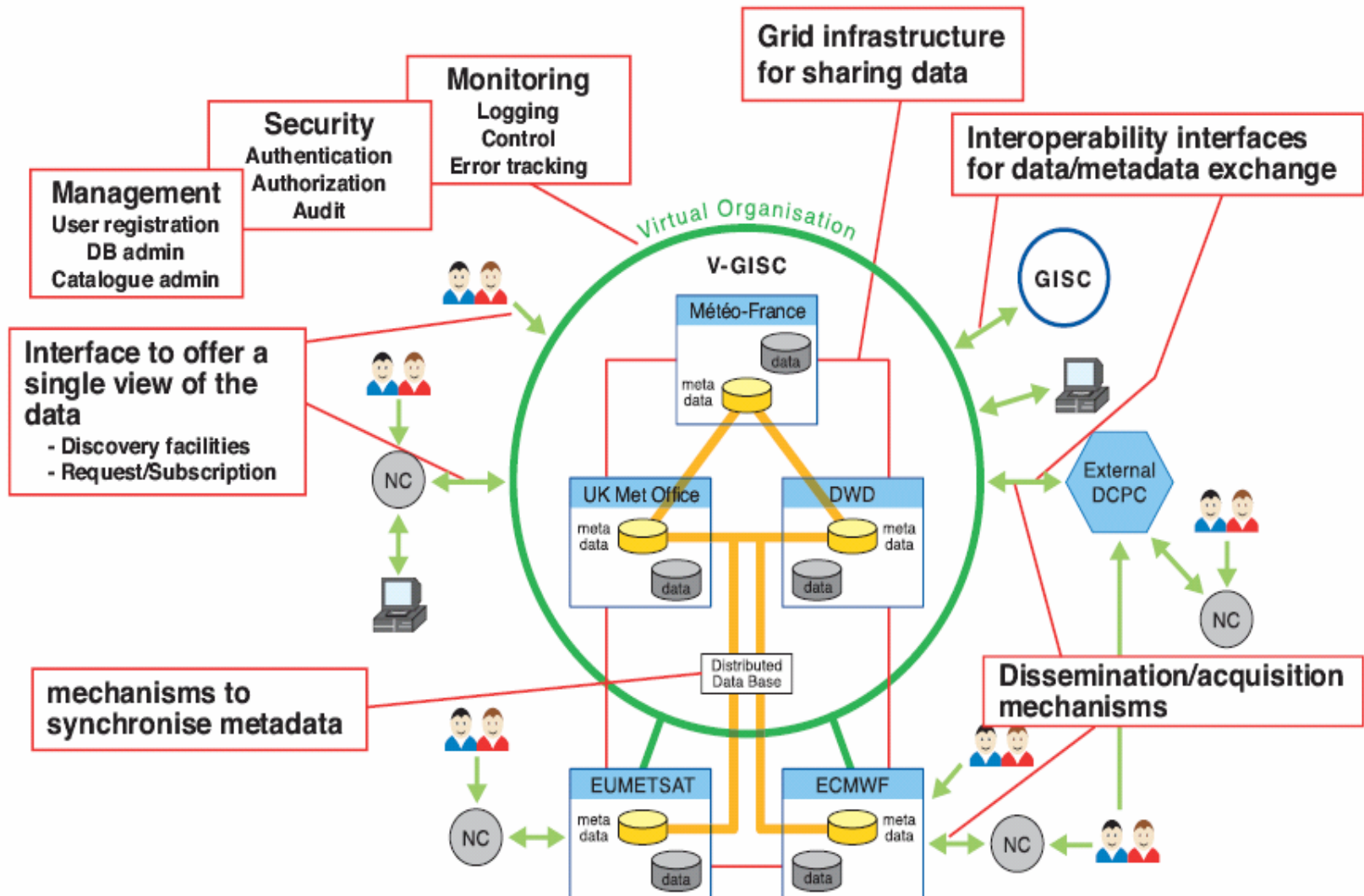
- **Phase B: Full WIS services**

- Provide data discovery, access and retrieval services to all users through unified user interface
- Provide flexible delivery services
- **Become the SINGLE, COORDINATED GLOBAL INFRASTRUCTURE** for the collection and sharing of all relevant weather, water, climate and environmental information for ALL WMO Programmes
- **Become WMO's information system gateway to GEOSS** and the preferred data exchange and data management approach for other Societal Benefit Areas

