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A New SDI Based Production Process.

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Objectives

Objectives of this briefing.



- Objectives for the project;
- Outline of the project plan;
- Modelling a new production process;
- Outline Design;
- Modelling the Business Process;
- Building a registry;
- What we have achieved;
- Future Work;
- Demo;

Our objectives for the project.



- To design a production process that is much more flexible and takes content from disparate sources.
- To create an end to end production process using a S.O.A pattern.
- Use an Enterprise Service Bus to connect and orchestrate the “Services”.
- Use OGC web services as a basis for connecting Services across a network.
- Create and build a catalogue that provides descriptions/discovery of services and associates key content such as business documents.
- Model our data using the GML model.

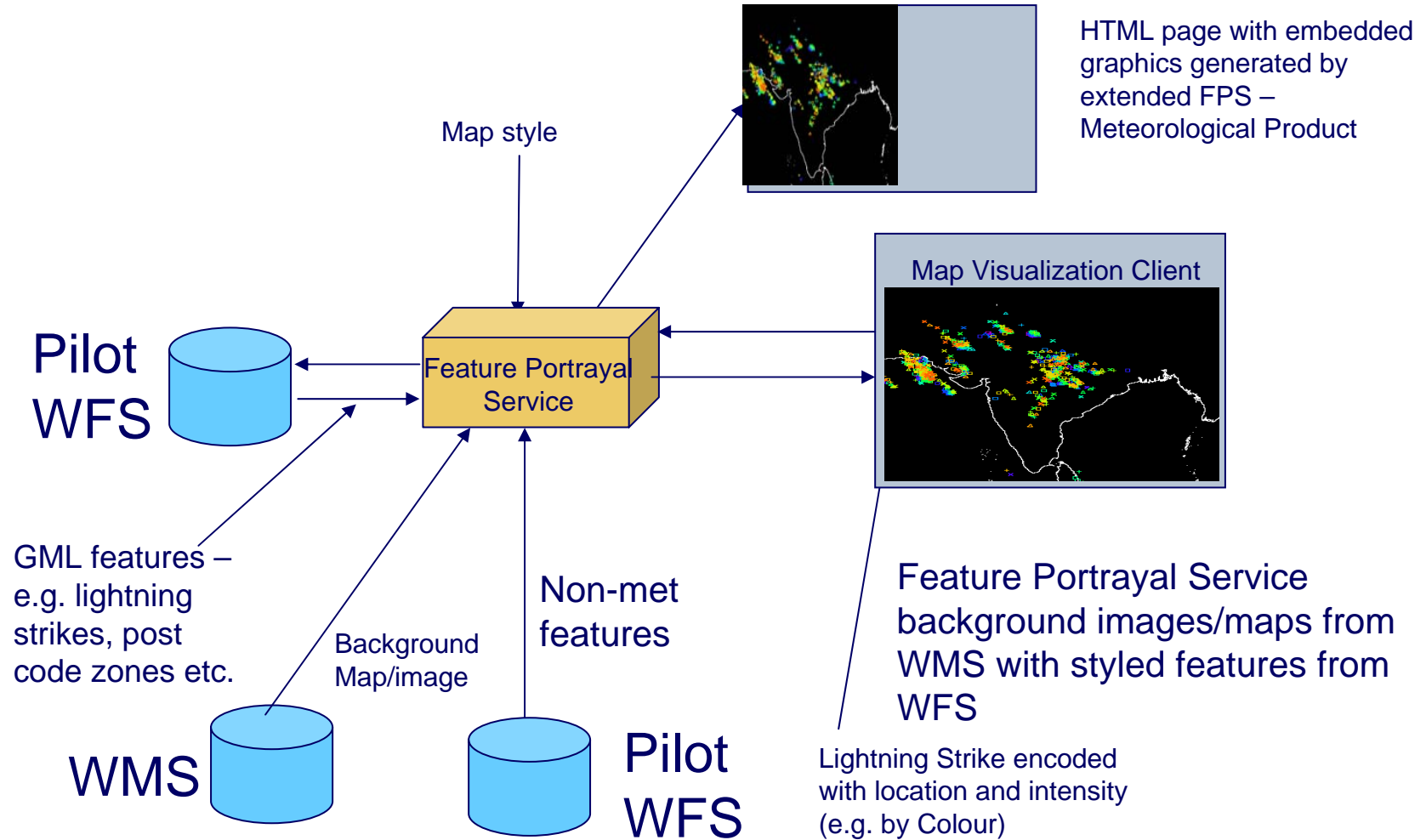
- Design a high level architecture.
- Define the “Services” that are required to build a representative set of products.
- Build the Catalogue after first modelling the information model.
- Install the Feature Portrayal Service from Galdos and connect to live data.
- Enable legacy applications to connect to the SOA as a Web Map Service (WMS) interface.
- Install and configure the ESB from Sun
- Produce end-to-end system and benchmark

