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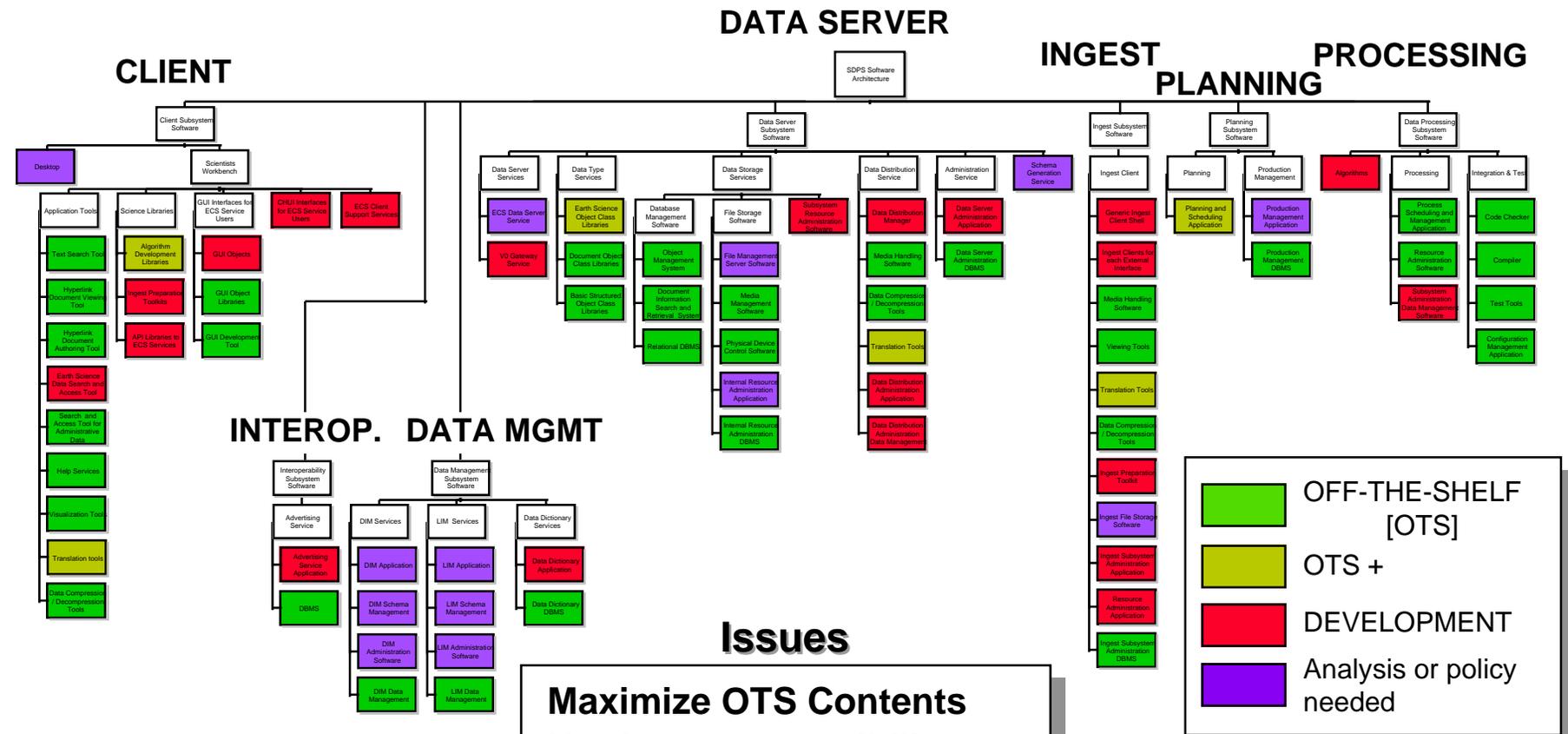
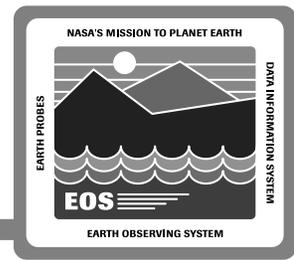
# **SDPS Software Implementation**

## **Richard Meyer**

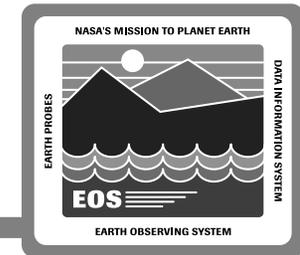
**System Design Review - 28 June 1994**

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# Software Implementation Overview



