V-GISC/SIMDAT

Alfred Hofstadler,

Matteo Dell'Acqua, Guillaume Aubert

ECMWF
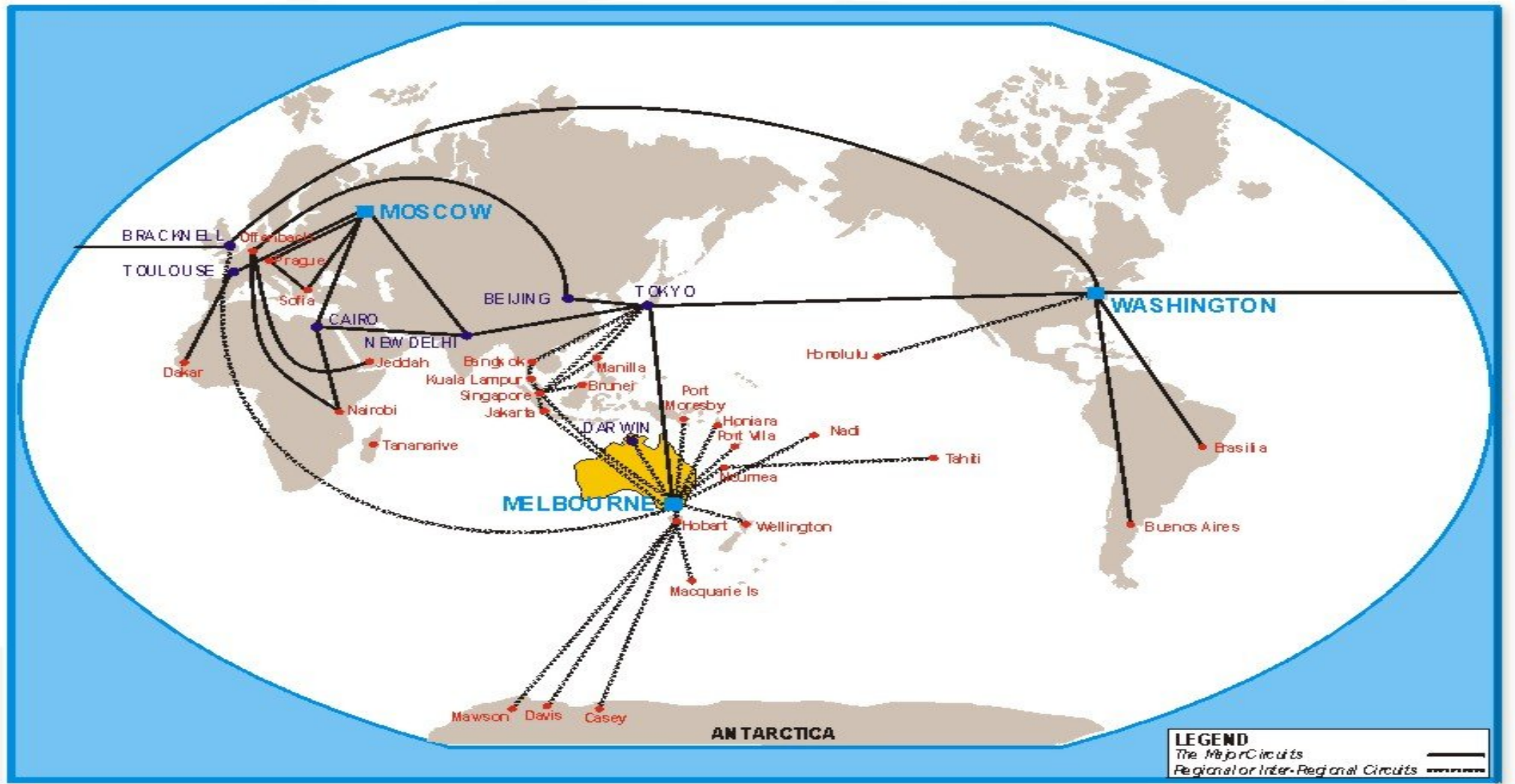
Background