Proposed new production process(1):

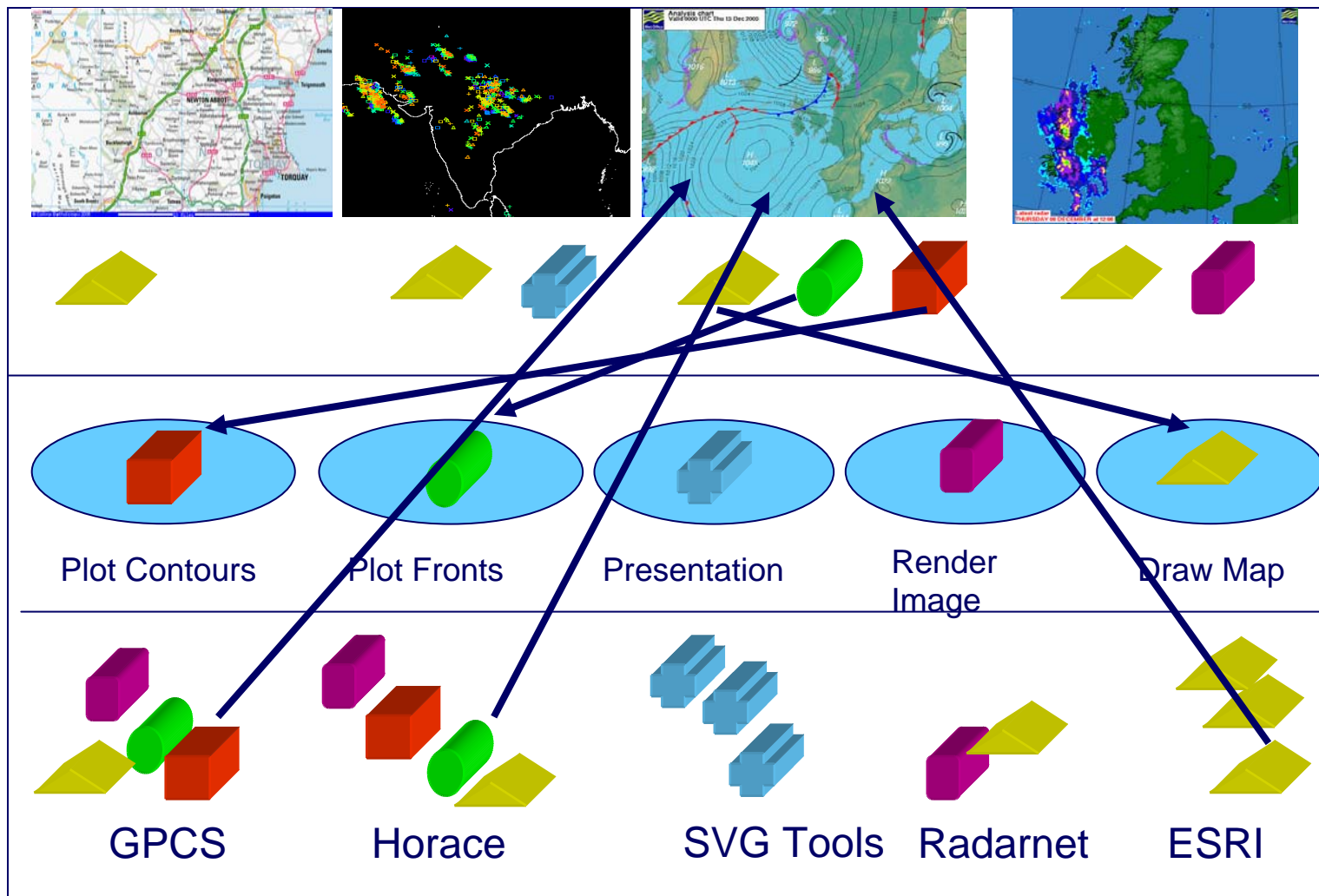


- Products will be layered and each layer will be created or obtained from a number of sources including the forecaster workstation; external servers (e.g. GIS); internally wrapped services etc.
- Only support one service for any particular layer e.g. radar imagery, plotting observations, mapping, geoprocessing, contouring etc.
- The layer model is well understood by the OGC model, in particular the WMS (Web Map Service).

