Managing Cultural Object Database

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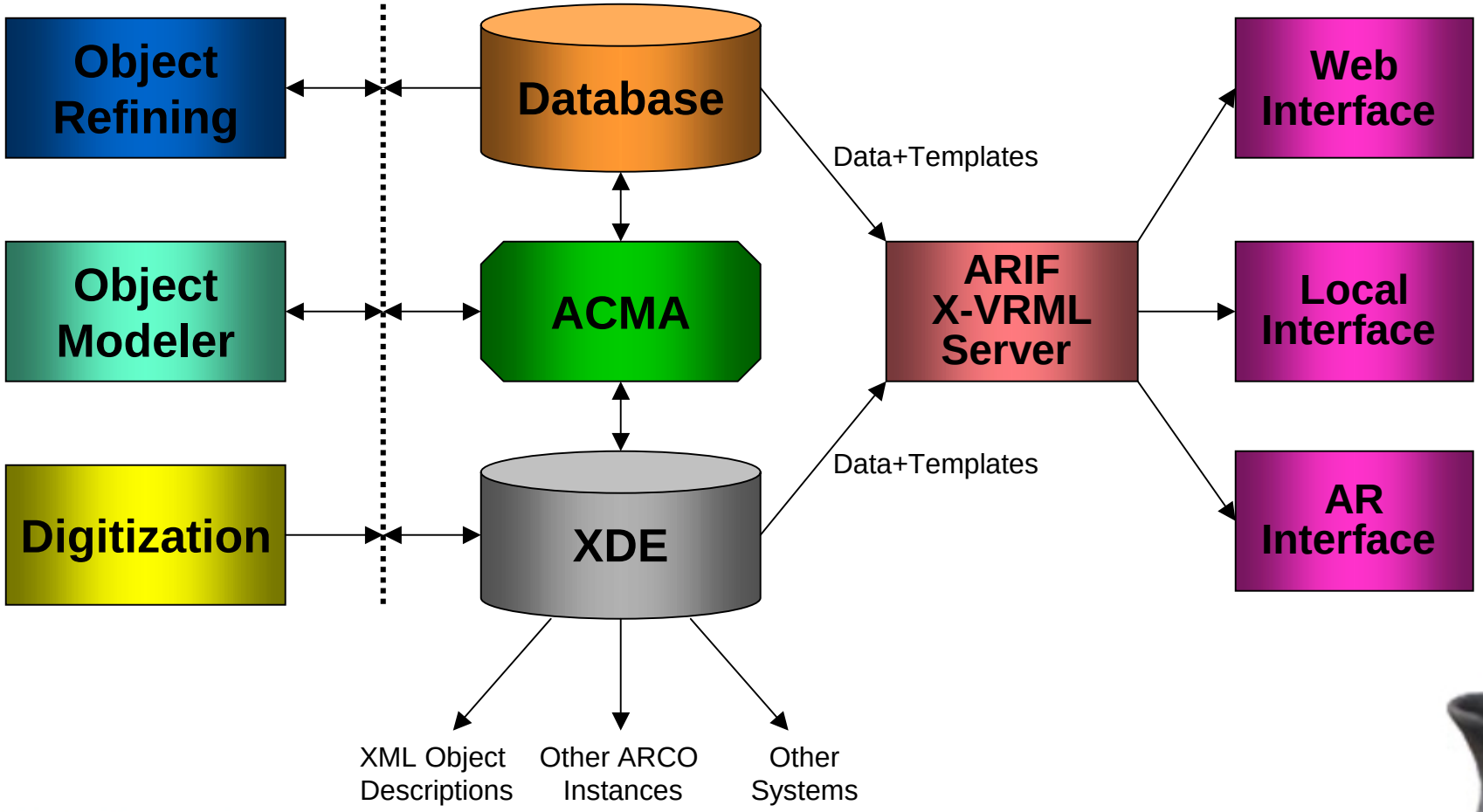
- Demo: ACMA and end-user ARIF interfaces

