

**Status & Perspectives**

**Meteorology e-Science Effort in Korea**

**WMO Information System : WIS  
and a Pilot Project from CAgM**

**Dec. 13, 2006**

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**Korea Meteorological Administration**

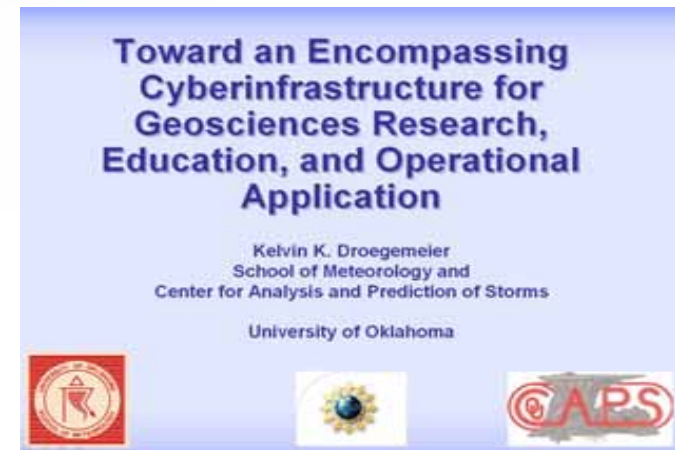
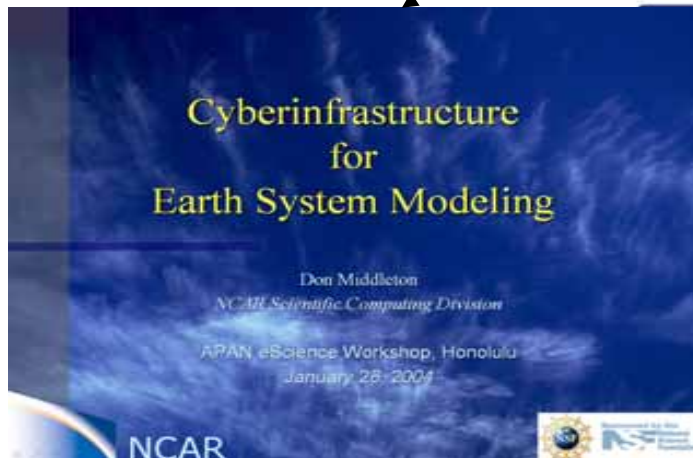
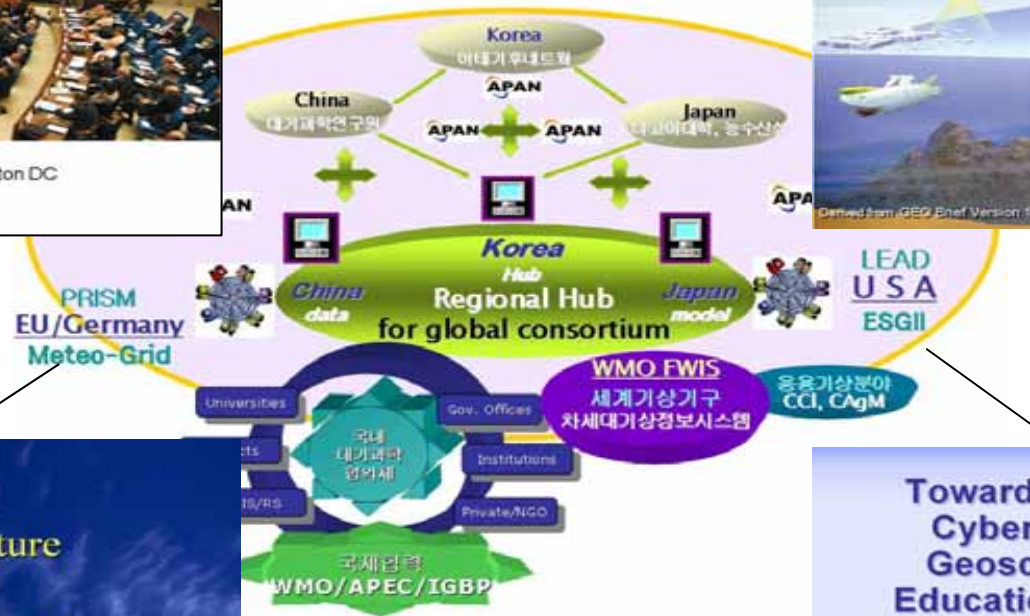


## Key Contents

- **Implementation Strategies**
  - Metadata/Ontology
  - Web service/Grid service
- **Current Implementations for WIS**
  - CAgM/WIS
  - WIS/KMA



# GEO Initiatives & Cyber Infrastructure



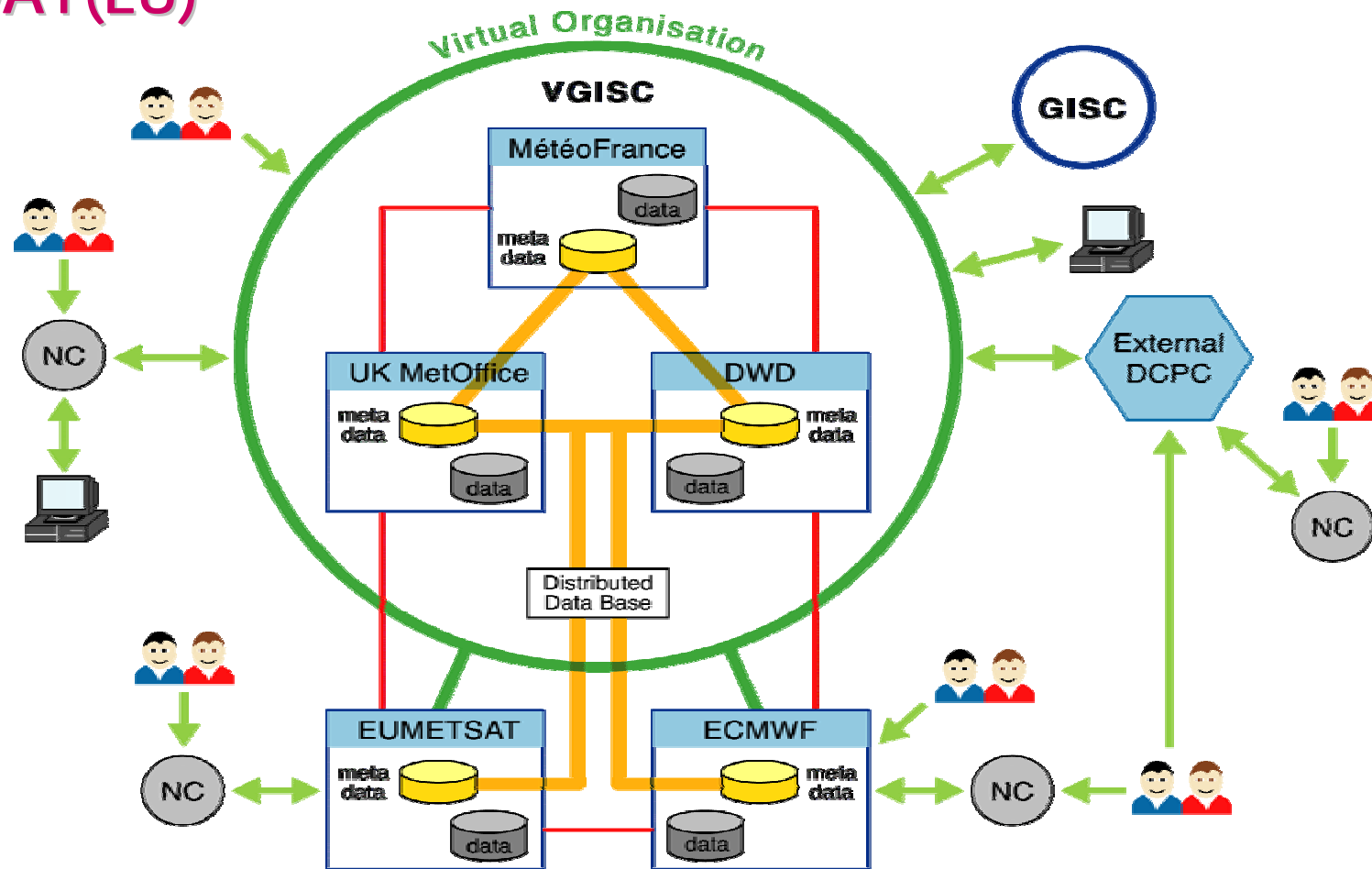
# WIS implementations (CAgM/WIS)