Proposed new production process(2):



Elemental and composed business services



Business Function

Elemental Business Function

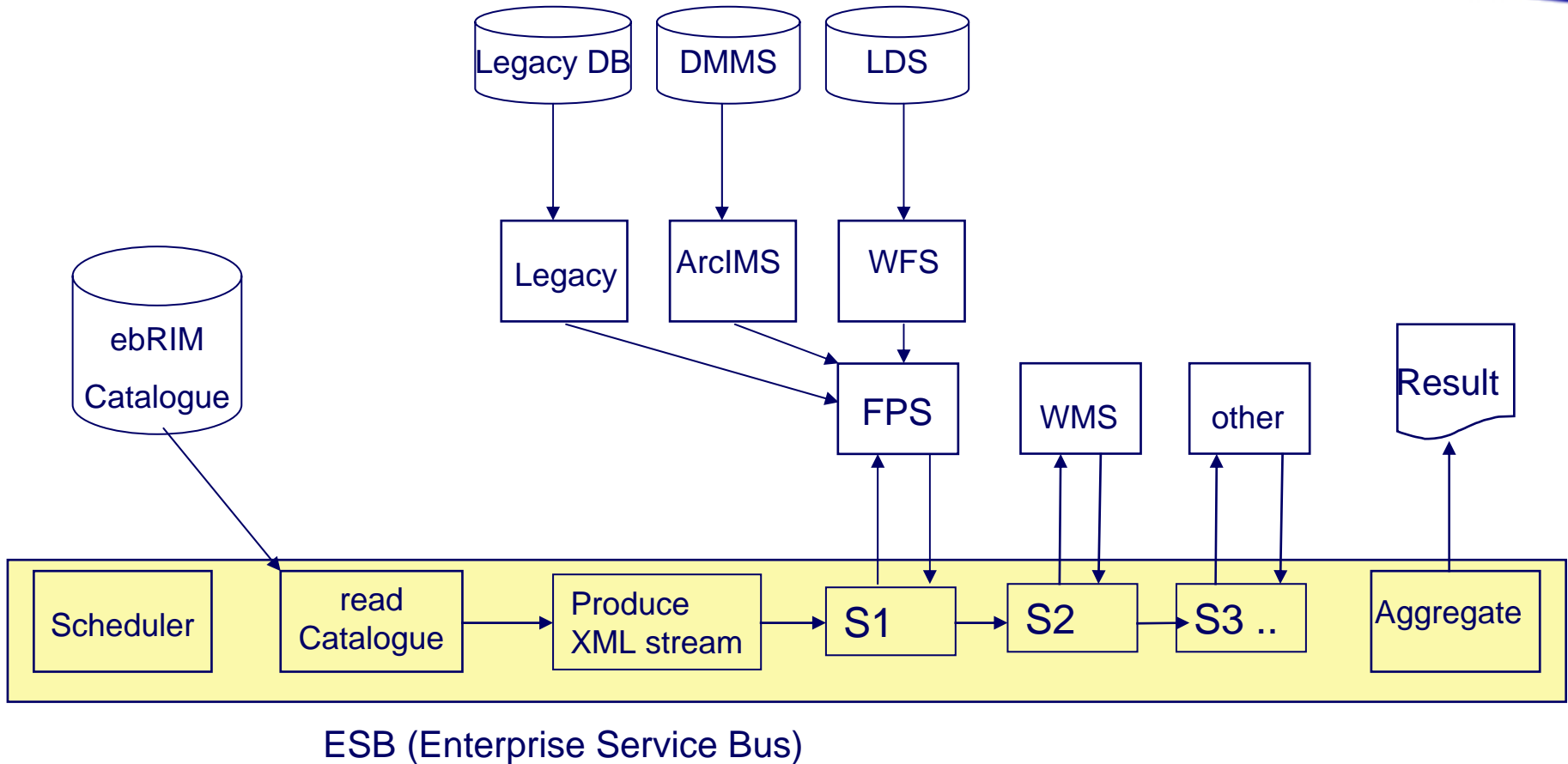
Existing System

Proposed new production process(3):



- The heart of this strategy is to make the process “product definition” centric by using a document that will:-
 - Describe the content, content layout and the **method** (or service binding) by which the content is created.
 - Centrally store and catalogue the information (Customer and Services database)
 - Hold a host of metadata, including details such as customer, ownership, format, destination etc.