Data Management in ARCO

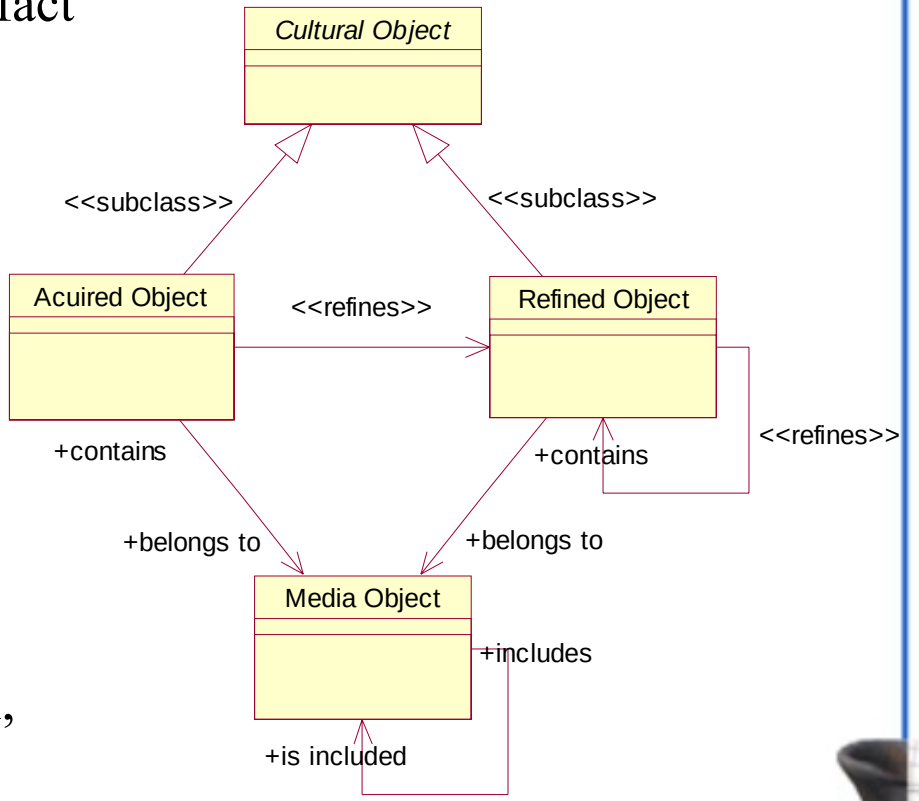
- Local and remote access do data by multiple users
- Consistency, security, backup/recovery
- User-friendly manipulation of complex data
- Metadata describing cultural object data at different levels of abstraction and processing stages
- Extensibility to support types of data used by museums at present and in the future
- Open architecture allowing interoperability with other systems and tools
- Scalability

ARCO Architecture



ARCO Data Model

- Cultural Object
  - representation of a physical artefact (abstract)
- Acquired Object
  - collects original data
- Refined Object
  - interpretation of cultural object acquired or refined
- Media Object
  - representation of cultural object in a specific medium (3D model, image, description, etc.)