# SDPS Generic Software Components



## Client Subsystem

### Desktop

### Scientists Workbench

#### Application Tools

Text Search Tool

Hyperlink Document Viewing Tool

Hyperlink Document Authoring Tool

Earth Science Data Search and Access Tool

Search and Access Tool for Administrative Data

Help Services

Visualization Tools

Translation Tools

Data Compression/Decompression Tools

#### Science Libraries

Algorithm Development Libraries

Ingest Preparation Toolkits

API Libraries to ECS Services

#### GUI Interfaces for ECS Service Users

GUI Objects

GUI Object Libraries

GUI Development Tool

#### CHUI Interfaces for ECS Service Users

ECS Client Support Services

## Interoperability Subsystem

### Advertising Service

Advertising Service Application

DBMS

## Data Management Subsystem

### DIM Services

DIM Application

DIM Schema Management,

DIM Administration

DIM Data Management

### LIM Services

LIM Application

LIM Schema Management,

LIM Administration,

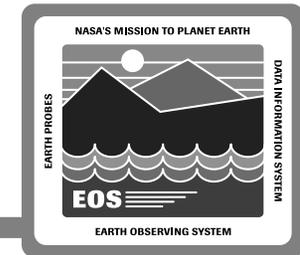
LIM Data Management,

### Data Dictionary Services

Data Dictionary Application

DBMS

# SDPS Generic Software Components (cont'd)



## Data Server Subsystem

### Data Server Services

- ECS Data Server Service
- V0 Gateway Service

### Data Type Services

- Earth Science Object Class Libraries
- Document Object Class Libraries
- Basic Structured Object Class Libraries

### Data Storage Services

- Database Management Software
  - Object Management System
  - Document Information Search and Retrieval System
  - Relational DBMS
- File Storage Software
  - File Management Server Software
  - Media Management Software
  - Physical Device Control Software
  - Internal Resource Administration Application Software
  - Internal Resource Administration DBMS
- Subsystem Resource Administration Software

### Data Distribution Service

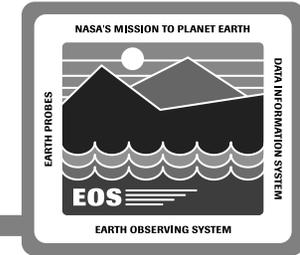
- Data Distribution Manager
- Media Handling Software
- Data Compression/Decompression Tools
- Translation Tools
- Data Distribution Administration Application
- Data Distribution Administration Data Management

### Administration Service

- Data Server Administration Application
- Data Server Administration DBMS

### Schema Generation Service

# SDPS Generic Software Components (cont'd)



## Ingest Subsystem

### Ingest Client

- Generic Ingest Client Shell
- Ingest Clients for each External Interface
- Media Handling Software
- Viewing Tools
- Translation Tools
- Data Compression/Decompression Tools
- Ingest Preparation Toolkit
- Ingest File Storage Software
- Ingest Subsystem Administration Application
- Resource Administration Application
- Subsystem Administration DBMS

## Planning Subsystem Software Implementation

### Planning

- Planning and Scheduling Application:

### Production Management

- Production Management Application
- Production Management DBMS

## Data Processing Subsystem Software Implementation

### Science Algorithms

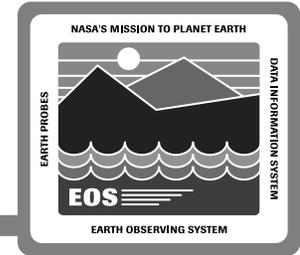
### Processing

- Process Scheduling and Management Application
- Resource Administration Application Software
- Subsystem Administration Data Management Software

### Integration & Test Environment

- Code Checkers
- Compiler/Debugger/Performance Analysis
- Test Tools
- Configuration Management Application