Outline Design



- The new production strategy needs a new lingua franca.
- Such a language has been developed for the geospatial community i.e. GML (Geography Markup Language).
- GML takes advantage of XML's flexibility and is a standard way of encoding geospatial data in XML, based on the OpenGIS standards for representation of geospatial features.
- GML's advantages over previous data formats are - it is extensible, it can easily be linked to any kind of nonspatial XML data and it can be displayed as a map on a Web browser with negligible effort.

- The Open Geospatial Consortium are striving to express geospatial data with common semantics to enable interoperability.
- The OGC have developed a number of services that enable the transfer of features, maps, grids etc in a standard way across a network using Internet protocols.
- Thus a lot of the hard work in setting catalogues and the metadata definitions has already been done. There are three main services:-

- The Web Coverage Service (WCS) supports electronic interchange of geospatial data as "coverage's".
- The OGC Web Map Service (WMS) allows a client to overlay map images for display served from multiple Web Map Services on the Internet.
- The OGC Web Feature Service allows a client to retrieve and update geospatial data encoded in Geography Markup Language (GML) from multiple Web Feature Services.

- Creating the itinerary driving the production process.
 - The information model will provide information that will support a set of queries that together will support a range of business functions.
 - These fall broadly into two categories; first to drive the process chain managed by the ESB (Enterprise Service Bus) and secondly provide information to the service/account managers etc.
 - The information model needs to be supported by services that allow for “multi rule” queries and be properly governed i.e. content needs to be “registered”
 - For the prototype project we have chosen to use the ebRIM model from OASIS.

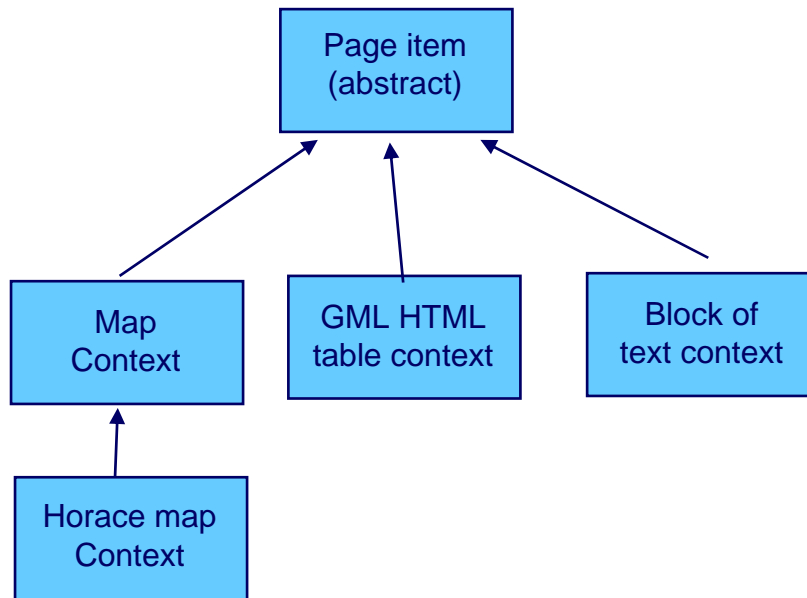
- The Book Pattern
 - The foundational element of any graphical/textual information is the page & each instance of a page is associated with a “page layout”.
 - A page consists of a number of items: e.g. graphics, tables, text, logo etc and a “page manifest” is a list of all the items required for that “page”.
 - A “customer portfolio” will contain a list of all “page manifests” required by a customer (including associated page layout).
 - Virtual groupings of pages called “jobs” will be created by querying the customer portfolio using a set of business rules e.g. all pages due by a certain time etc.

Modelling the Business Process (3):



- A page item is normally a graphic, text or a table.
- A Page item is created by a collaborating service. This service could be:
 - A WMS (Web map service);
 - A WFS (Web Feature Service);
 - A FPS. (Feature Portrayal Service);
 - A bespoke web service (Might use the WMS spec, but connect to a legacy application)
 - A non web enabled service e.g. RMI
- A page item definition does not know anything about other items to be placed on the page.
- A page item can be therefore be reused.