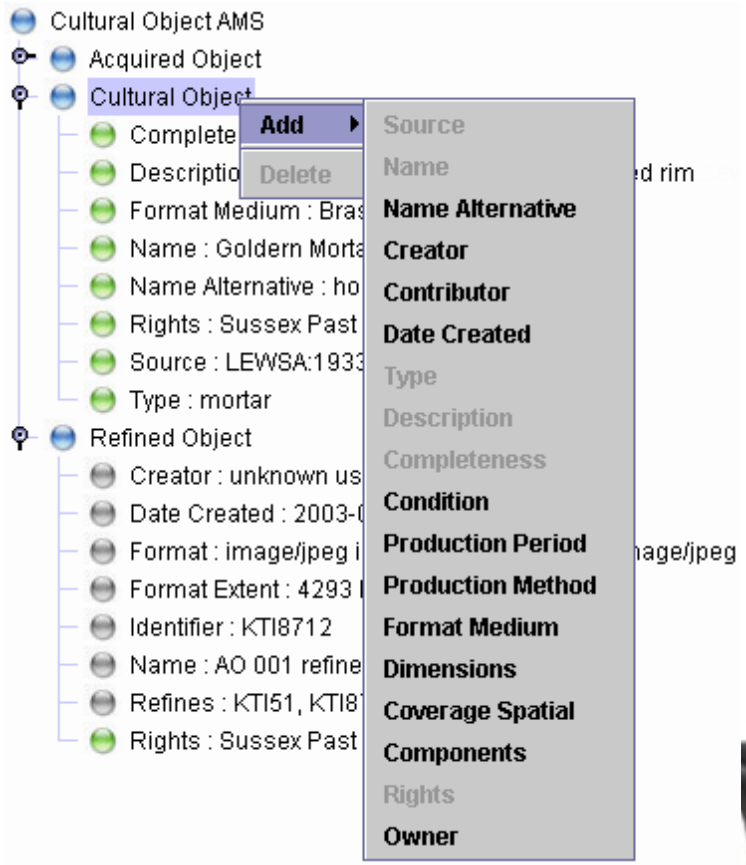
AMS – ARCO Metadata Schema

- AMS is a metadata schema used for describing cultural object data stored in the ARCO database
- AMS is used throughout the whole ARCO process from digitisation to visualisation …
- ... by various ARCO user groups
  - Cataloguer
  - Digital Photographer
  - Object Modeler
  - Object Refiner
  - ARIF Content Designer
  - ARCO End-user