# WIS/GISC infrastructure

(WMO Information System)

**SIMDAT(EU)**



# CAGM MetaData Management

Metadata-annex-CAGM.doc - Microsoft Word

ICT-ISS 2004 annex modified for uCAgM

Format version	version (206) TransferOptions (273)	Multiple formats to be included. It could also include reference to documentation or compression methods. Version of the format (date, number, etc.) NOTE: At least either on-line source or off-line media is required
On-line source	OnLine (277) Linkage (397)	Information about online sources from which the dataset can be obtained Location (address) for on-line access using a Uniform Resource Locator
Off-line media	WMO_Source (new) Offline (278) mediumName (292)	WMO centre identifier Information about offline media on which the dataset can be obtained Name of the medium on which the dataset can be received [code list: ISO 8.5.20]
FeatureCatalogue	MD_ContentInformation (232) MD_FeatureCatalogueDescription (233) complianceCode (234) language (235) includeWithDataset (234) featureTypes (237) featureCoverage (new) featureCatalogueCitation (236)	Describes the content of the dataset in more detail than the keywords. The ISO standard provides both "feature catalogues" and "Coverage" to describe the attributes of the data held in the dataset. This WMO Core Metadata chooses to use "features" to describe all aspects of these attributes, including those relating to grids of data. Value 1 if feature catalogue is compliant with ISO 19110. Default is 0 (not compliant) Language(s) used in the Catalogue Required if feature Catalogue is used. Value 1 in feature catalogue is included in dataset, 0 if not. Subset of feature types from the cited feature catalogue occurring in the dataset. Note: the physical variables described by the data are attributes of a feature (which could be an observed profile or a field of data, for example). Information about grids and other qualifiers for features (such as which pressure level a temperature field refers to) Required if featureCatalogue is used. Bibliographic reference to the feature catalogue(s) used.
Processing Level	LL_Liqaage (82) statement(83) processStep(84)	Information about the level of processing applied to the dataset. This field should be used to indicate whether the data are observations, analysis (re-analysis), forecast (based on initial states including observations), simulations or other sources of data. Could also be used to include the platform/instrument in the source of data (eg Ship, aircraft, satellite, satellite id). May need to use pairs of [source, processing step] to provide additional information. May contain references (eg URL) to external information on the processing and source. Information about the events or source data used in constructing the dataset Information about an event in the creation process for the dataset
Reference System	source(85) Equipments(new) reference(new)	Information about the source data used in creating the dataset To provide information about where the data came from and what has been done to it (for CAGM)
Reference System	MD_ReferenceSystem (136) referenceSystemIdentifier (187) authority (206) SL_ResponsableParty (374) (see above)	Information about the reference systems used (temporal, coordinate and geographic) Name of reference system Person or party responsible for maintenance of the reference system namespace

6 페이지 1 구역 6/15 위치 6.7cm 13 줄 1 열 기법 추적 확장 검색 영어(미국)

Metadata-annex-CAGM.doc - Microsoft Word

ICT-ISS 2004 annex modified for uCAgM

### Extended Keywords for Describing AgMet Datasets

Note: The list is not, and cannot be, exhaustive but is included to allow metadata providers to include them in their data descriptions and for users to use them for searching. However, to avoid the situation where data cannot be described, data creators are able to define new keywords, and a mechanism will be put in place to assess proposals for new keywords for inclusion in the list (and hence for having multi-lingual equivalents defined).

Absolute	Anticyclone	BUFR	Compound
Absorbing	Anticyclonic	Bulb	Condensation
Absorption	Anthropogenic	Buoy	Condition
Acceleration	Applied	Burst	Conductivity
Accumulated	Arbitrary	Calibration	Conservative
Accumulation	Area	Canopy	Content
Acid	Aridity	Carbon	Constant
Acoustic	Available	Carbon dioxide	Contour
Active	Aviation	Carbon monoxide	Convection
Active	Ash	Carbonyl sulfide	Convective
Adiabatic	Assimilation	Catchment	Convergence
Adjoint	Asymmetry	Cave	Cooling
Advection	Atmosphere	Ceiling	Core
Advisory	Atmospheric	CFR	Cyclis
Aerological	Automatic	Change	Corrected
Aerology	Avalanche	Chemical	Correlation
Aeronomy	Average	Chemistry	Coupled
Aerosol	Aviation	Chill	Covariance
Age	Bacscatter	Chilly	Cover
Ageostrophic	Balance	Circulation	Coverage
Aggregated	Baroclinic	Cirrocumulus	CREX
Agriculture	Barometer	Cirrostratus	Critical
Agrobiosphere	Barometric	Cirrus	Crop
Agrometeorological	Base	Climate	Cross
Agrometeorology	Basic	Climatology	Cryosphere
Air	Basin	Climatological	Cryospheric
Albedo	BGC (biogeochemical)	Cloud	Crystal
Alkaline	Biennial	CO2	Cumulonimbus
Alpine	Biogeochemistry	Coast	Cumulus
Altimeter	Biogeochemical	Coastal	Current
Altitude	Biology	Coefficient	Cycle
Altostratus	Bio mass	Cold	Cyclone
Amount	Bio meteorology	Coldness	Cyclonic
Analysis	Biosphere	Colour	Daily
Annual	Boundary	Column	Damage
Anomaly	Brightness	Component	Data
Anomalous	Budget	Composite	Day
		Composition	Decadal

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Prototypes of Extended WMO Metadata Core Profile

Keywords

11Dec. – 13 Dec. 2006, 3<sup>rd</sup> Grid@Aisa & GFK2006 International Joint Workshop *KMA*



Microsoft Excel - AgMet-DB-Hierarchy 0224.xls

	A	B	C	D	E	F
1		Factors	Components	Phenomena	Elements	measurements
2	EnergyXML					
3		Radiation				
4			Solar radiation			
5				Sunshine	sunshine duration	
6					possible duration	
7				energy	direct solar radiation	
8					scattered solar radiation	
9					reflected solar radiation	
10					absorbed solar radiation	
11					Net radiation	
12					Albedo	
13					global solar radiation	
14					PAR	
15			Longwave radiation			
16					upward	
17					nocturnal	
18			Flux			
19		Sensible Heat				
20			Air temperature		maximum	
21					minimum	
22					average	
23					climate normal	
24					lapse rate	
25					degree days	
26					wet bulb	
27				wind	Horizontal	speed
28						direction
29						maximum
30						instantaneous
31					Vertical	direction
32						speed
33					Profile	
34						
35				Pressure	gradient	
36					atmospheric	
37					pattern	
38				typhoon	name	
39					origin	
40					trajectory	
41					prediction	
42			Flux			
43		Latent Heat				
44			Water			
45				precipitation	intensity	