Key Accomplishments

- **GISC Prototype** functions demonstrated at TECO-WIS:
 - ✓ RA VI VGISC, SIMDAT, Web portal, discovery and pull
- Implementation of **DCPCs prototypes**:
 - ✓ ECMWF & EUMETSAT associated with VGISC project
 - ✓ NCAR (Boulder), NODC (Obninsk) for JCOMM data
- **Plans for further GISC** developments exist:
 - ✓ BOM, CMA, JMA, KMA, NOAA
- **NCs are being tested**: Finland, Rep of Korea,...
- **IGDDS** (operational for space-based data)
- **Network technologies** are in operation/being tested:
 - ✓ IMTN, satellite DVB dissemination, Asia-Pacific VPN project,...
- **WMO Core metadata profile**

Example: European Virtual GIS Project



Key Milestones

- **Consolidate plans** on development, governance and implementation of WIS: **2006-2008**
- Develop **regulatory and guidance documentation** for WIS implementation and use, including specifications for the GISCs and DCPS, designations procedures, unified user interface: **2006-2008**
- Implementation of **DCPCs**, i.e., WIS interfaces at WMO programme centres: **2007-2011**
- Develop **security, authentication and authorization** procedures for WIS services : **2007-2008**
- **First fully operational GISC: 2008**
- Implementation of **other operational GISCs: 2009-2011**

Challenges

- **Understanding of WIS** – both internal and external to WMO:
 - What it is, why it is important, what it does for NMHSs, what needs to be done, ...
- **Active participation of WMO Technical Commissions and other bodies** -- stating requirements, developing metadata and implementing WIS interface at their data centres, etc
- **Active participation of Regional Associations** with respect to regional planning
- **Involvement of all NMHSs** – developed and developing countries- in the WIS development, including awareness of users communities
- **Capacity building and WIS training**
- **Financial and human resources** for WIS development into operations

Thank you



WIS

WMO Information System



WMO
OMM



Additional slides for information and reference

Developing country outreach programme, intended primarily, but not only for their NMHSs, ensures these countries' effective participation in WIS