# Software Implementation



## Maximizing Off-the-shelf (OTS)

- best fit, glue software, modified OTS
- availability for target platforms

## Evolvability

- short term cost and risk versus long-term strategy

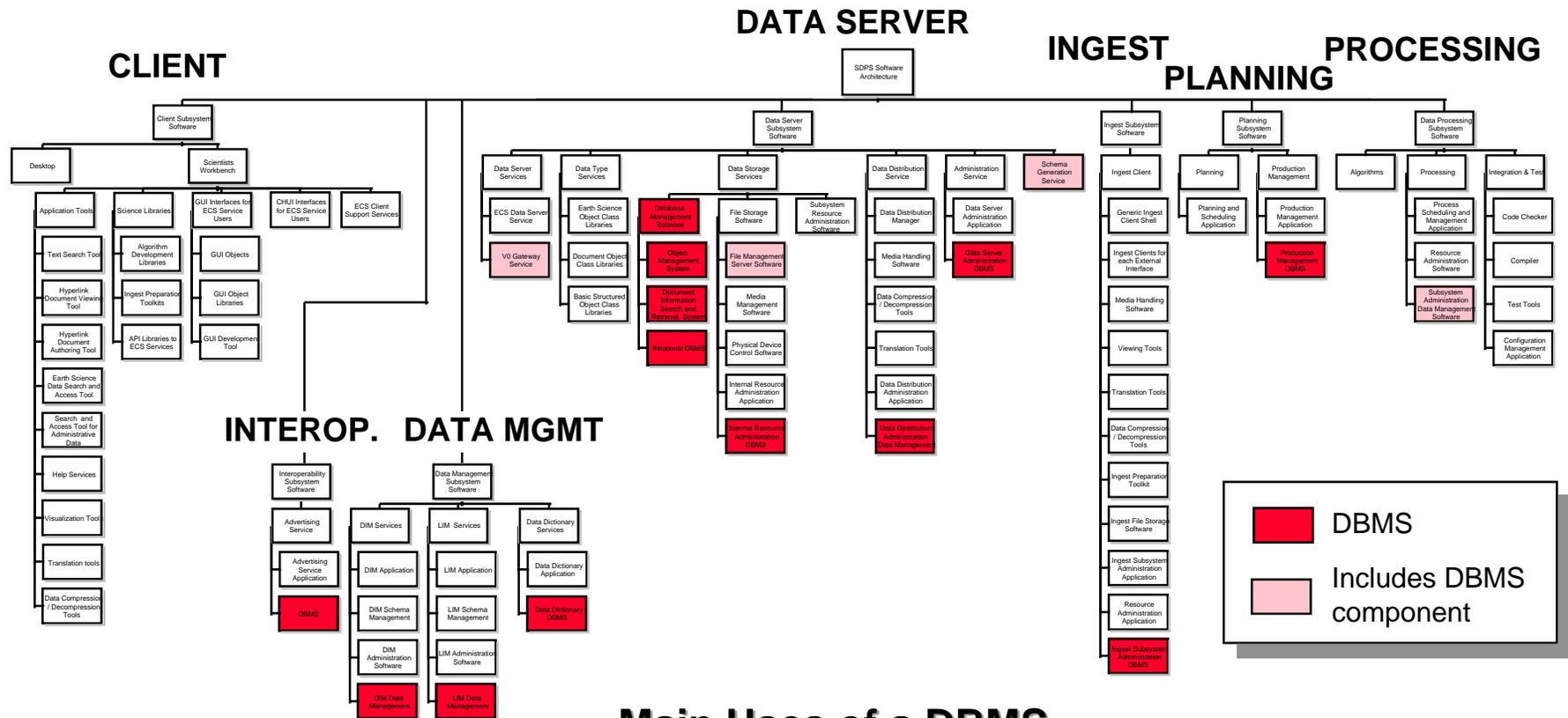
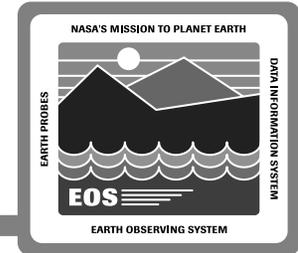
## Software reuse

- Database Management, File Storage Management, Resource Management
- Use of Libraries (algorithm libraries, ingest preparation toolkit)
- Support for SDPS common facilities

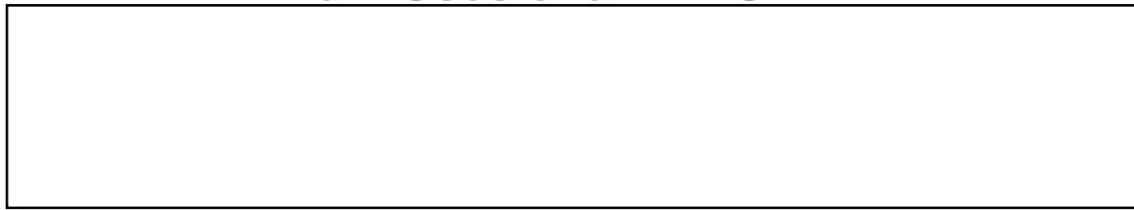
## Significant user community contribution

- user methods (data type services)
- science algorithms
- public domain libraries and tools (e.g., Freeform, etc....)