energy.owl - Microsoft Word

```

<?xml version="1.0"?>
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  </owl:Class>
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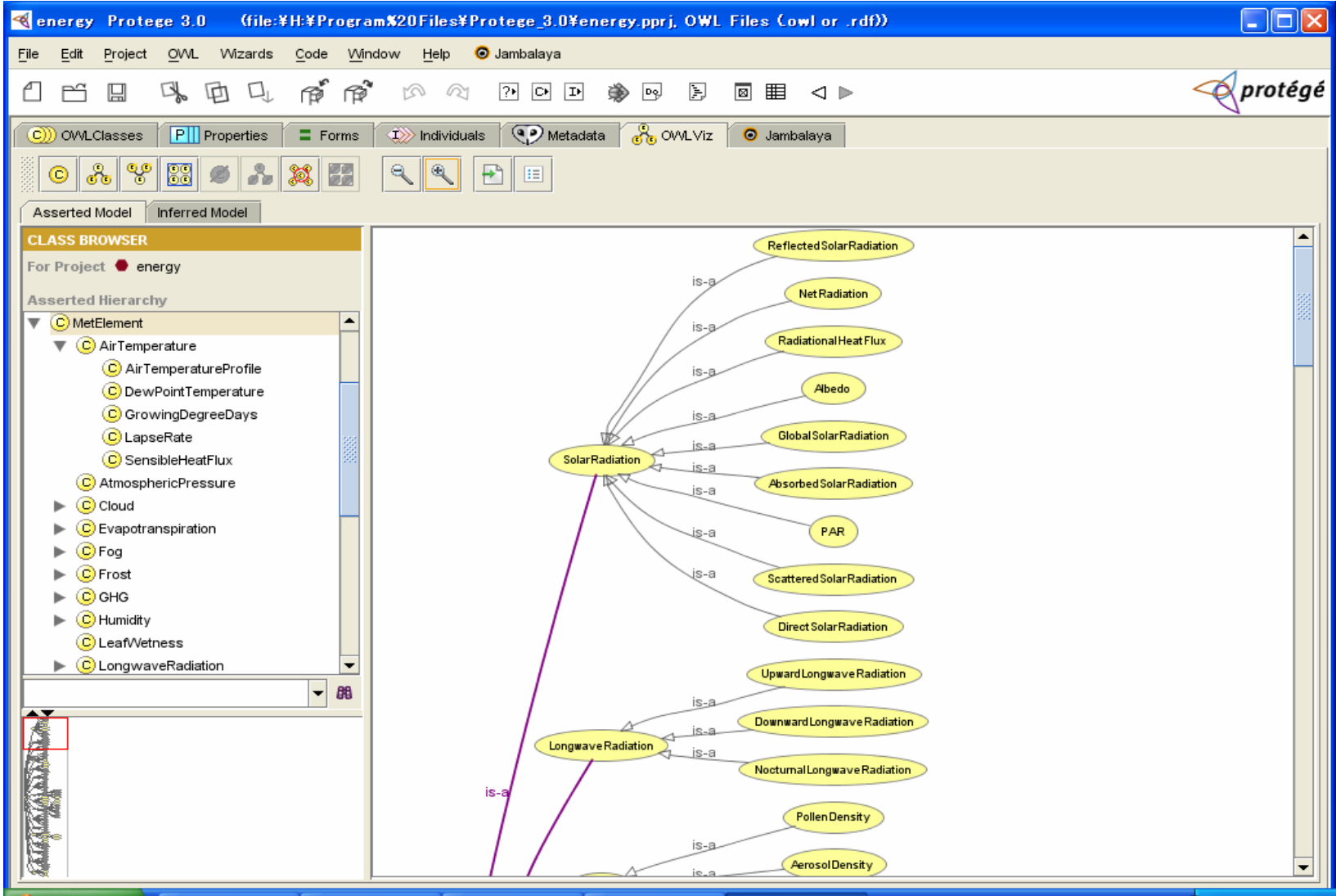
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## Hierarchy of weather elements

## RDF/OWL presentation



# Prototype of Ontology using extended Keywords





# Web & Workflow

The image displays two overlapping windows. The background window is a Mozilla Firefox browser showing the 'Korea Meteorological Administration' website. The page features a header with the KMA logo and a navigation menu. Below the header, there is a main content