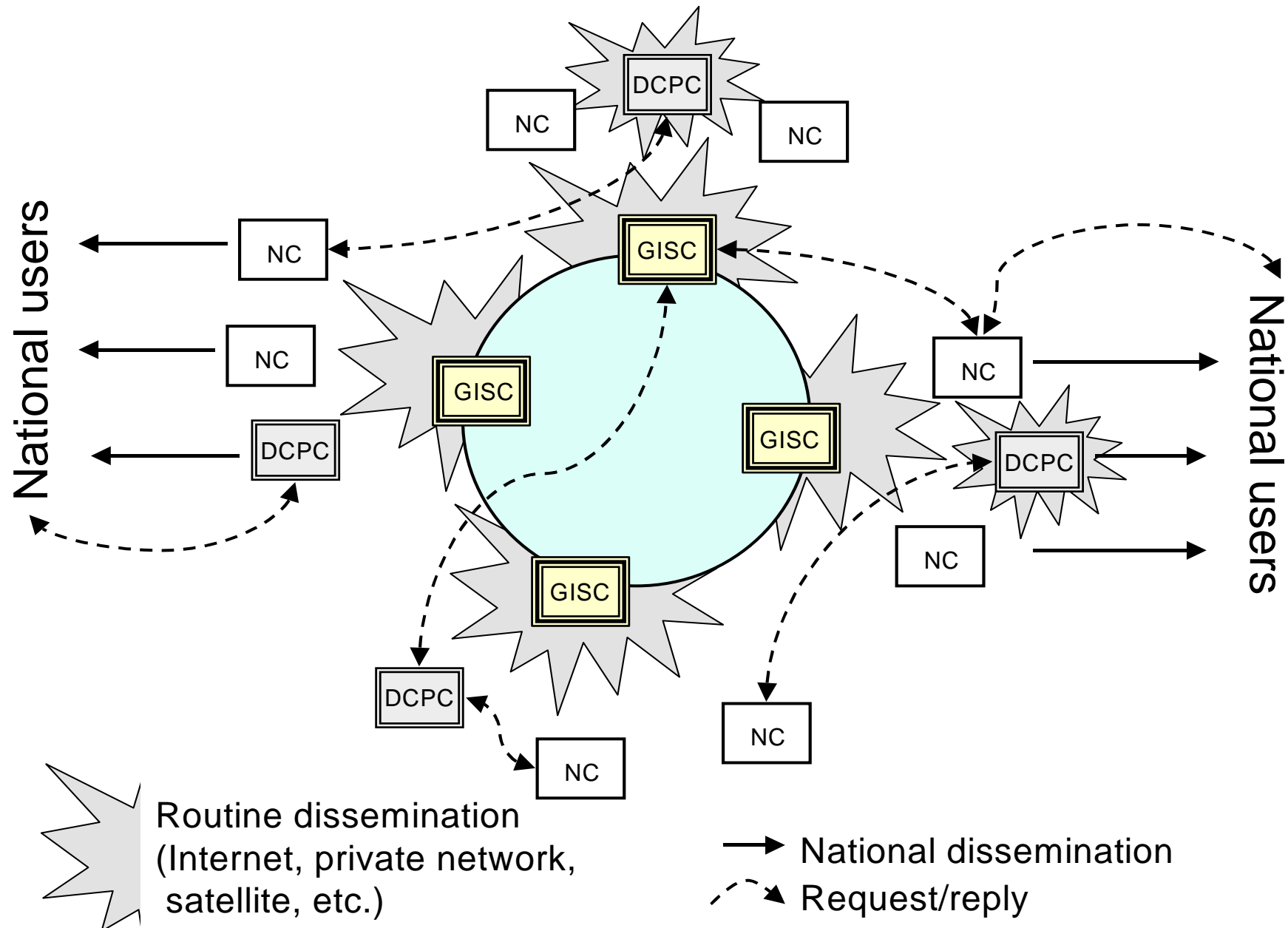
- **May 2002: Thirteenth session WMO Regional Association VI "…agreed that the concept of a Virtual GISC had merit…"**