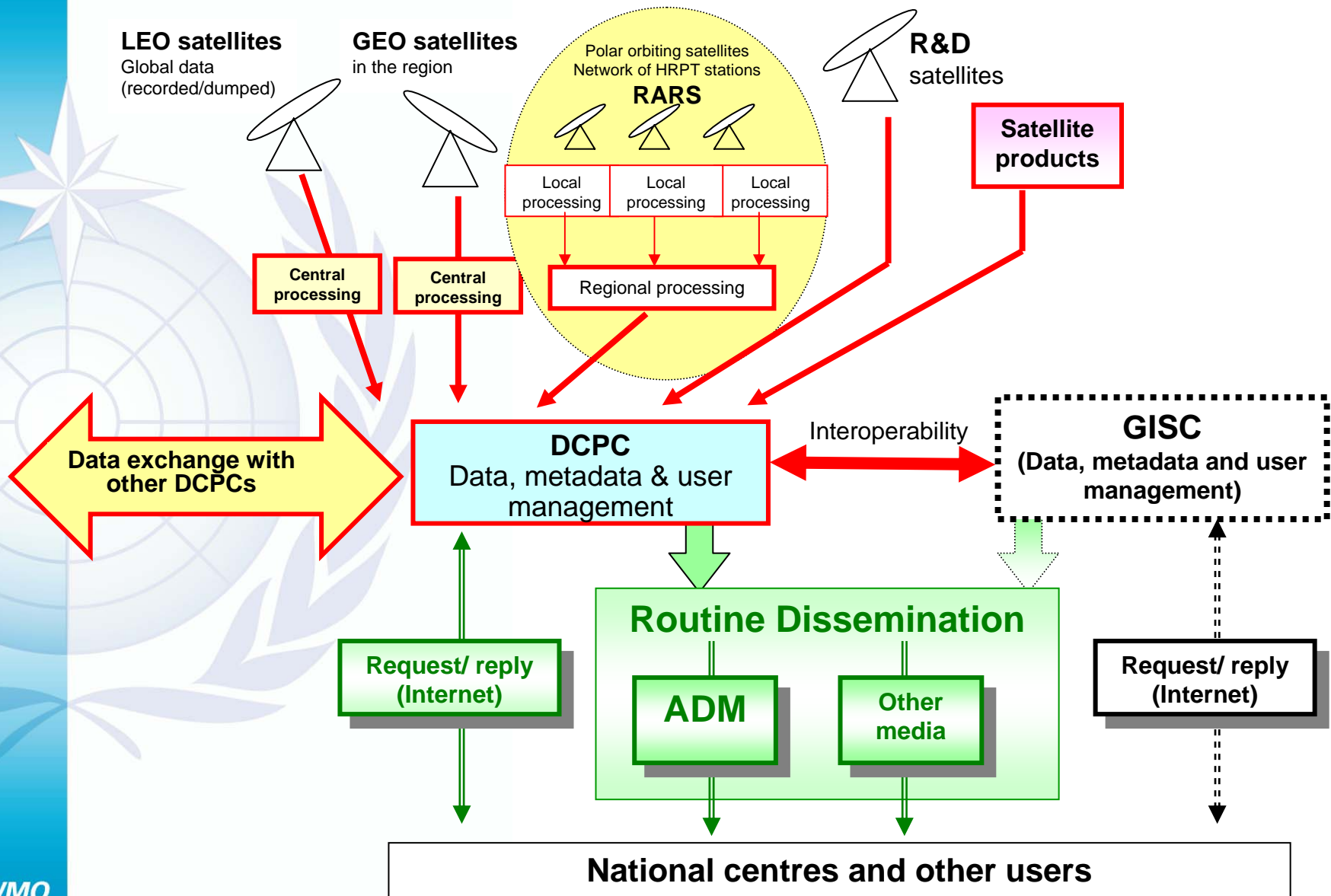
Expected Results	Activities
(i) With priority on LDCs, the developing countries are advised on WIS, possible modes of participation and cooperation, and receive support in kind or through financial means to facilitate technical solutions for their WIS participation	(i) Expert Meeting to develop the strategy for preparing developing countries for the use of WIS, including approaches to resource mobilization and funding options such as WIS Trust Fund, VCP, and other sources
(ii) ICT staff of developing country NMHSs is knowledgeable in operating WIS facilities in their centres	(ii) Training for developing countries' ICT staff, using mainly scheduled events (seminars, conferences, etc.) and available training facilities (RMTCs), and CAL/ distance learning methods
(iii) WIS projects for developing countries are endorsed and reviewed by the corresponding Regional Association	(iii) <u>Development of country-specific WIS projects</u> (priority on LDCs); (iv) Implementation of WIS projects in LDCs (v) Implementation coordination meetings for LDC projects on WIS, using mainly events of opportunity

IGDDS

Integrated Global Data Dissemination Service

- A WMO-CGMS initiative to enhance satellite data access and use;
- A component of WIS;
- Satellite-based two-way systems;
- Cost-effective and reliable data dissemination of large-volume data sets (i.e., in-situ and satellite data, images, operational and research data and products).
- Dissemination of operational-critical information to countries where GTS links and the Internet have low bandwidths.
- Technology is based on Advanced Dissemination Methods (ADM), including Digital Video Broadcast by telecommunication satellites (DVB-S) and Direct Broadcast from the meteorological satellites.