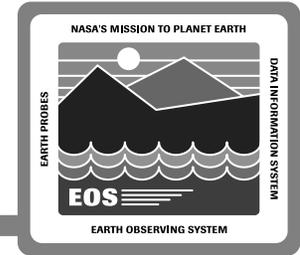
# Database Management



## Main Uses of a DBMS



# Database Management



## Earth Science Data

- Object Oriented (OO) or Object Relational (OR) DBMS

## Documents

- Z39.50/WAIS compatible server desired (external accessibility)

## Administrative Data

- OO/OR DBMS preferred, but use of RDBMS may be permitted

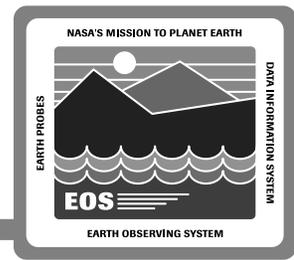
## Short-term cost & risk vs. Long-term direction

- RDBMS not suited for space/time data, SQL not suited for space/time queries
- COTS Maturity vs. Functional Fit

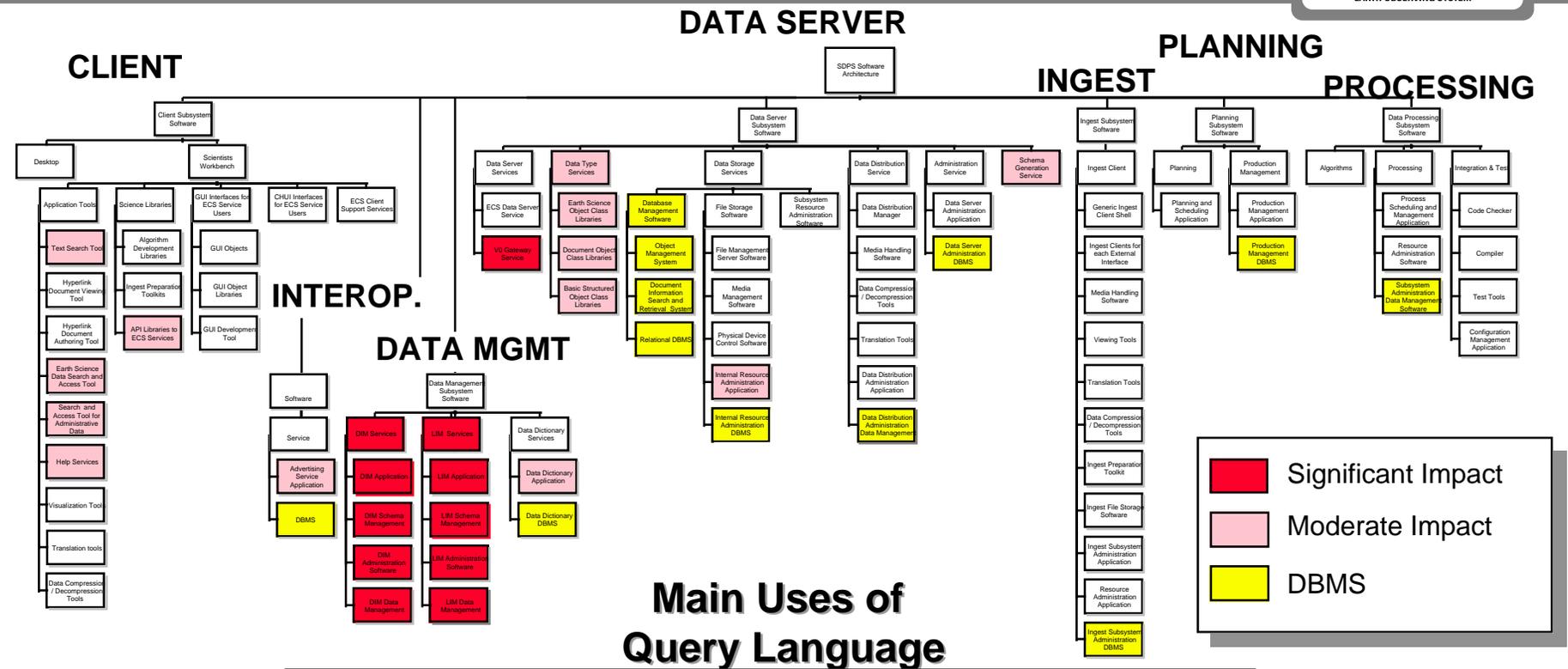
## Approach: anticipate technology replacement

- Interface encapsulation
- Query language and data model coupling

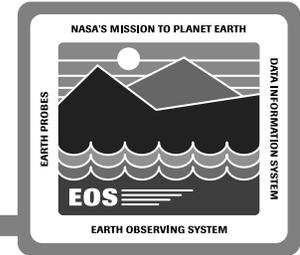
**DBMS Evaluation will be completed by December 1994**



# Query Language



help? ....