- **June 2002: V-GISC in RA-VI Kick-off Meeting**

  ➔ **Partners: DWD, Meteo France, UK Met-Office, EUMETSAT, ECMWF**

- **2003: SIMDAT project proposal submitted to EU**

- **1 September 2004: contract with EU signed for 4 year project**

- **October 2004: V-GISC steering group agrees to move V-GISC development into the SIMDAT project**

- **November 2004: SIMDAT Kick-off meeting**

- **November 2005: First V-GISC demonstrator**

WMO GTS - Major links

The Global Telecommunications System : Major Links

WMO GTS - Region VI

Regional Meteorological Telecommunication Network for Region VI (Europe)

Figure 1 - *point-to-point circuits implementation (transmission speed in kilobit/s)*

XII.2004

WMO WIS

Routine dissemination
(Internet, private network,
satellite, etc.)

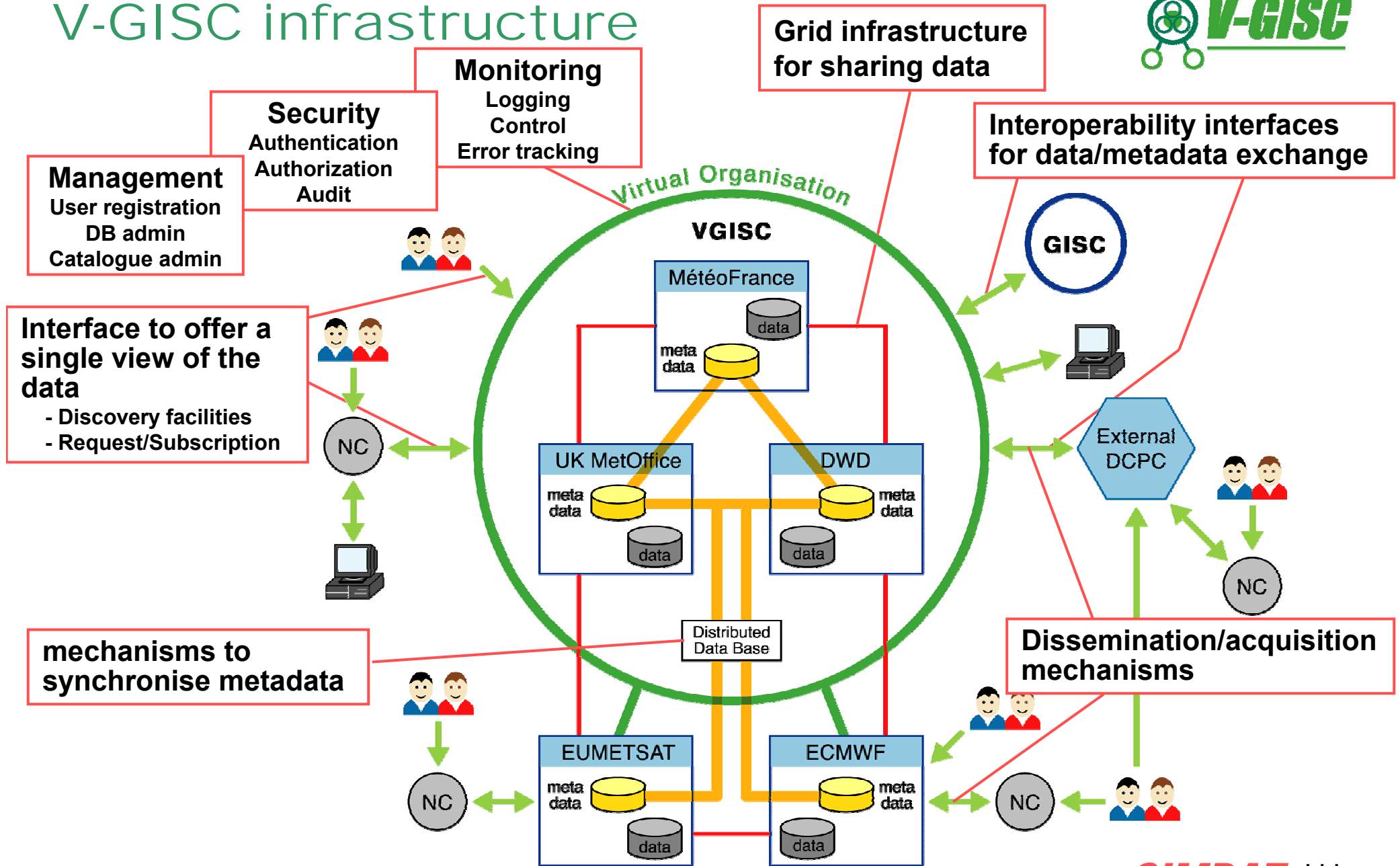National dissemination

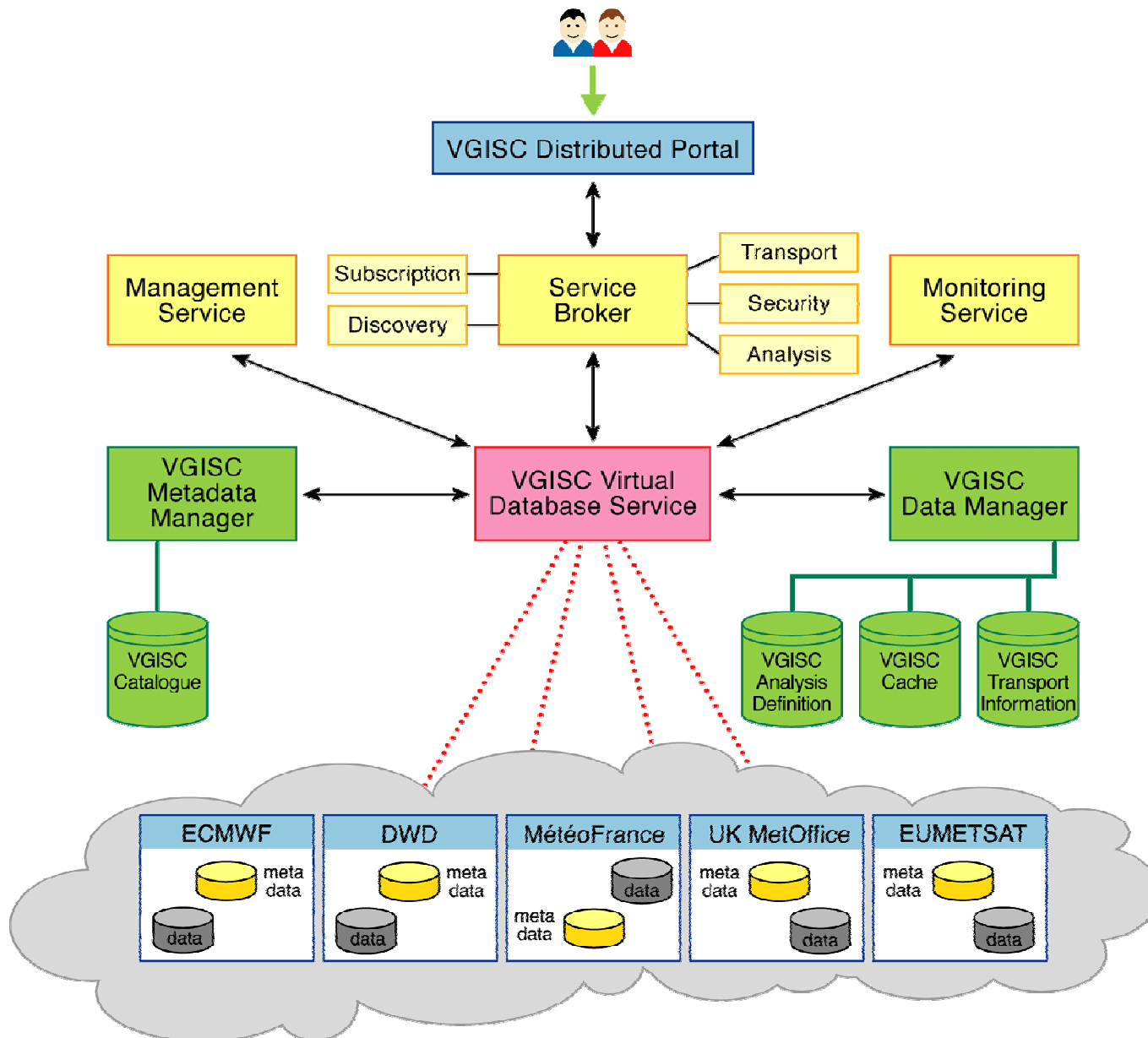Request/reply

V-GISC Project Aims

- **Instead of three GISCs in Region VI have one V-GISC**

- **The V-GISC will be seen as a normal GISC and will fulfil the WMO Information System technical requirements**

- **A complex problem: To build a Virtual GISC, an integrated and scalable framework for the collection and sharing of distributed data that will offer:**