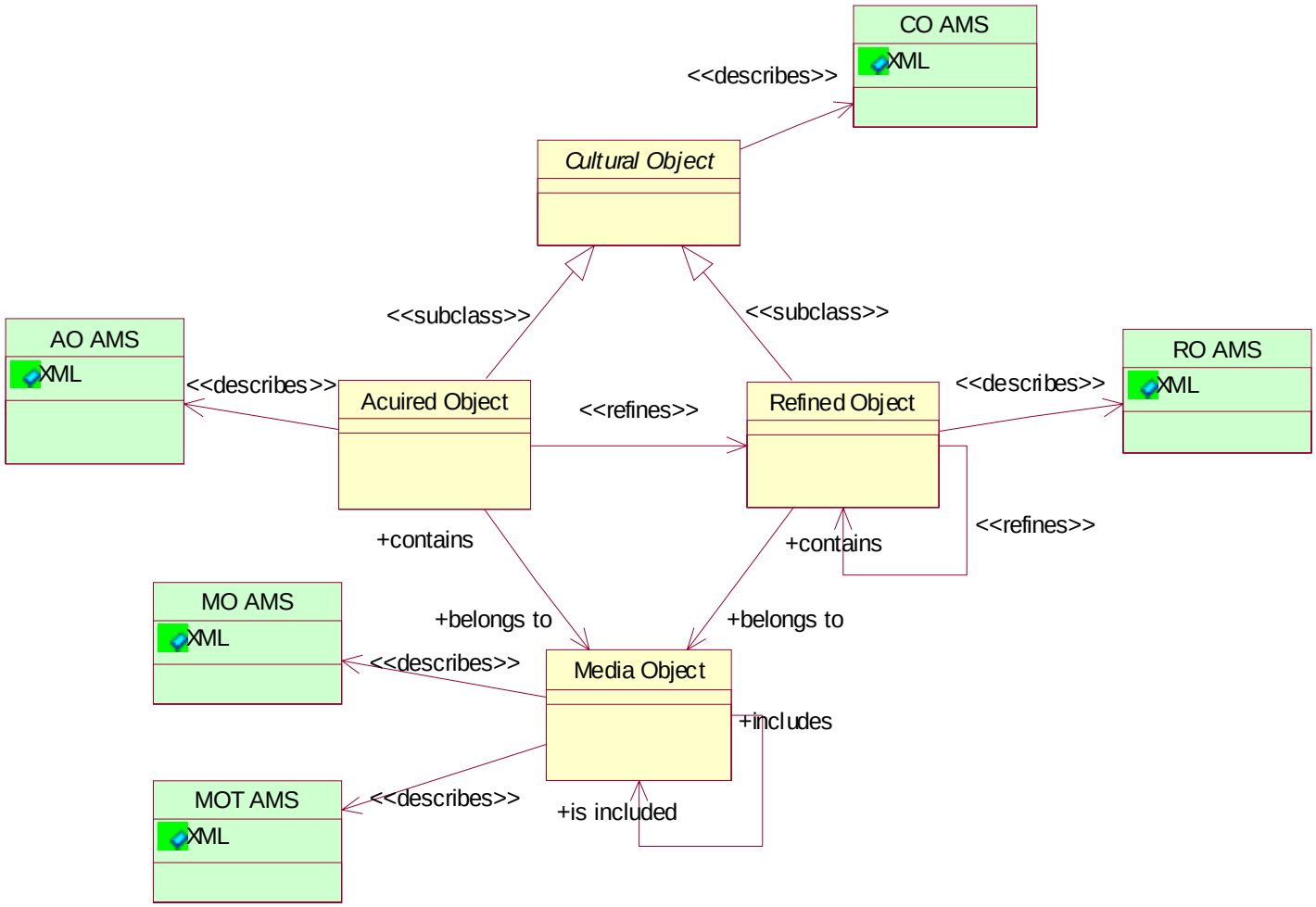
Overview of AMS

- AMS includes:
  - Resource discovery metadata
  - Curatorial and descriptive metadata
  - Technical metadata associated with ARCO components
- AMS elements:
  - Adopted from standards (DC, AMICO, Spectrum, etc.)
  - ARCO specific elements
- Interoperability
- Implemented with XML Schema

AMS Metadata Editor



AMS in ARCO Data Model



AMS – ARCO Metadata Schema

- Acquired Objects are described by:
  - Cultural Object AMS
  - Acquired Object AMS
- Refined Objects are described by:
  - Cultural Object AMS
  - Acquired Object AMS
  - Refined Object AMS
- Media Objects are described by:
  - General Media Object AMS
  - Media Type Specific AMS (one of 6 element-sets)

AMS – ARCO Metadata Schema

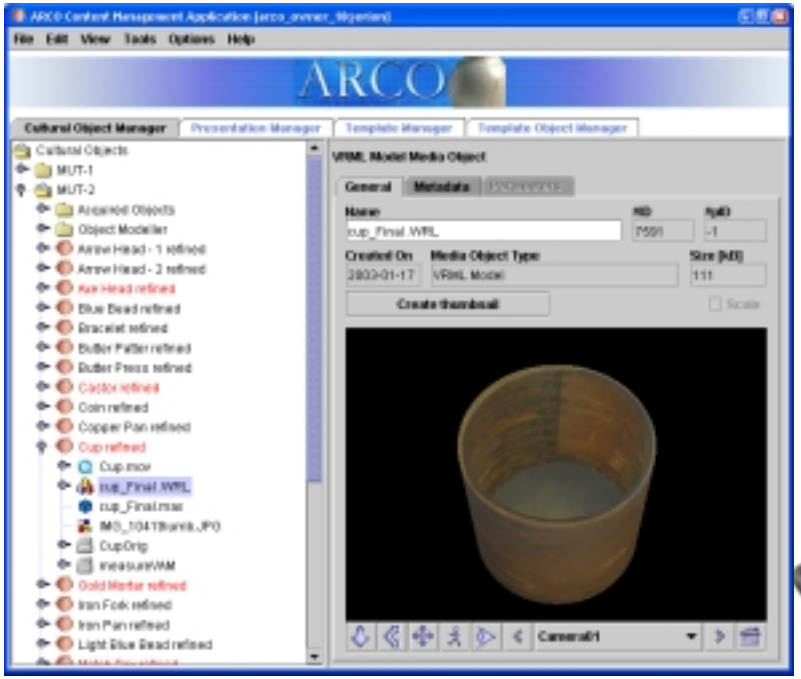
- AMS element-sets defined in 2nd prototype
  - Cultural Object AMS (18 elements)
  - Acquired Object AMS (10)
  - Refined Object AMS (11)
  - Media Object AMS (8)
  - Simple Image Media Object AMS (6)
  - Description Media Object AMS (3)
  - 3D Studio Max Media Object AMS (3)
  - VRML Model Media Object AMS (5)
  - Panorama Image Media Object AMS (3)
  - Multiresolution Image Media Object AMS (4)
- Public deliverable D8 provides all details

ARCO Object Relational Database

- All ARCO data is stored in a database
  - Cultural objects and media objects
  - AMS metadata descriptions
  - Visualization templates (X-VRML)
  - Virtual exhibitions
  - Data dictionaries
  - Users, groups, privileges, etc.
  - Folders for easy data organization
- Implemented in Oracle 9i R2
- Meta-schema design
  - Adding new types of objects without changing the database structure, ACMA, or ARIF tools
- XML data in native XML format