# Query Language

## Earth Science Data

- Long term: SQL3?
- Short term: SQL\* (SQL3 subset) or OQL subset

## Documents

- Z39.50 query language

## Administrative Data

- Depending on DBMS selection

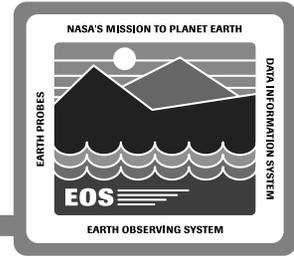
## Short-term cost & risk vs. long-term direction

- SQL not suitable for earth science queries
- Timing, scope, COTS support for standards uncertain

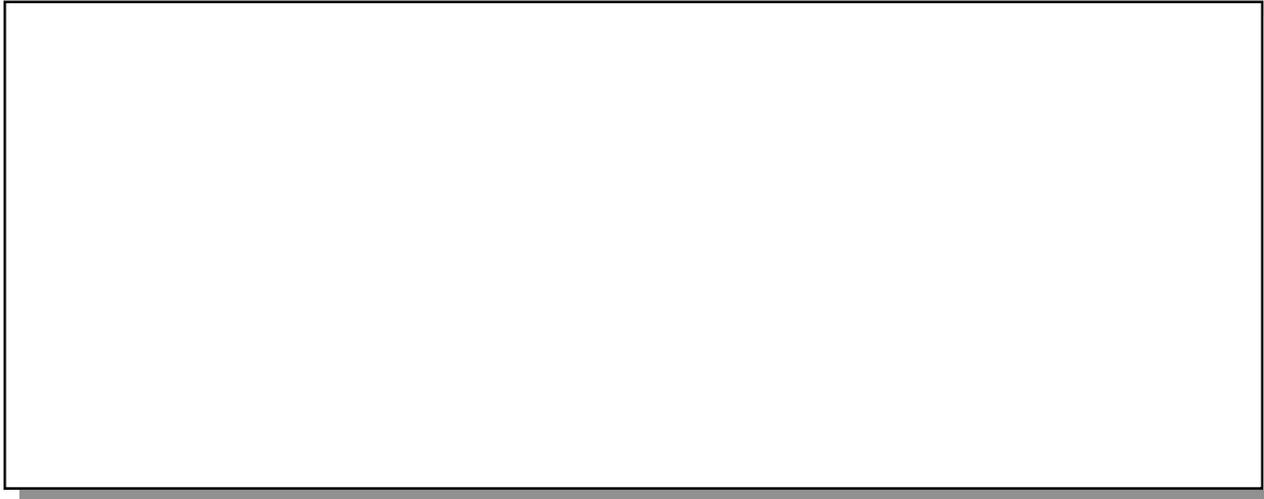
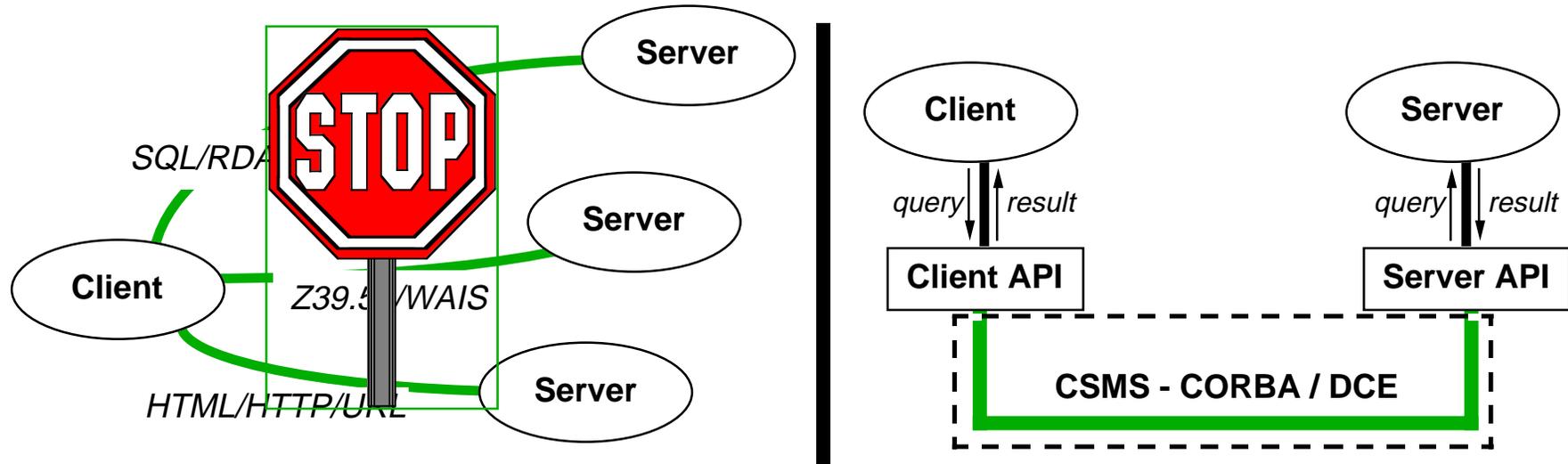
## Approach - minimize QL investment and dependence