area with several service icons: 'Search Data', 'Directory Browse', 'Request Status', and 'Computing Service'. Each icon has a brief description of the service. To the right of the main content, there is a sidebar with a 'KMA Meteo Portal Service' menu containing links for 'Directory Service', 'Data Service', 'WAMIS Service', and 'WorkFlow GUI'. The foreground window is a Microsoft Internet Explorer browser displaying the 'MM5 and AMBER MODEL DESIGNER' workflow designer. The browser's address bar shows 'http://210.107.255.15:8080/meteo-portal/workflow.html'. The workflow designer interface includes a menu bar with 'Link', 'Process', 'T:Terrain', 'T:InterPB', 'T:InterPF', 'T:MMSA', 'T:MMSB', 'T:MMSG', 'T:Regrid', and 'T:Amber'. Below the menu bar, there are buttons for 'Open...', 'Save...', 'Clear...', 'Submit...', and 'Monitor...'. The main workspace shows a workflow diagram with a grid background. The diagram consists of several colored squares representing tasks and red circles representing processes, connected by arrows. The tasks are: T:Terrain (yellow), T:Regrid (blue), T:InterPB (purple), T:InterPF (green), T:MMSA (cyan), T:MMSG (magenta), and T:Amber (dark blue). The processes are: P:Terrain, P:Regrid, P:InterPB, P:InterPF, P:MMSA, P:MMSG, and P:Amber. The workflow starts with T:Terrain, T:Regrid, and