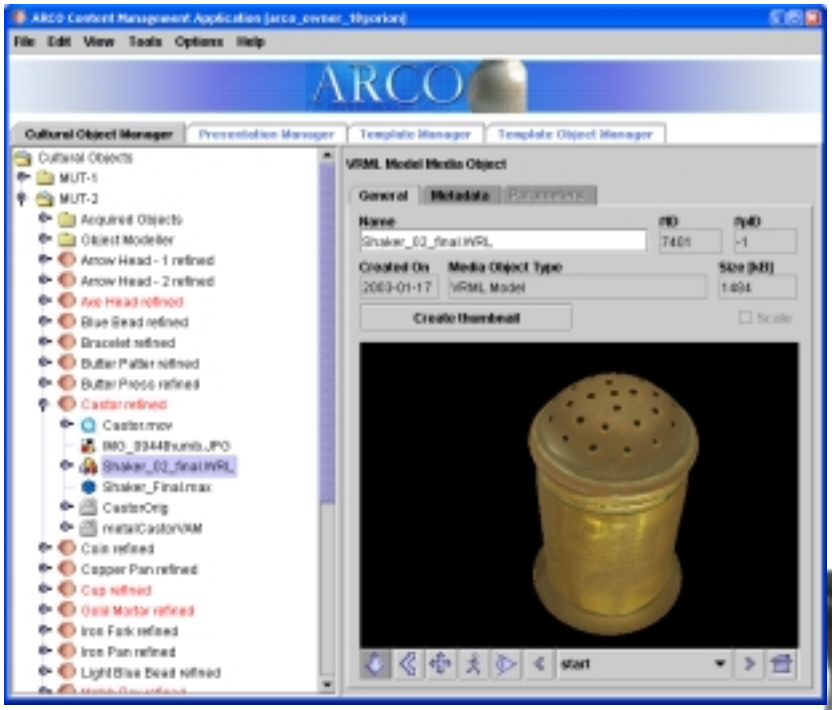
ACMA – ARCO Content Management Application

- Integrated application for management of the ARCO database
- Provides several managers for ease of data manipulation
  - Cultural Object Manager
  - Presentation Manager
  - Template Manager
  - Template Object Manager
  - Object Type Managers
  - AMS Schema Manager
  - …



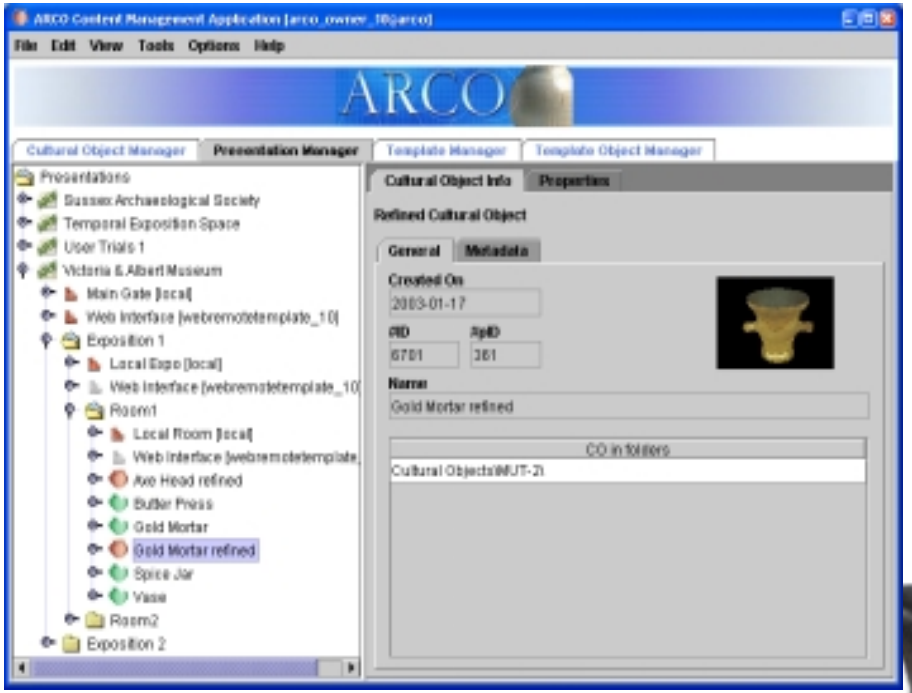
Cultural Object Manager

- Managing cultural objects – virtual representations of cultural artefacts – stored in the ARCO database
- Managing media objects associated with cultural objects
- Managing AMS metadata for cultural and media objects
- Preview and manipulation of multimedia data
  - Images
  - VRML models
  - QT Movies
  - Text