- FPS page item is just one of the page items types. Others can be:
 - Horace page item
 - A logo
 - A block of text
 - HTML table containing information from GML data
- This can be modeled as a type hierarchy:



- The term “context” is taken from OGC Map Context and we use it with the meaning of “prescription”
- Horace map context adds some parameters specific to Horace map creation:
 - Parameter (T, P, W, H)
 - Level value
 - Level Type
 - Model Name (World, EU, UK)
 - Temporal (see discussion on previous page)

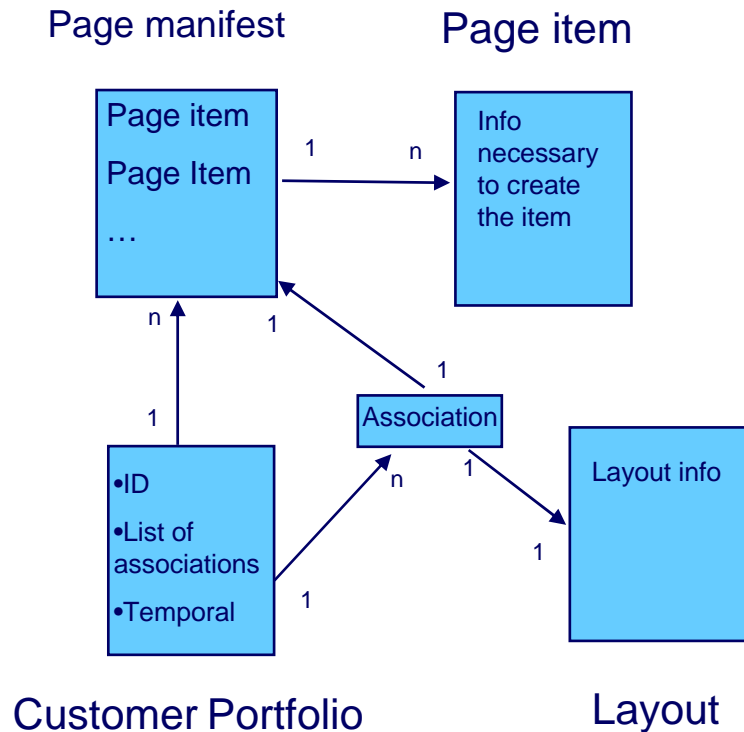
- Information required in the page item specification:-
 - URL of the WFS, WMS, FPS plus any other service.
 - Layer name or definition;
 - Style name or definition;
 - Bounding Box;
 - Output format;
 - Size.

Page Item (3) Specification:



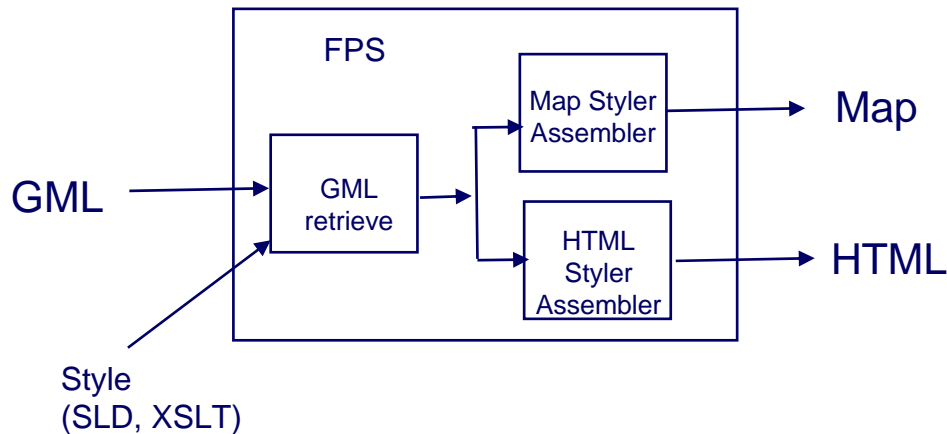
- A key design issue is that the service binding must not be hardwired into the page item definition.
- The parameters e.g. temporal and spatial information will be added at run time.
- The layer name will initially be strongly typed e.g.
 - Temperature/model=ukglobal
 - Wind Speed/model=ukmes
- The ukglobal and ukmes will be associated with Service
- Level and Time information will be added using the WMS spec.