T:InterPB, which all lead to P:Terrain, P:Regrid, and P:InterPB respectively. P:Terrain and P:Regrid lead to P:InterPB. P:InterPB leads to P:InterPF. P:InterPF leads to P:MMSA. P:MMSA leads to P:MMSG. P:MMSG leads to P:Amber. Additionally, T:InterPF leads to T:MMSA, and T:MMSG leads to T:Amber.



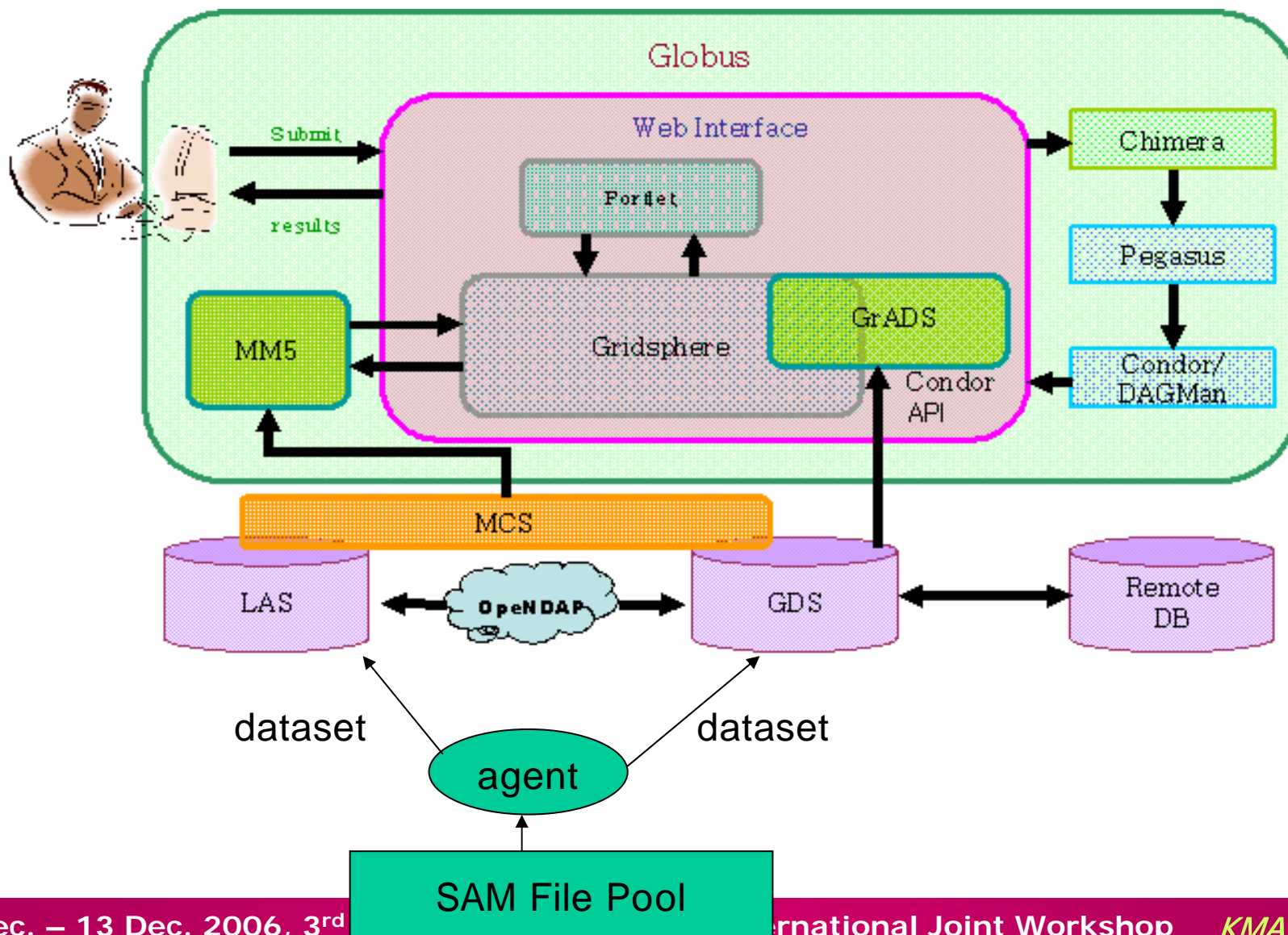
## Requirements from CAgM

- **Dedicated (Virtual) DCPC/GISC to Agro-/Applied Meteorology**
  - To take care of non-conventional and extra-disciplinary data/products  
(flux, vegetation, soil, forestry, water cycle, etc.)
  - To establish a bridge toward GEOSS in information sharing
- **Resource sharing technology**