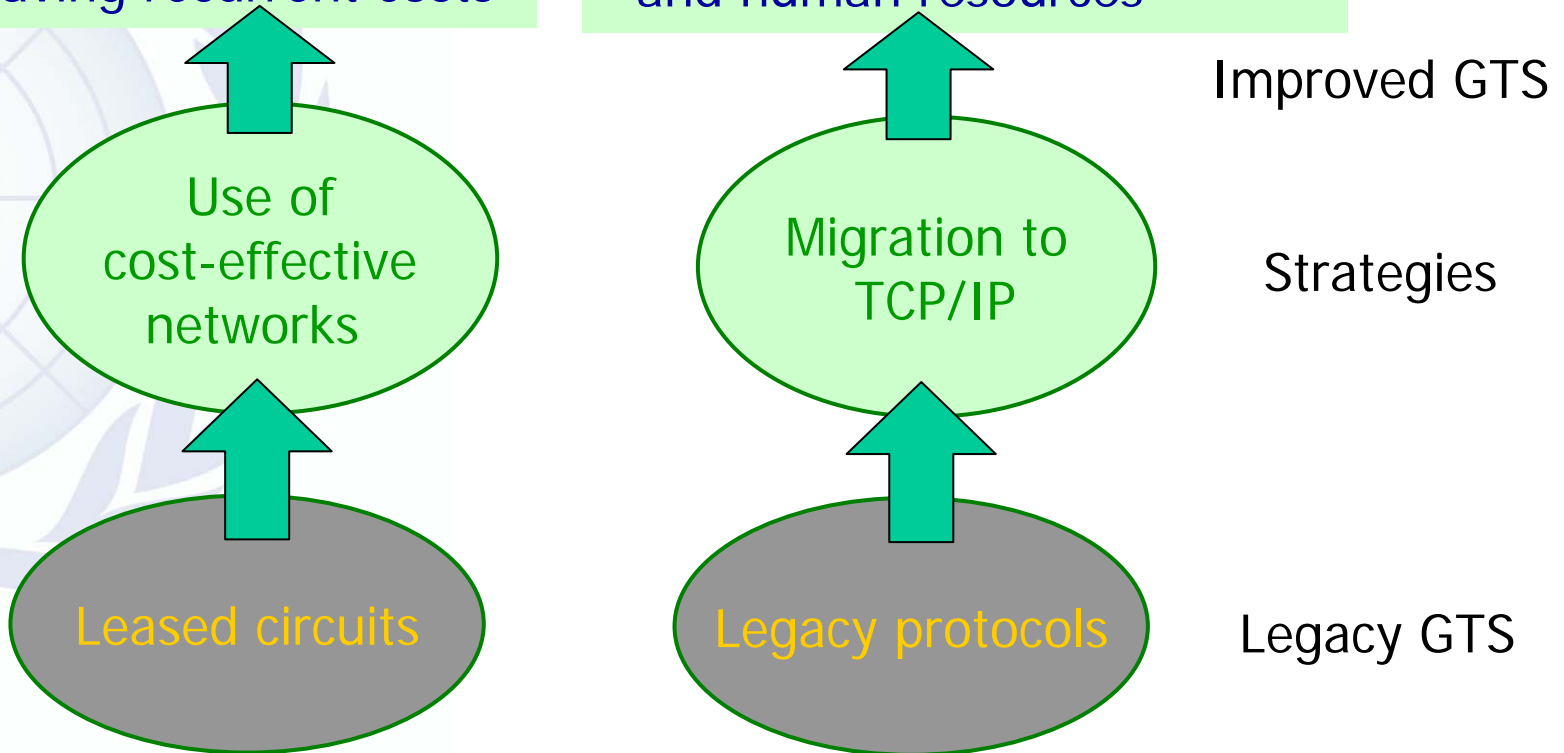
IGDDS within the WIS



From the GTS towards the WIS core network

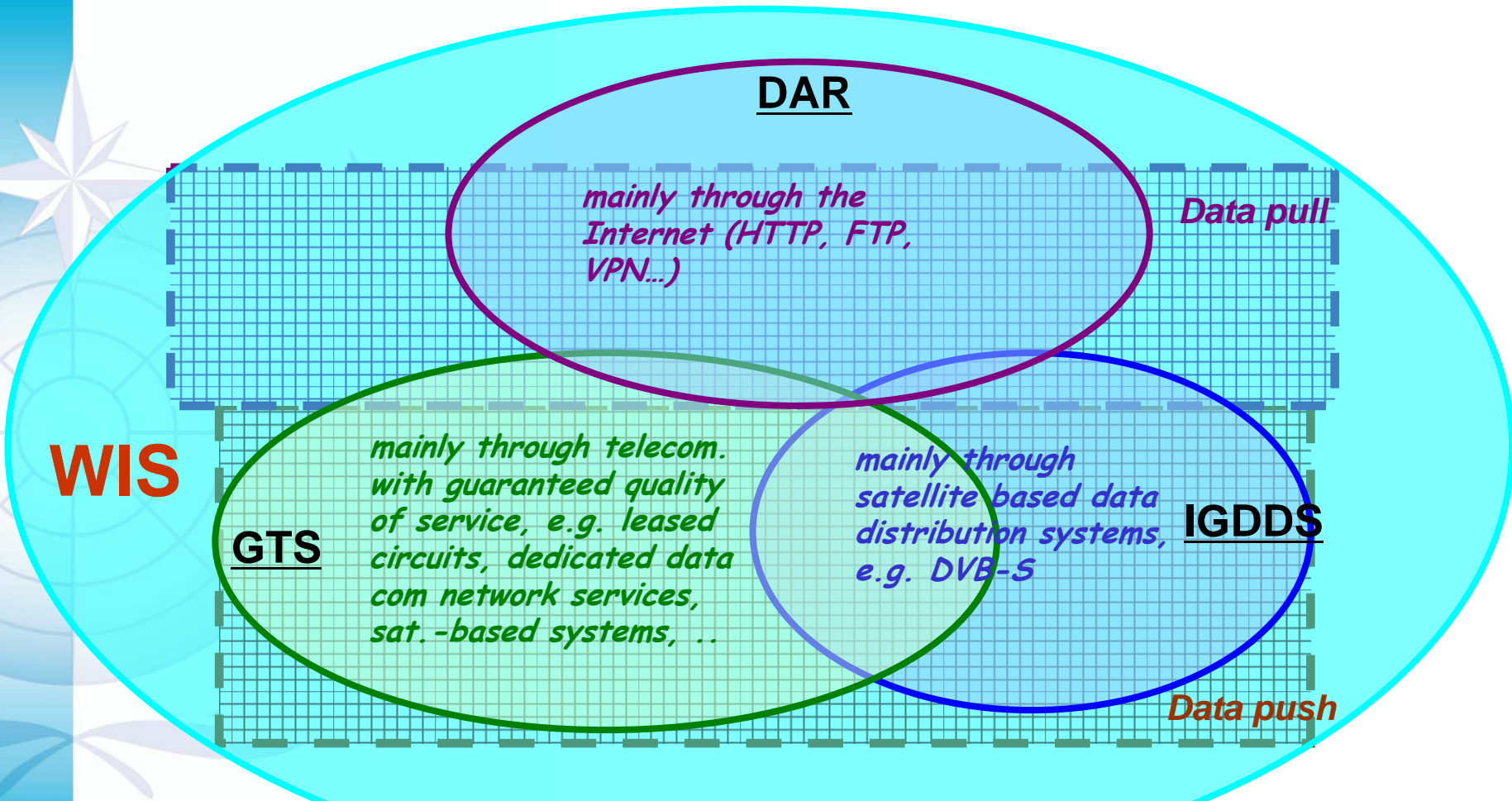
- Expanding bandwidth
- Flexible connectivity
- Saving recurrent costs

- Internet like applications
- Flexible services
- Saving implementation costs and human resources



Strengthen GTS capabilities
benefit from technology opportunities

WIS DATA-COMMUNICATION IMPLEMENTATION



WIS

DAR

mainly through the Internet (HTTP, FTP, VPN...)