The “Page Manifest”



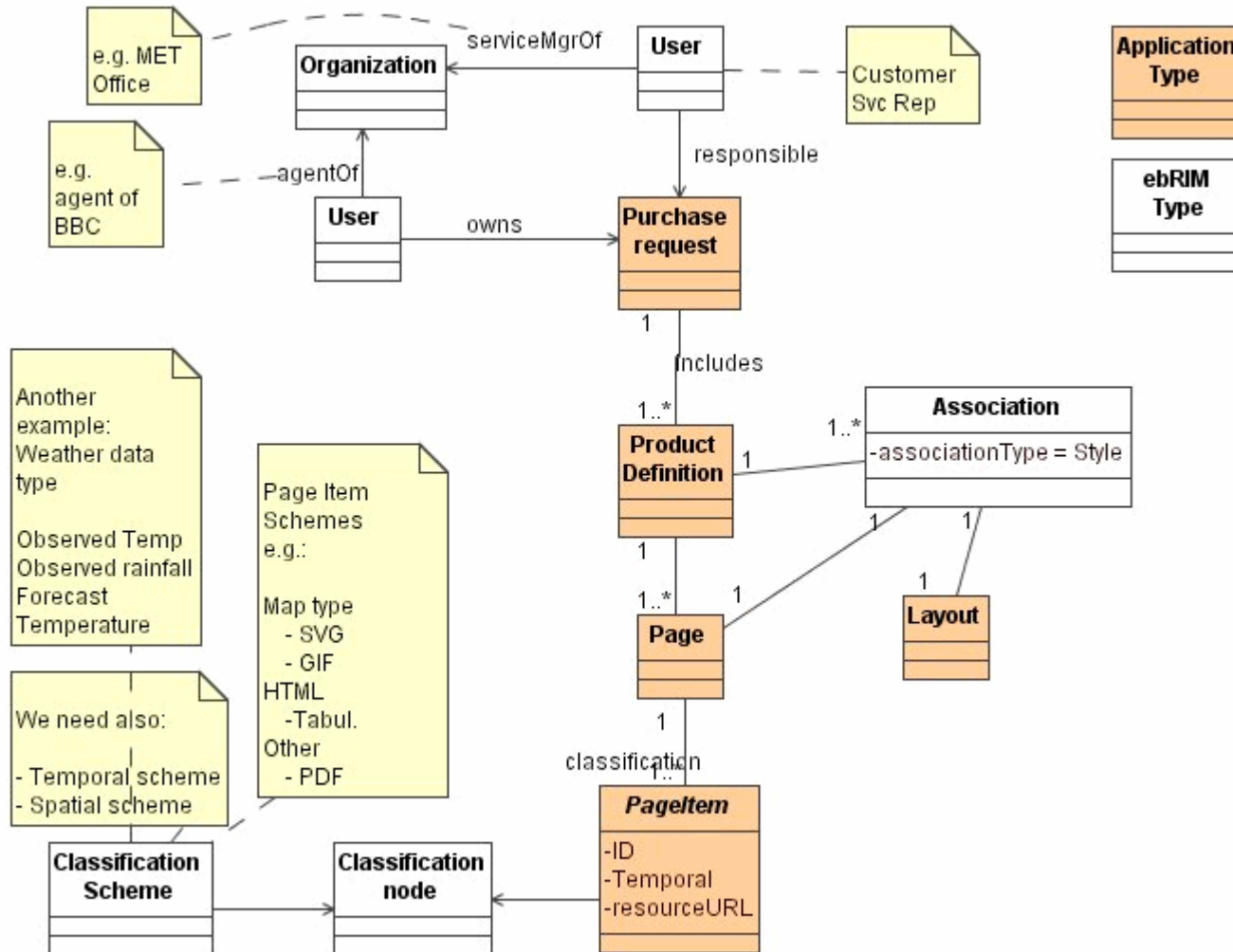
- Customer portfolio consists of what the customer owns i.e. a list of page manifests.
- Page Manifest is a “bill of materials”, i.e. a list of “Page Items” for a Page
- Each PageManifest is associated with one or more layouts (e.g. web layout and print layout).
- The associations are registry level associations.
- The “Customer Portfolio” has a number of associations between a PageManifest and the layout objects which are essentially “styles” applicable to page items using layouts.

- With respect to different types of page items (e.g. map image, HTML table, etc) and FPS functionality, we can look at the whole styling process using the following simplified diagram:



- Map Assembler uses the concept of layers, and HTML Assembler may use some different concept to prepare the result (e.g. rows, columns)
- The styling and assembling processes are different for the map and HTML so we assume that we need different PageItem types.
- There will be other types as well.

- A registry provides a stable store where information may be stored in a controlled manner.
- A set of registry services provides access to the registry contents to clients of the registry.
- The registry information model provides a blueprint or high level schema for the ebXML registry.
- Implementers of the ebXML registry may use the information model to determine which classes to include and what methods and attributes these classes may have. They may also use it to determine what sort of database schema is needed.
- The Registry information model may be implemented using object or relational database schema.



What we have achieved (1).