  - Servers for NWP, application models, GIS tools, etc.
  - Computing GRID is being tested

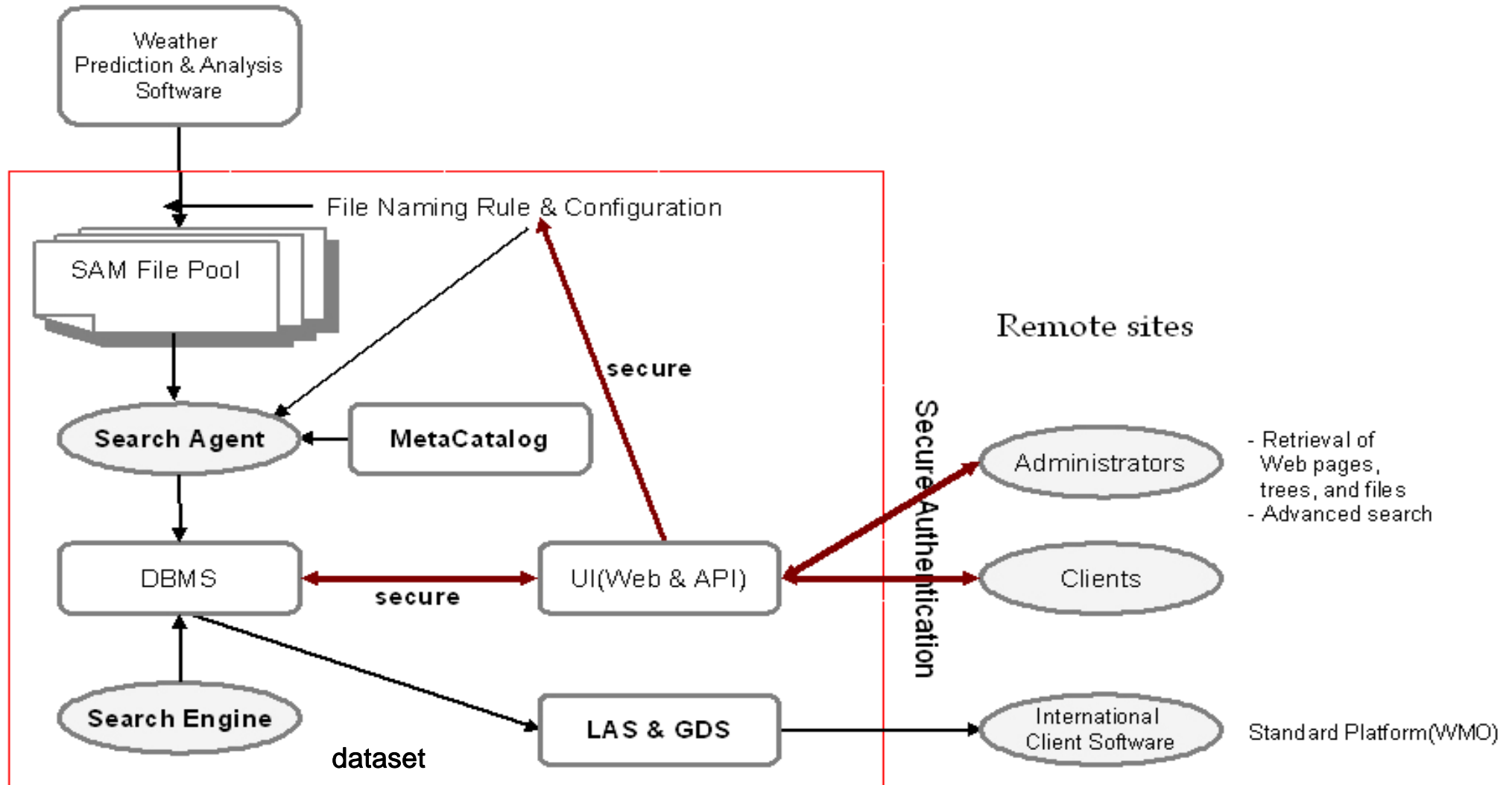
# Implementations (WIS/KMA)



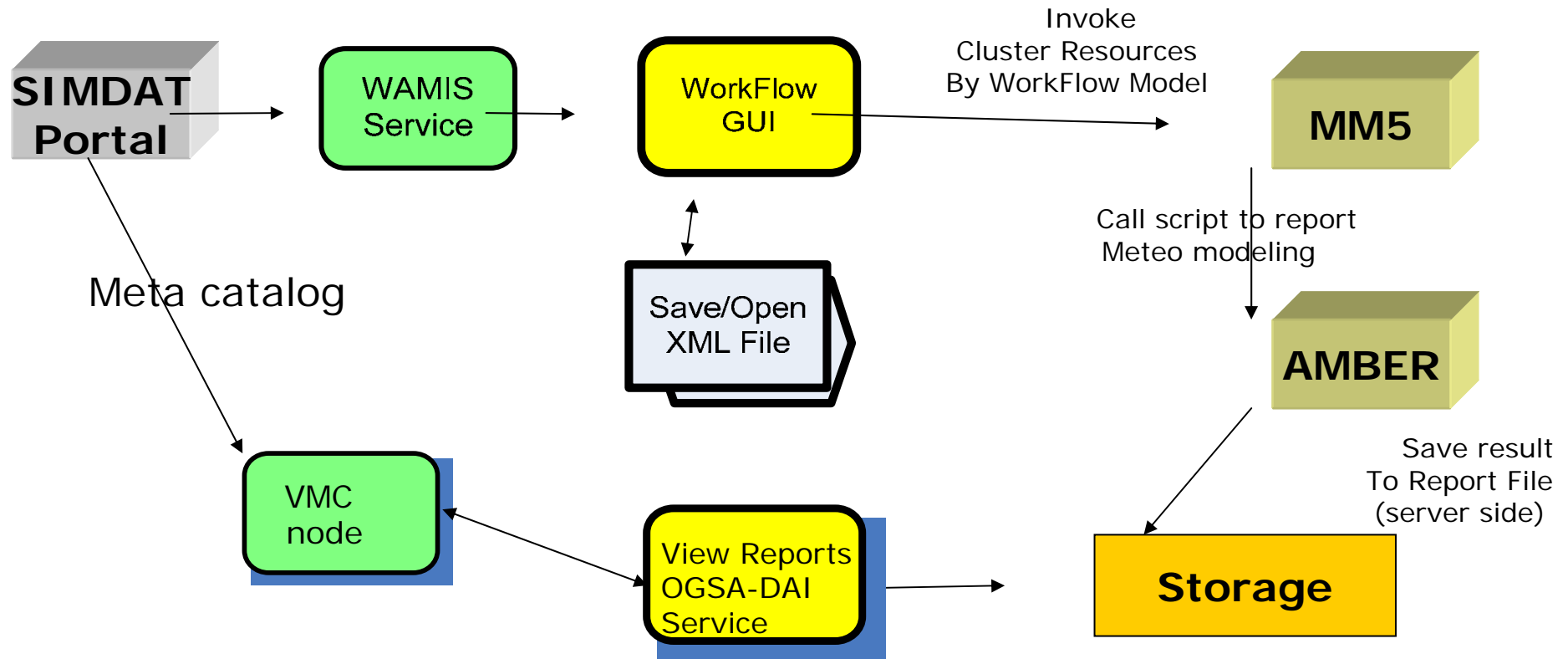
# KMA Efforts to OPENDAP with Grid (I)



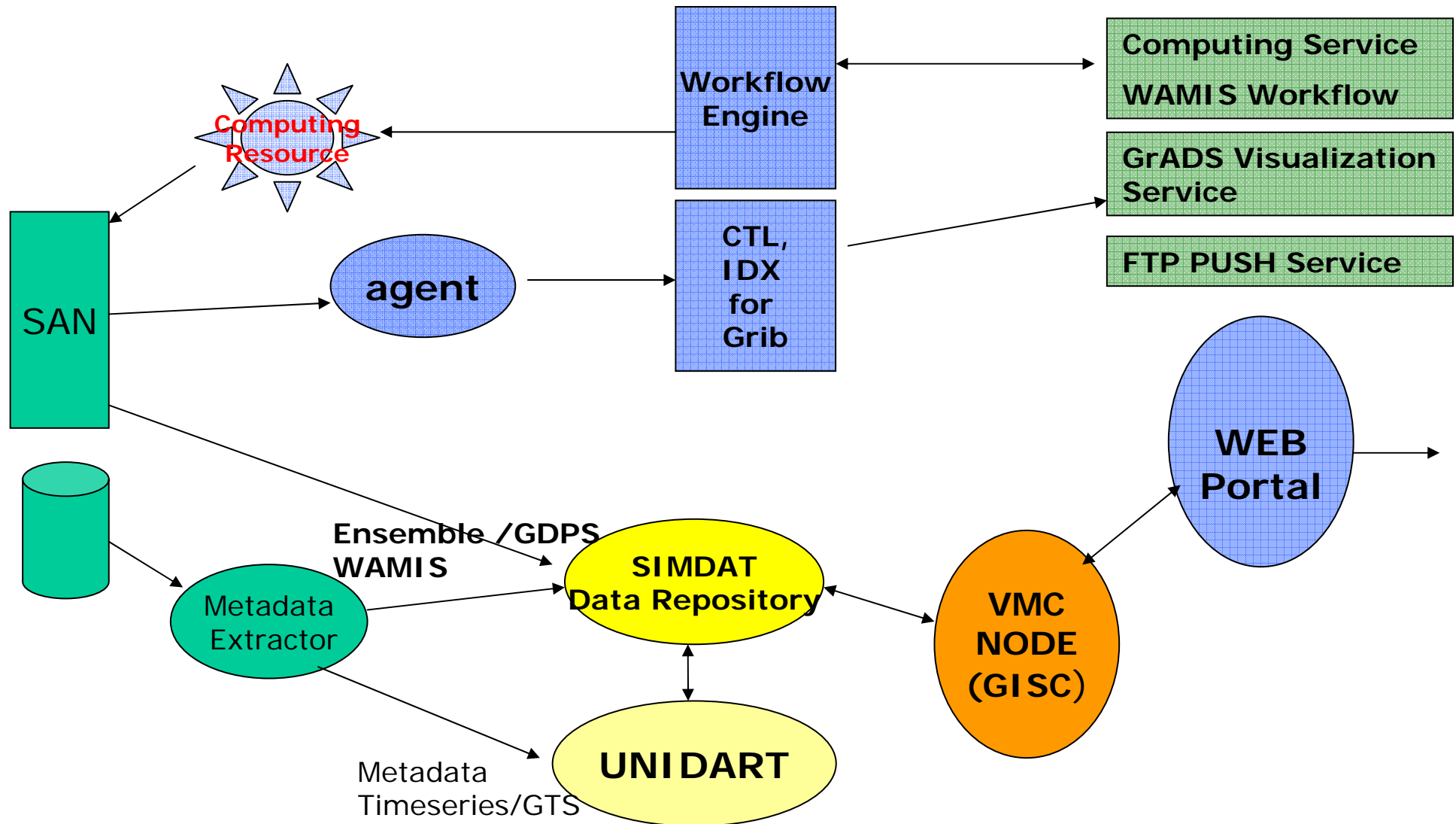
# KMA Efforts for WIS (II)



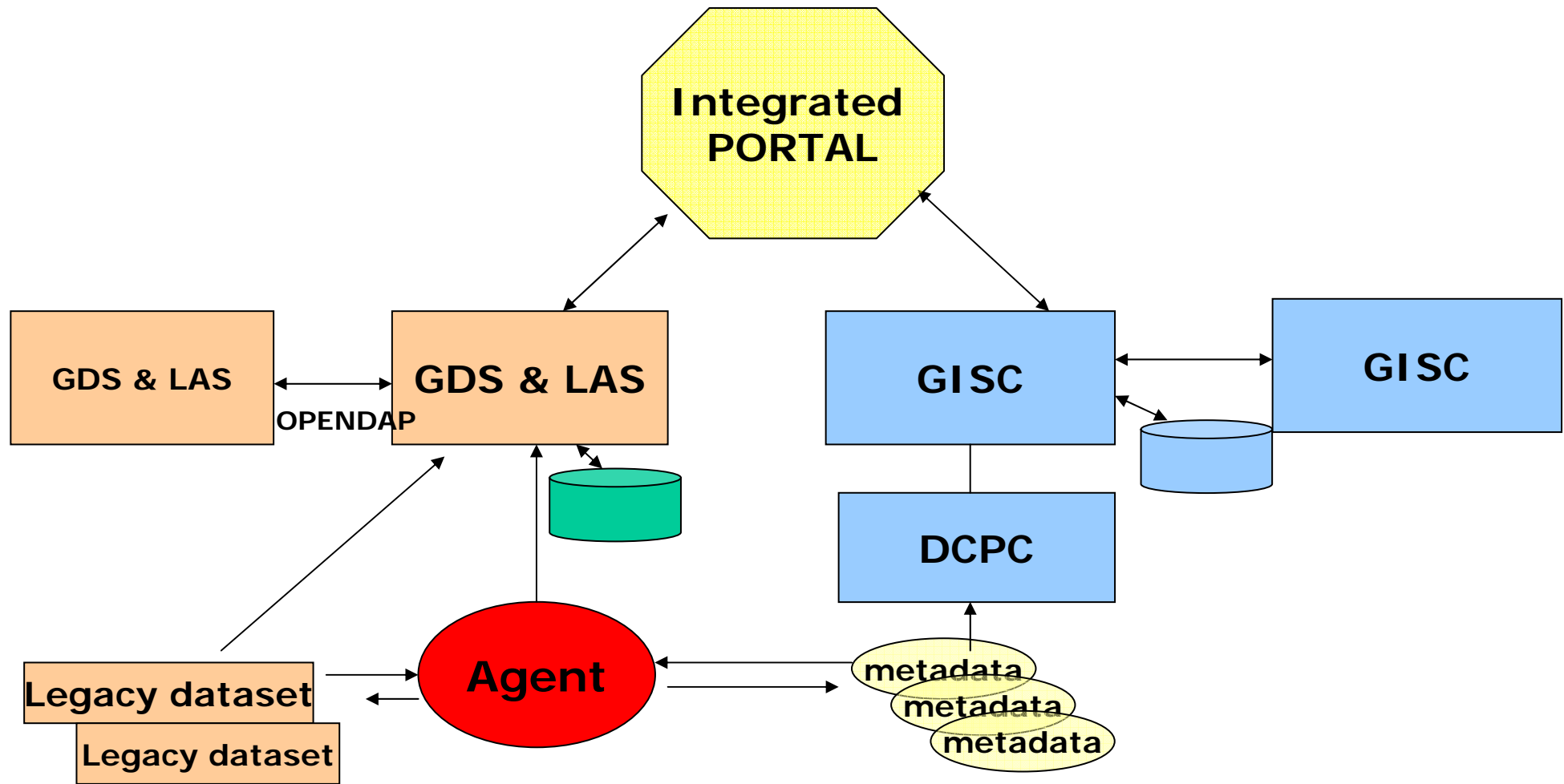
# KMA Efforts for WIS (III)



# KMA Efforts for WIS (IV)



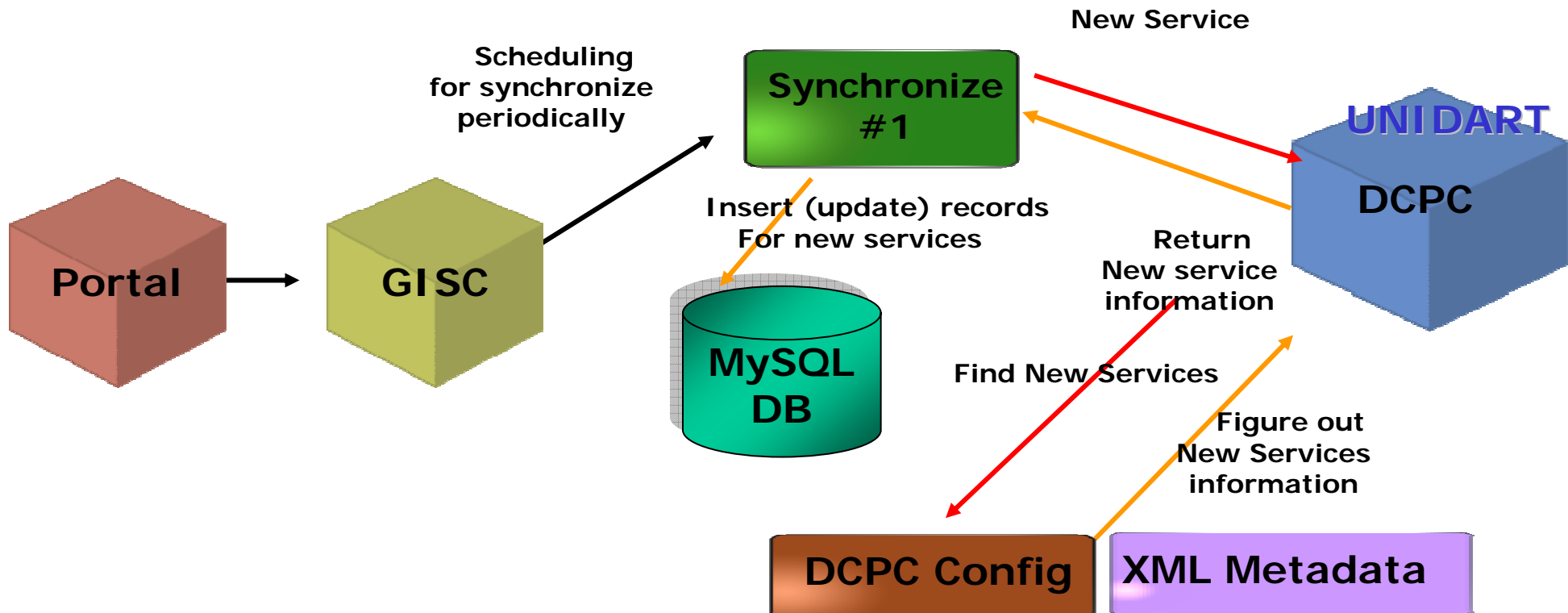
# Future KMA Efforts for WIS





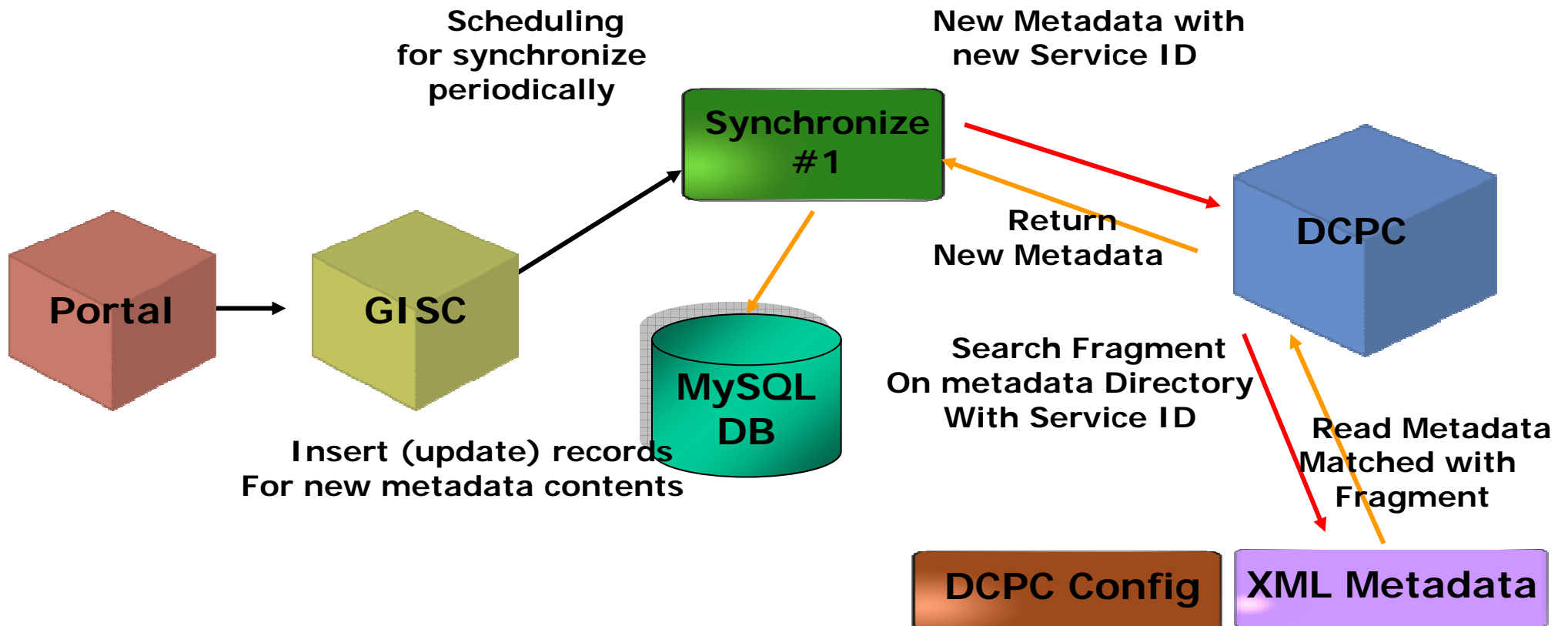
# Implemented GISC Functions (1)

## 1. Synchronize between GISC and DCPC for new service



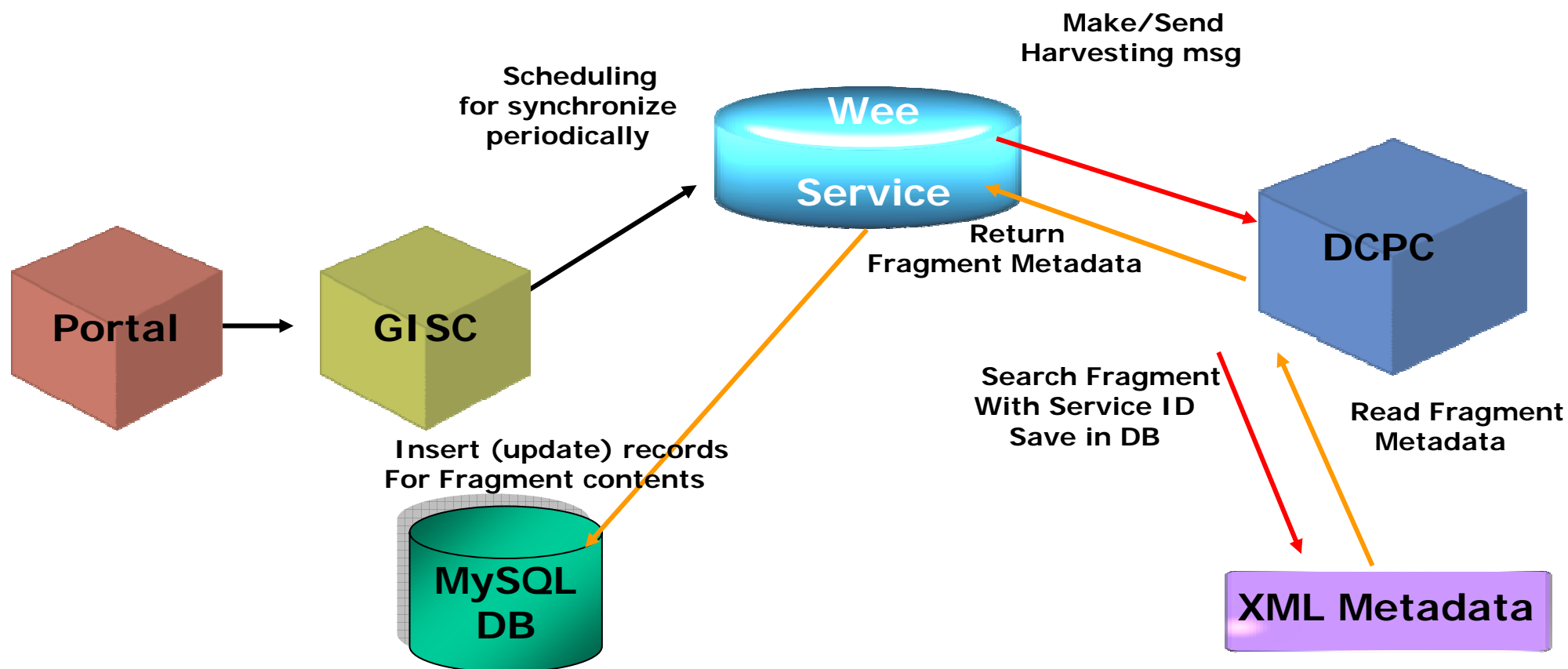