Data pull

GTS

mainly through telecom. with guaranteed quality of service, e.g. leased circuits, dedicated data com network services, sat.-based systems, ...

mainly through satellite based data distribution systems, e.g. DVB-S

IGDDS

Data push

WIS/GTS: for time and operation-critical data & products

WIS/IGDDS: for satellite data & products

WIS/DAR: data discovery, access and retrieval

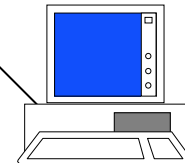
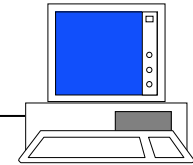
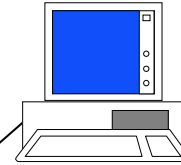
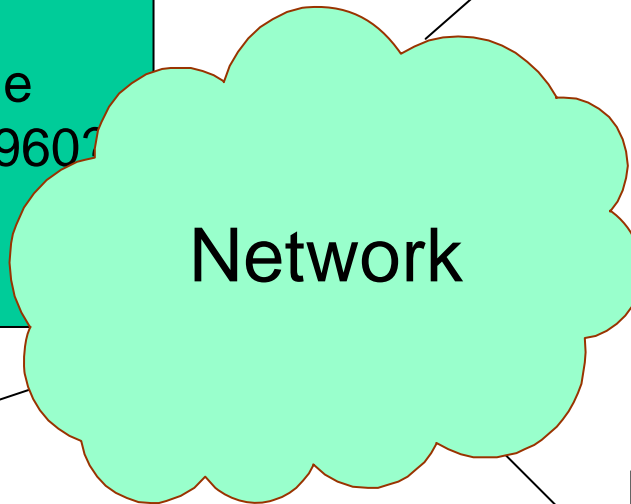
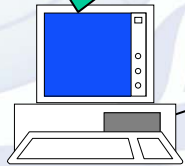
Data push: routine distribution of data & products

Data pull: access to and retrieval of data & products

Interoperability of Information Systems

Example of queries:

Where to find surface data on the
Antarctica for the period 1950-1960?
How to get them?
How to handle them?



At present, WMO Programmes cannot offer appropriate response to such queries in quasi real-time and on-line

WIS and GEOSS

- **GEOSS comprises a GEO Information System of Systems (GEO-ISS)**
- **GEO-ISS to serve the societal benefit areas and provide in each of these areas:**
 - **data collection, management, archives, routine distribution, discovery and on-request retrieval**
- **WIS is a core contributor to GEO-ISS under the responsibility of WMO**
- **It is expected that other networks provided by other communities will serve the needs of other themes, all being interoperable**

GEO-NetCast within GEO-ISS

- GEO-NetCast (a component of GEO-ISS) provides a high-capacity (satellite dissemination) service available for all GEO themes
- GEO-NetCast will have certain components in common with WIS, e.g.,
 - IGDDS/EUMETCAST
 - data management standards
- GEO-NetCast governance will take into account the overall GEO-ISS architecture and requirements of data providers, users and infrastructure providers

GEO-NetCast within GEO-ISS

- Interoperability standards: “the few things that shall be the same to allow all the other things to be different...”
- **User Interface:** users would benefit of single access to data from all providers through unique interface
 - one single dissemination system
 - one multi-system user interface
- **Data provider interface:** interoperability with multiple data providing centres in charge of:
 - Consolidation of collected data
 - Quality control and data management
 - Catalogue / metadata
 - Archiving and on-request retrieval