- Created the overall design (see next slide for outline).
- Installed and configure the FPS.
- WMS enabled ArcIMS to access and display map data stored in ArcSDE.
- Started our domain modelling in GML using UML as the design medium
- Overlaid content from a variety of WMS servers including the FPS (Lightning data), Maps (ArcIMS), radar data (ArcSDE), Satellite data (NASA WMS), etc
- Started work on the catalogue and in particular modelling our information

What we have achieved so far (2)

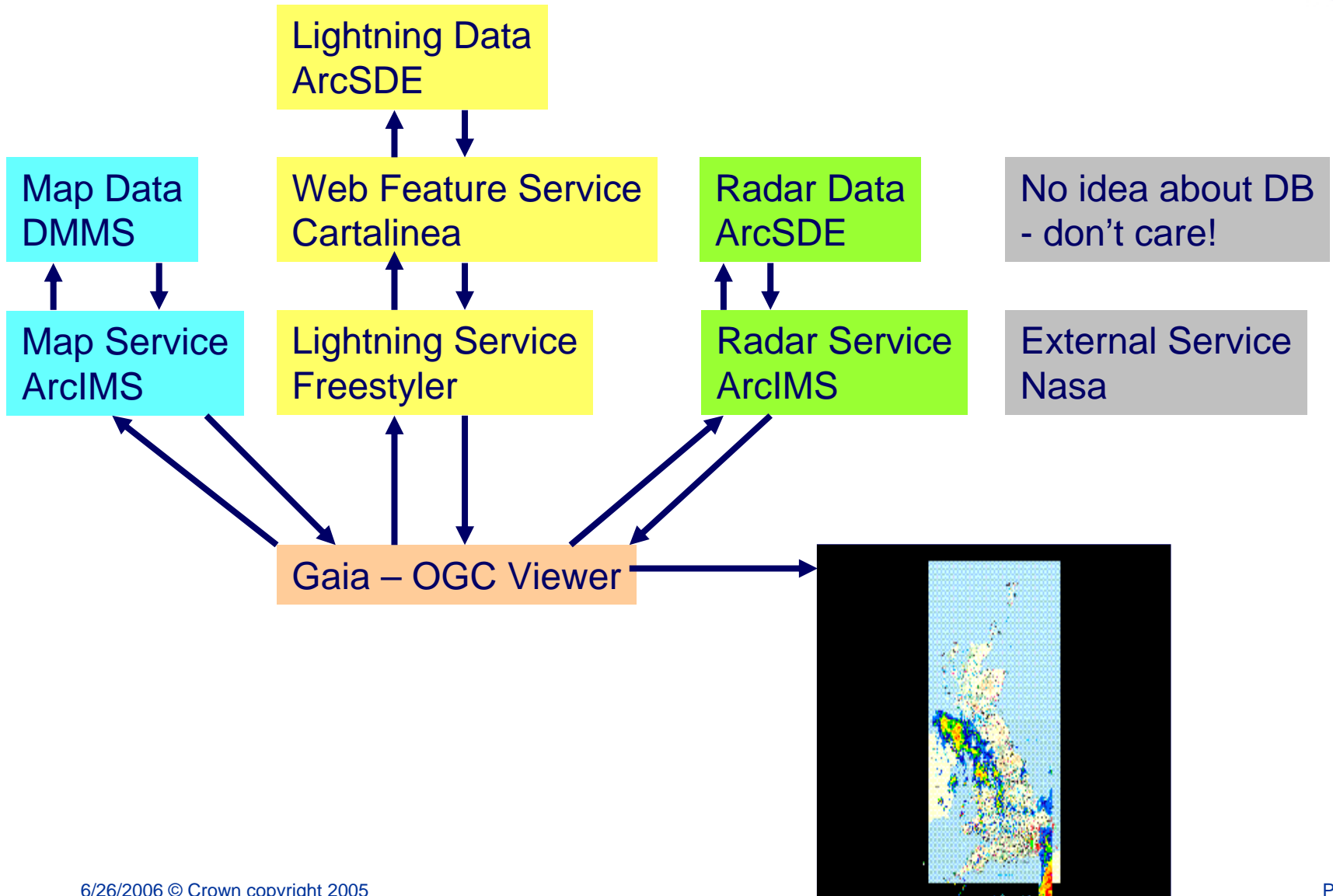


- GML workshop
 - Established a number of important principles and models (in UML) to support the creation of GML schemas for Meteorological features.
- High Level Architecture complete.
- WMS and WFS procured and installed.
- Installation of ARCIMS 9.1
 - The OGC WMS interface successfully set up with various layers and projections.
 - Note less success with the ESRI's WFS
- Procuring an E.S.B, and looking at report creation.