# Implemented GISC Functions [2]

## 2. Synchronize between GISC and DCPC for new metadata



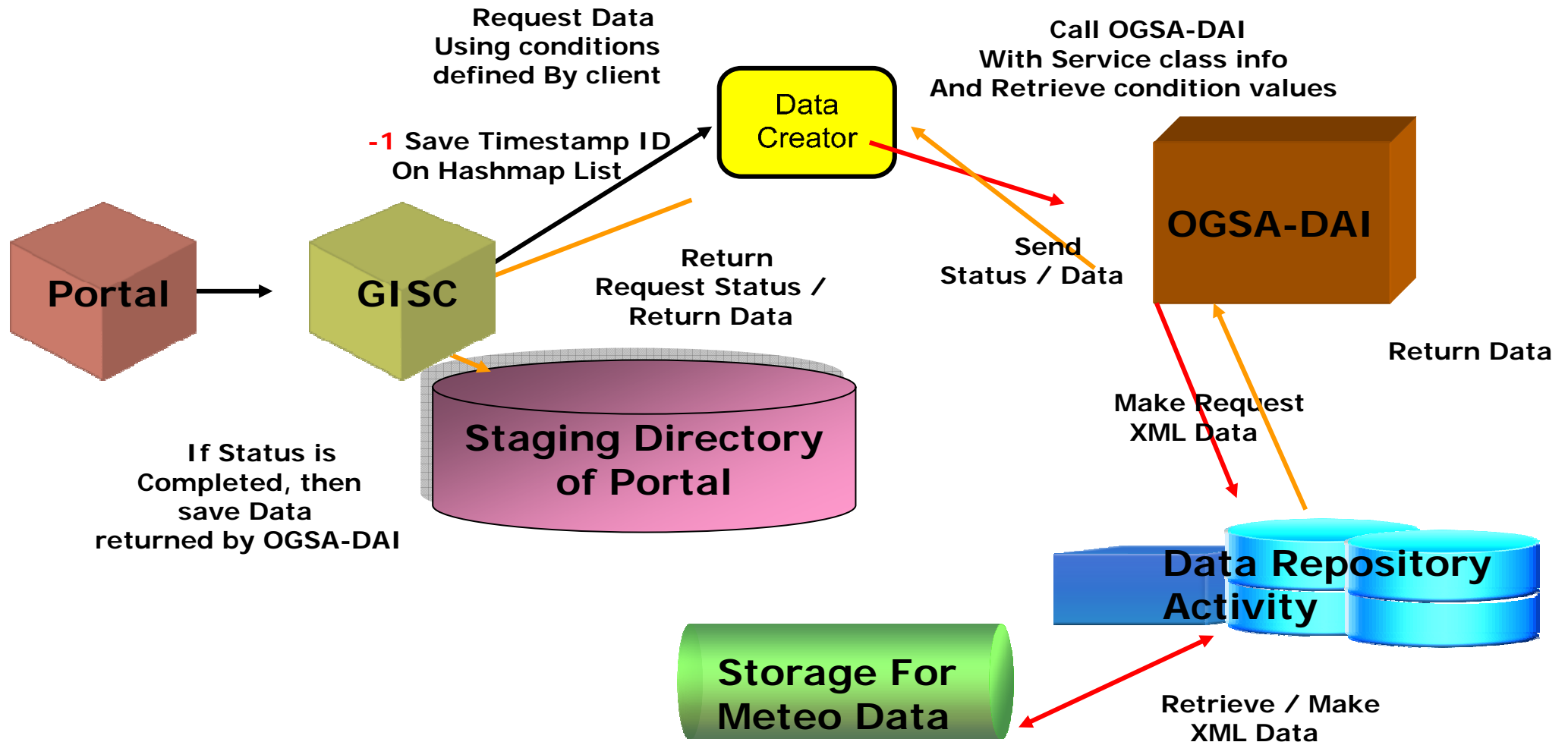
# Implemented GISC Functions [3]

## 3. Harvesting using Wee Service - OAI



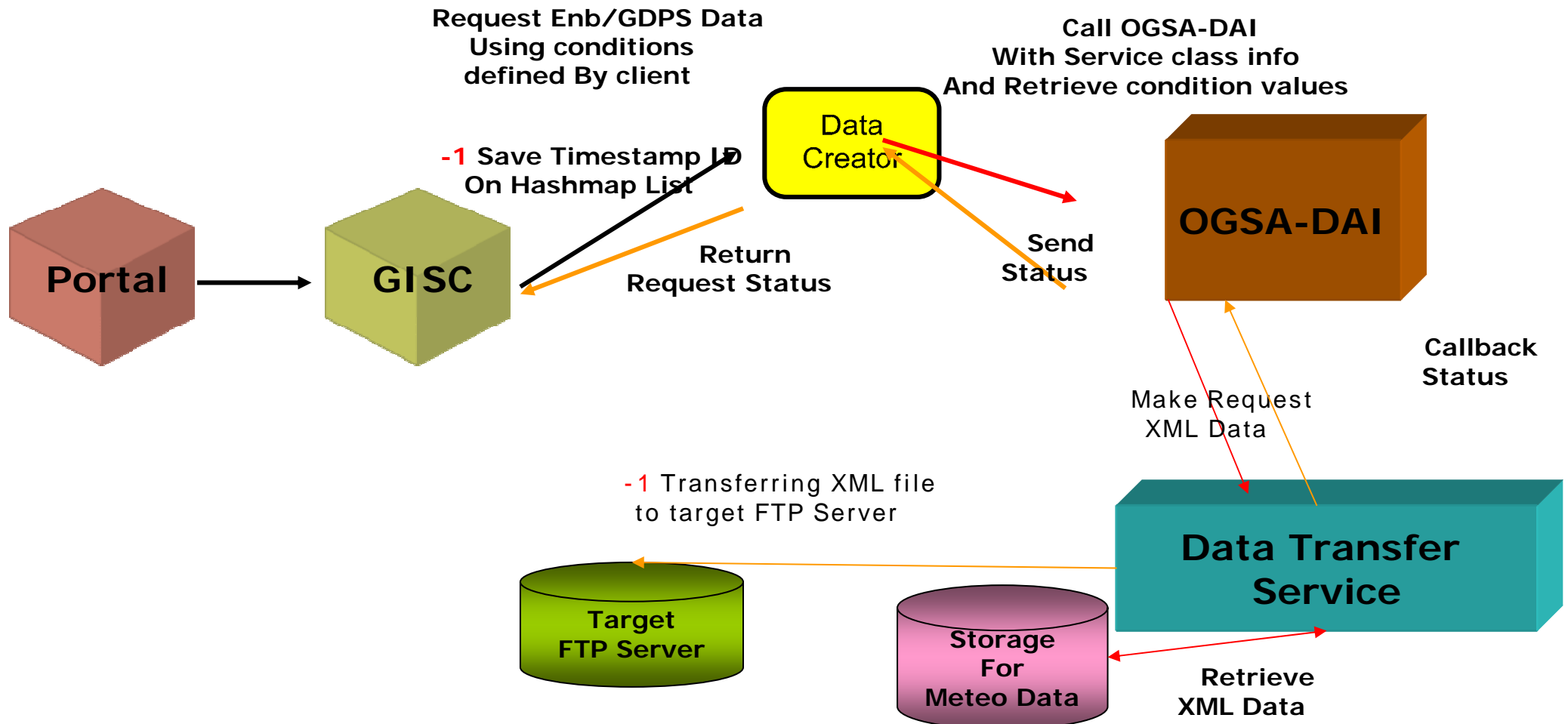
# Implemented GISC Functions [4]

## 4. Data Requesting OGSA-DAI service: Instant XML Result Service



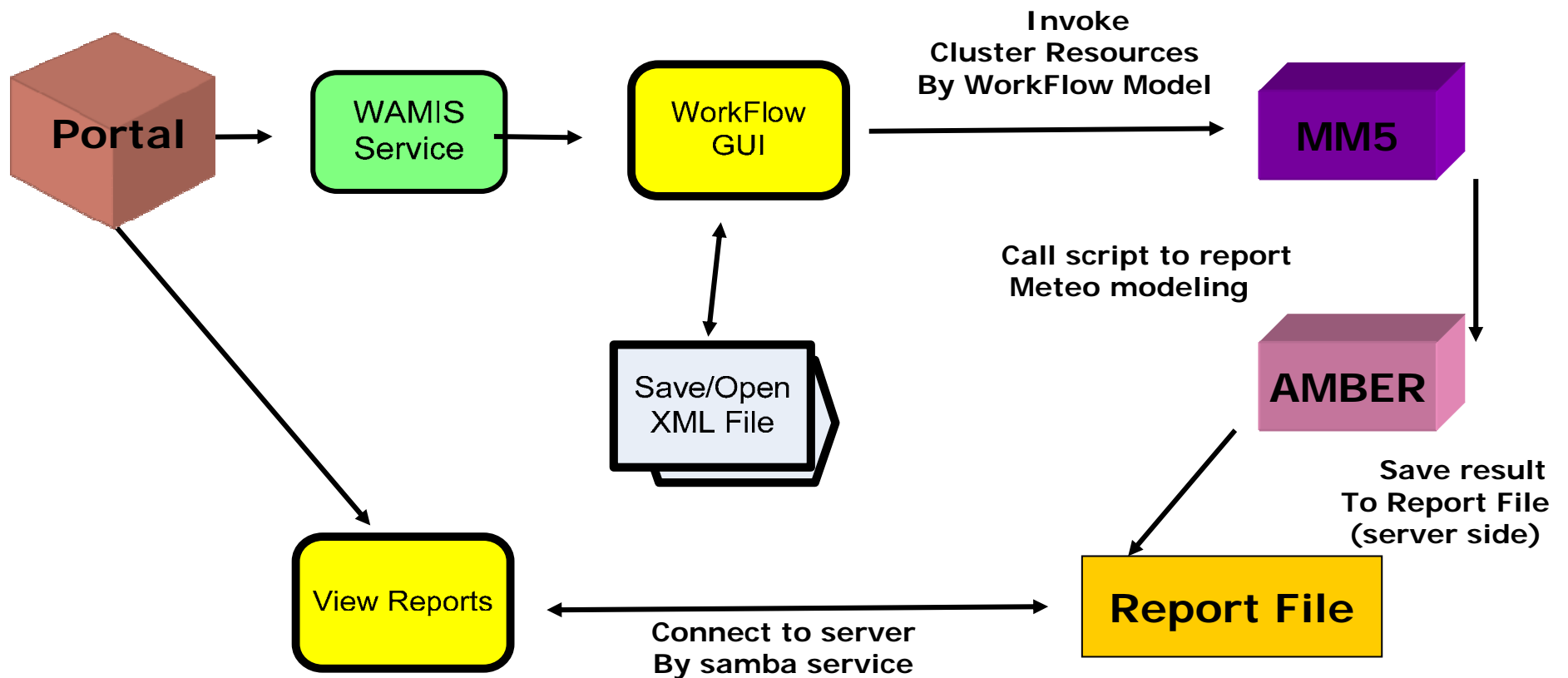
# Implemented GISC Functions [5]

## 5. Data Requesting using OGSA-DAI service: PUSH Service

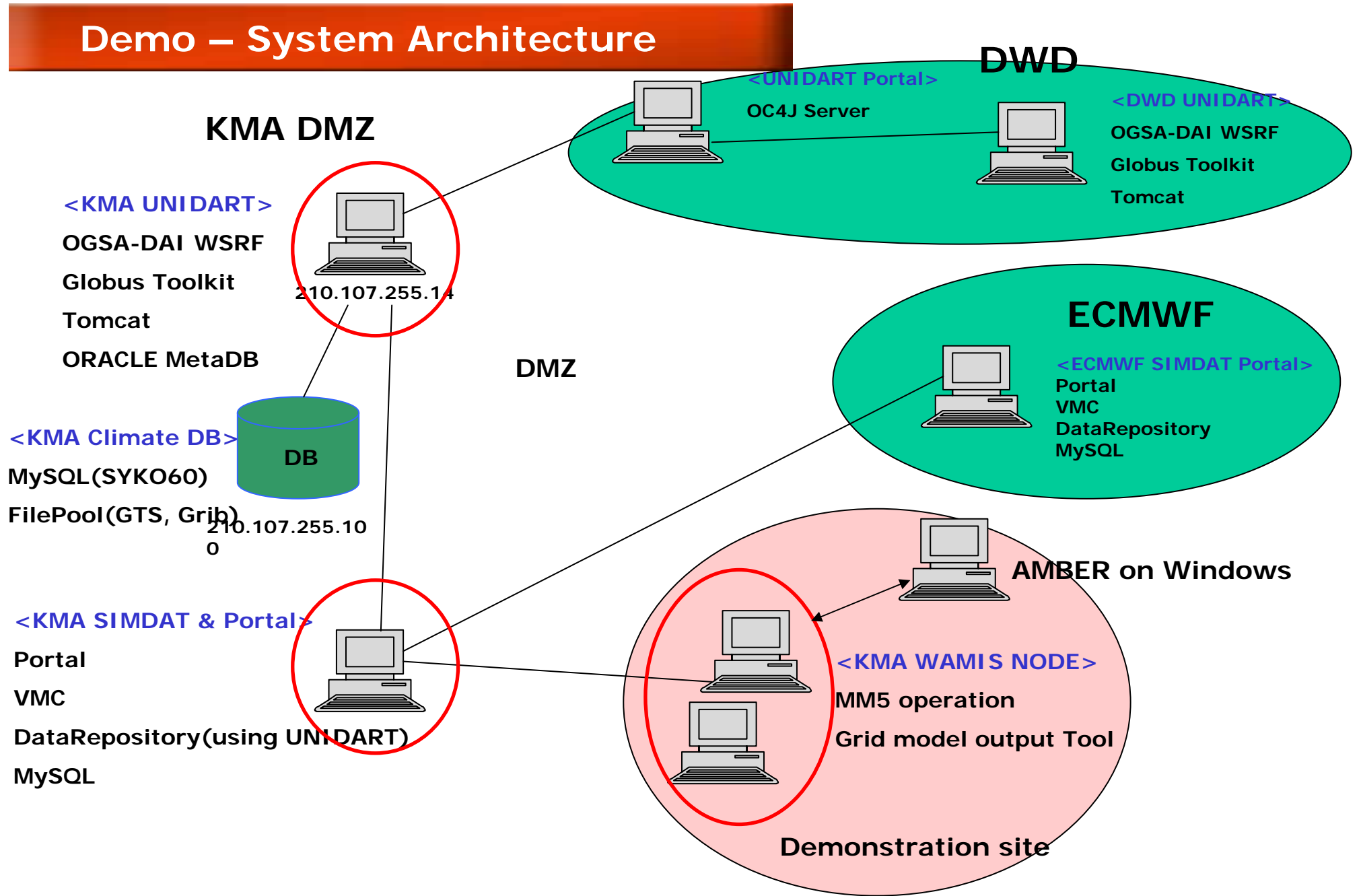


# Implemented GISC Functions – WAMIS

## 6. WAMIS Service Execution using WorkFlow GUI component



# Demo – System Architecture



# Thank you!