  → **A single view of meteorological information which is distributed amongst the 5 partners**

  → **Improve visibility and access to meteorological data through a comprehensive discovery service based on metadata development**

  → **Offer a variety of reliable delivery services (routine dissemination and collection of data)**

  → **Provide a global access control policy managed by the partners and integrated into their existing security infrastructure**

  → **Quality of services, reliability and security**

  → **Processing services and shared data manipulation facilities**

- **The software developed within the project will be made available to WMO**

SIMDAT

V-GISC infrastructure

Management
User registration
DB admin
Catalogue admin

Security
Authentication
Authorization
Audit

Monitoring
Logging
Control
Error tracking

Grid infrastructure for sharing data

V-GISC

Interoperability interfaces for data/metadata exchange

Interface to offer a single view of the data
- Discovery facilities
- Request/Subscription

mechanisms to synchronise metadata

Dissemination/acquisition mechanisms

Virtual Organisation

VGISC

MétéoFrance
data
meta data

GISC

UK MetOffice
meta data
data

DWD
meta data
data

External DCPC

NC

Distributed Data Base

EUMETSAT
meta data
data

ECMWF
meta data
data

NC

NC

NC

SIMDAT

V-GISC Conceptual view

- **Through the Distributed Portal users search for and retrieve data, subscribe to services subject to authentication and authorization**

- **The Virtual Database Service provides a single view of partner databases**

V-GISC Conceptual view

- **Virtual Database**
  - → **Provide a unified view of all the shared datasets through a distributed catalogue**
  - → **Maintain the distributed catalogue amongst the partners using synchronization mechanisms**
  - → **Provide interfaces to legacy databases**
  - → **Implement data replication mechanisms**
 - → **Preserve the integrity of the data**

- **Access Facilities**
  - → **Collection & Dissemination services that support secure, efficient and reliable transport mechanisms**
  - → **Quality of Service (QoS): Traffic Prioritization, Queuing mechanisms, Scheduling**
  - → **Discovery service by browsing the catalogue or using a keyword search engine**
  - → **Interactive and batch interfaces**

- **VO**
  - → **Security Services**
  - → **Users management**
  - → **Data policy management**
  - → **Monitoring and control**