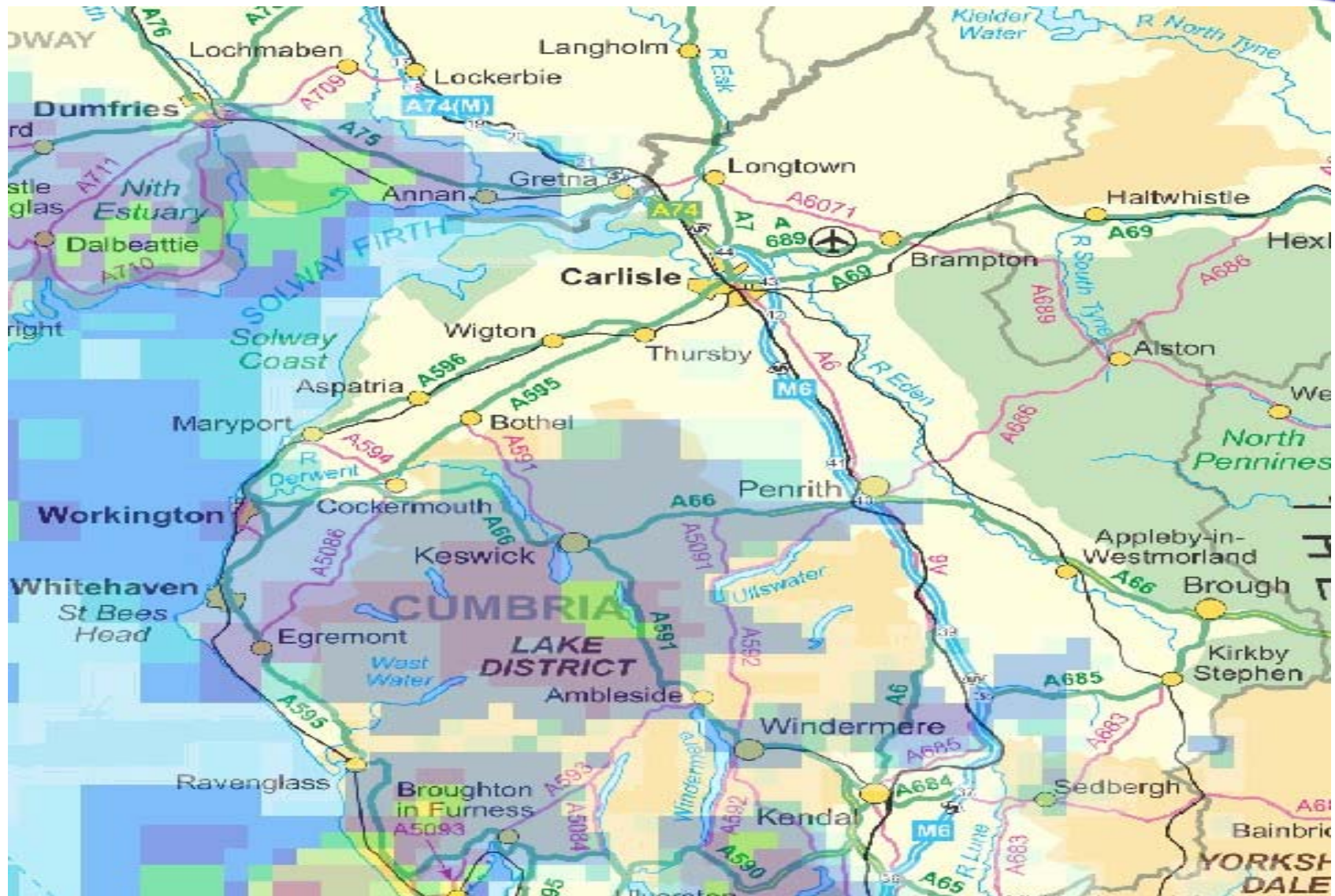
The background of the slide features a light blue color with several horizontal, wavy bands of a slightly darker shade of blue, creating a soft, water-like or cloud-like texture.

Demo

Demo - Gaia



Overlaying a high resolution map with radar (2)



- Complete the SOA prototype project.
- Document the lessons learned from the project.
- If the SOA prototype is successful then begin to make SOA mainstream within the Met Office.
- Consider web enabling more legacy applications and more particularly data sources.
- Finish the modelling of meteorological information in GML.



Thanks