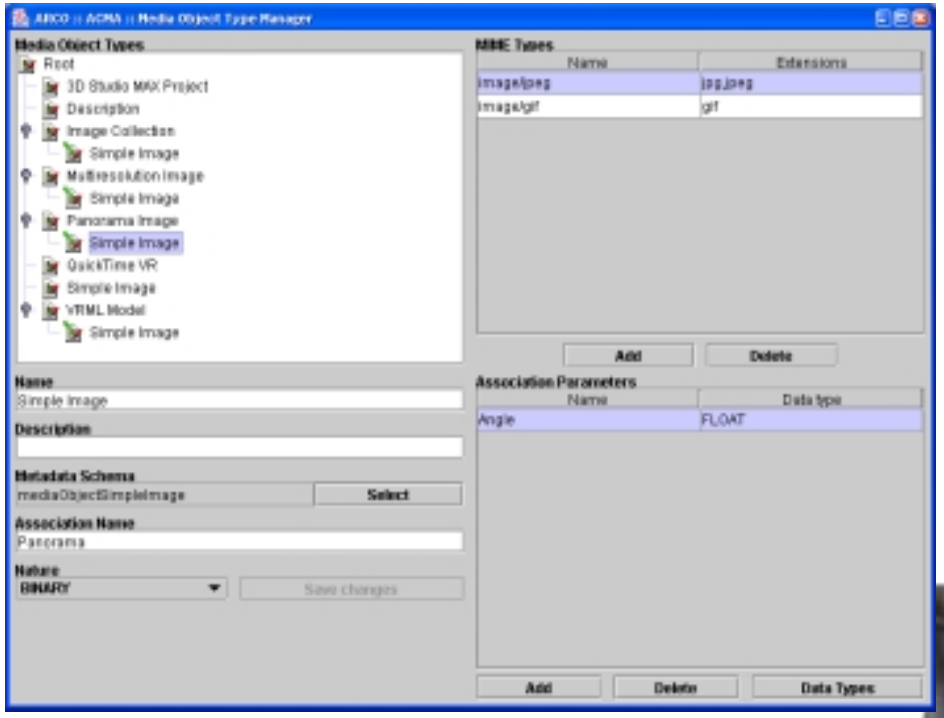
Presentation Manager

- Managing virtual exhibitions of cultural objects – contents displayed in end-user ARIF interfaces
- Creating and managing virtual exhibition spaces
  - Exhibition spaces
    - 2D web pages
    - 3D virtual rooms
  - Assigning cultural objects to exhibition spaces
  - Assigning and customising visualization templates
  - Preview of exhibition spaces



Media Type Manager

- Management of types of media objects supported by the database, ACMA and ARIF
  - Simple types
  - Composite types
- Functions
  - Creating new type
  - Assigning allowed MIME types
  - Defining type-specific AMS schema
  - Assigning sub-types and defining association parameters