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V-GISC Distributed Architecture
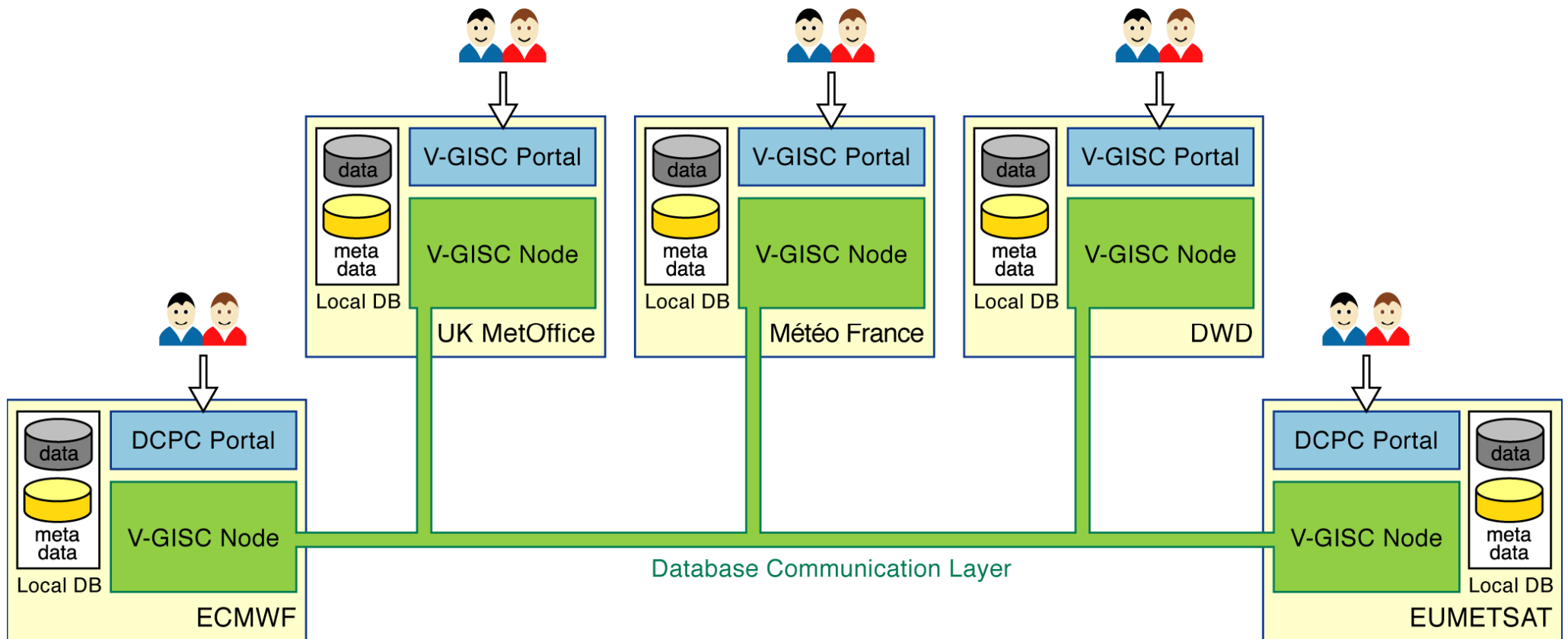
V-GISC Distributed Architecture

- **Distributed components**

  → **V-GISC node is installed on each partner site**

  → **All nodes are interconnected through a dedicated secure communication channel: Database Communication Layer (DCL)**

 → **All the nodes exchange messages through the DCL**

- **Decentralized architecture**

  → **No central point where all the nodes are declared**

  → **No single point of failure**

- **Self-organized network**

  → **The network dynamically accepts new nodes and is aware of node disconnections**

  → **The network organizes its topology and indicates to the entering new nodes their position within the network**