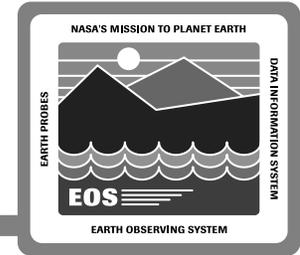
- Limit dependence on QL - Use Object API
- Support use of multiple QL in architecture

## Evaluation related to DBMS selection - will be completed by 12/94



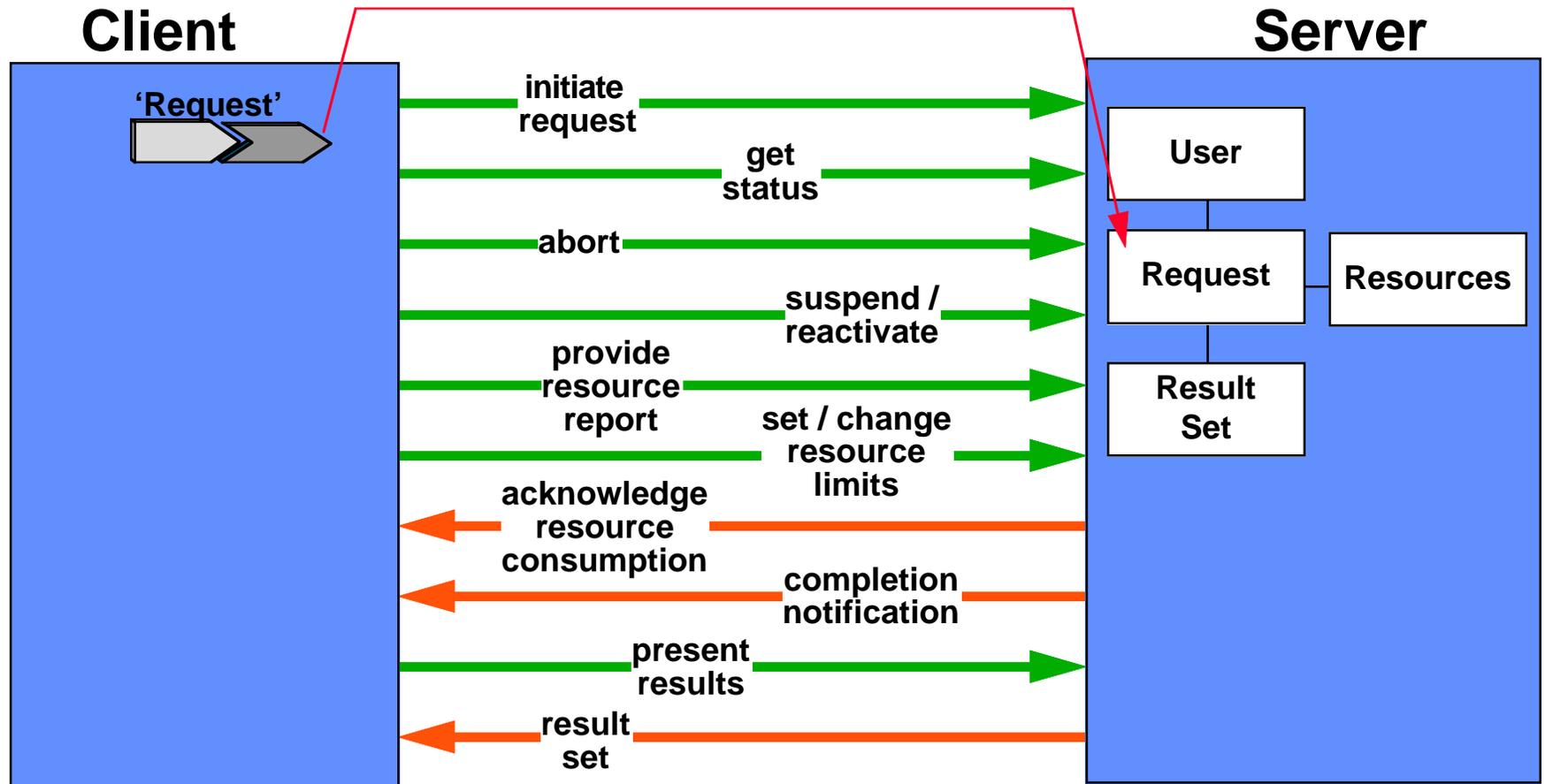
# Protocols

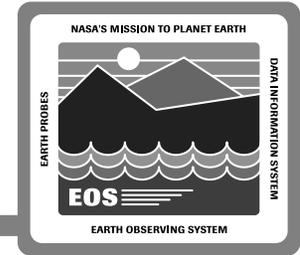




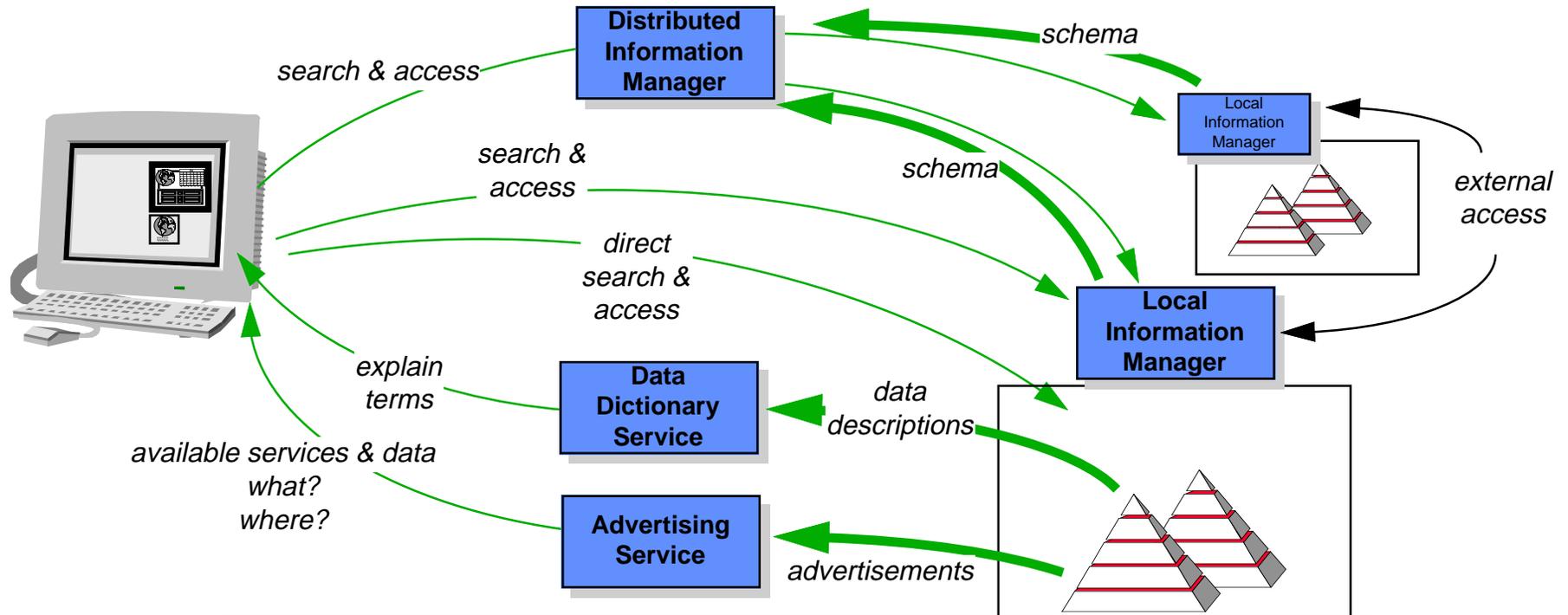
# Protocols

## Managing Long Running Requests





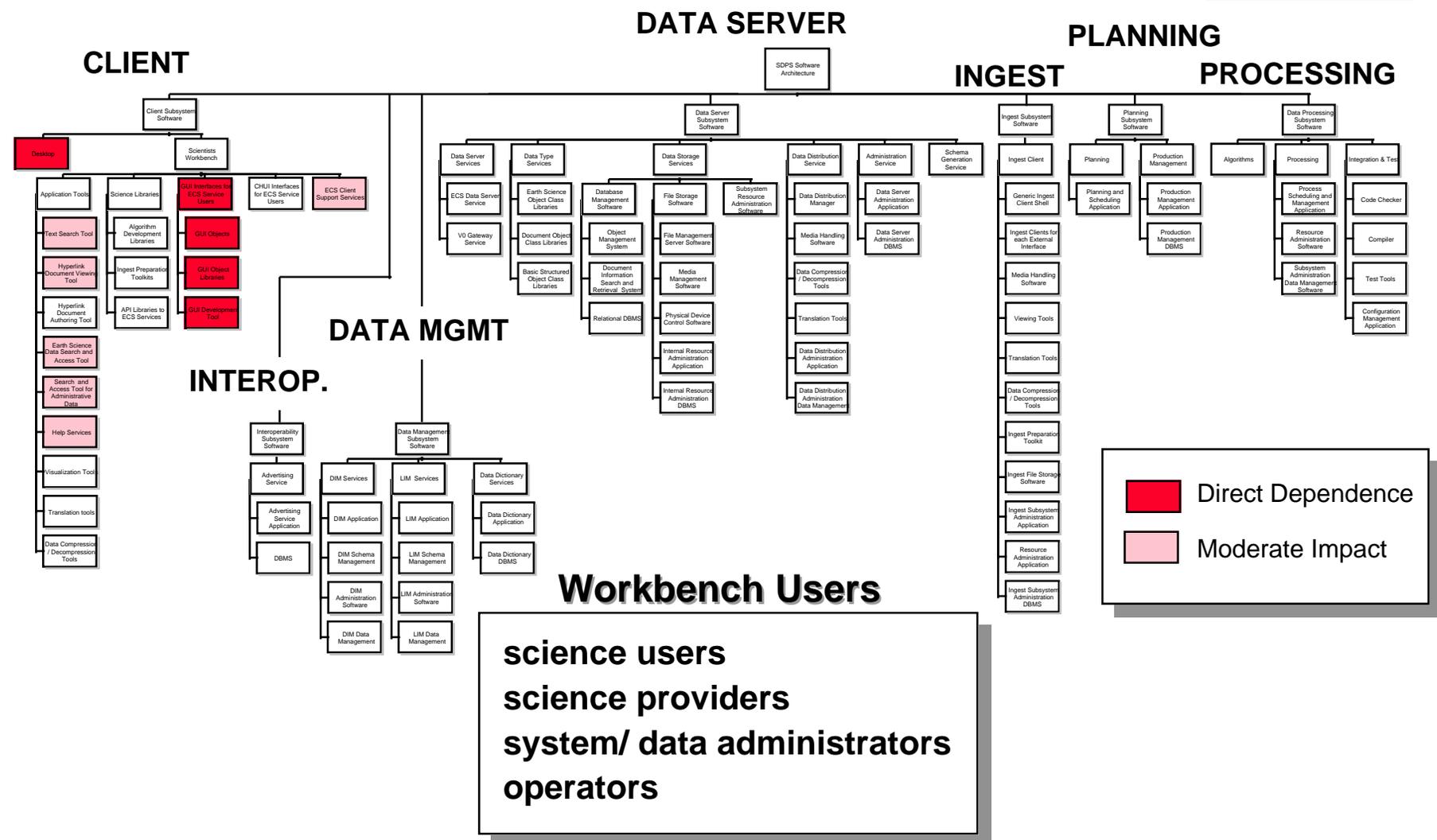
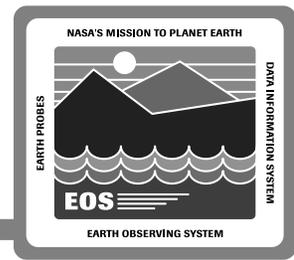
# Protocols



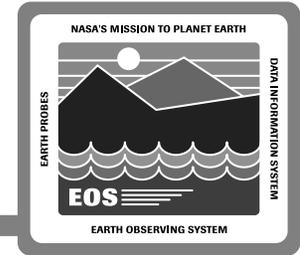
## Major uses of protocols

- searching, retrieval, hyperlink access
- inserts, deletes, updates - advertisements, data dictionary
- SDPS client-to-SDPS service vs. SDPS-to-OTS component
- External Access

# Desktop/Science Workbench



# Desktop/Science Workbench



**Evaluation will focus on the following options (Target 12/94):**

- **Build on Common Desktop (CDE) from COSE**
- **Build on hardware platform vendor desktop**
- **Custom build an 'ECS Desktop' using OpenDoc**

**Desktop will work and interact with user environment**

- **No special 'ECS Environment'**

**Windows NT support is not in current baseline**

- **Portability of workbench software and development tools will be a design criterion**
- **Unix - NT portability options will be monitored**

**Desktop and Science Workbench will focus on providing framework, libraries, and providing access to ECS**

- **Tools and Applications should be 3rd-party and science user provided**