  → **No manual intervention on the nodes to accept new peers**

SIMDAT

V-GISC Node - Functional Design
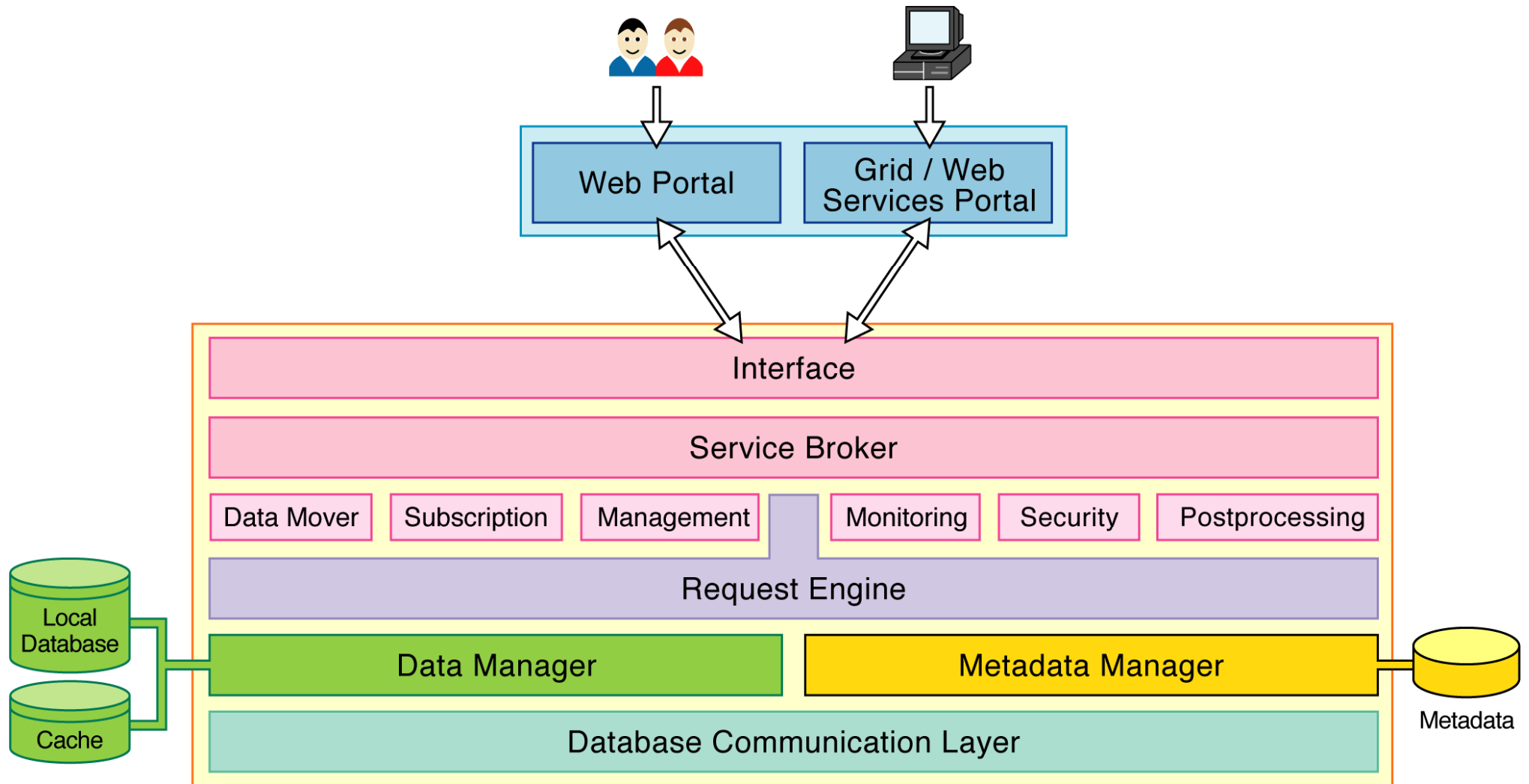
V-GISC Node

- **Each node maintains a copy of the global catalogue describing data available through the V-GISC**

    - **➔ The catalogue synchronization is done using the DCL**

- **Each node maintains a cache used to replicate data and to efficiently serve the users**

- **A node is interfaced with the local legacy databases**

- **A node has a Web Portal for interactive access**

- **A node has a Grid/Web Service Portal for batch access and integration of the V-GISC in a bigger Grid**

- **A node implements all services offered by the V-GISC**

SIMDAT

SIMDAT Outlook

- **Finalise the Connectivity phase**

- **Coordination with other GISC and DCPC developer**

- **Prototype presentation at CBS-Ext., Seoul, November 2006**

- **Introduce acquisition of real-time data → link with GTS**

- **Develop subscription service → Push mode**

- **Develop Virtual Organisation**

  → **Monitoring and management of the system**

  → **User management and data access control**

- **Develop discovery mechanism**

- **SIMDAT project will run until August 2008**

- **Basic WIS infrastructure should exist by 2008**