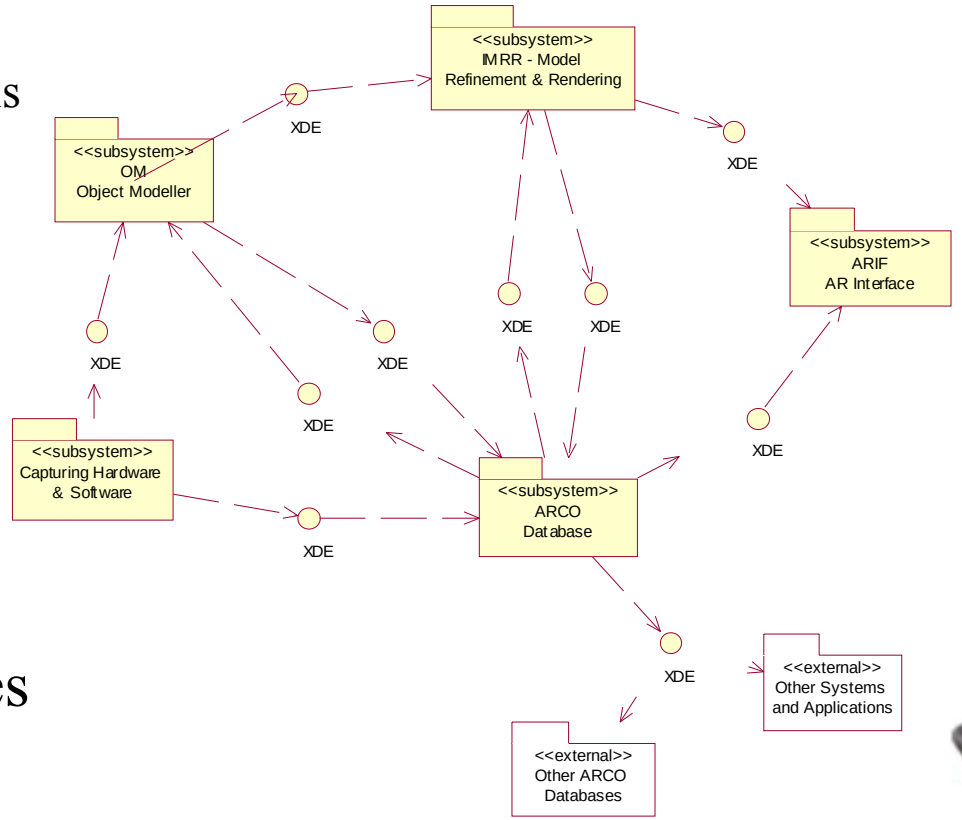


Other ACMA Tools

- Template Manager
  - Management of X-VRML visualization templates (both 2D and 3D)
- Template Object Manager
  - Management of multimedia ARIF objects
- AMS Schema Manager
  - Management of XML Schema versions for AMS: CO, AO, RO, MO, MOT
- Template Object Type Manager
- XSL, Configuration, Presentation Domain, and Data Type Managers

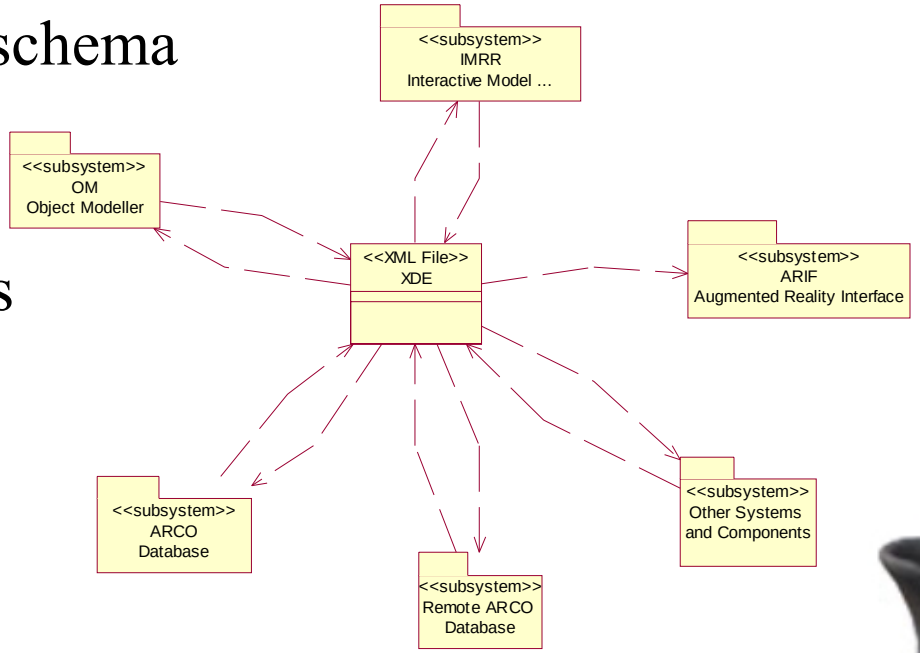
XDE – XML Data Exchange Format

- XML interfaces of ARCO components
- Open architecture
  - Extensible set of ARCO tools
  - Interoperability with other systems
- Off-line work without database connection
  - Archaeology
  - Museum presentations
- Data exchange between ARCO database instances



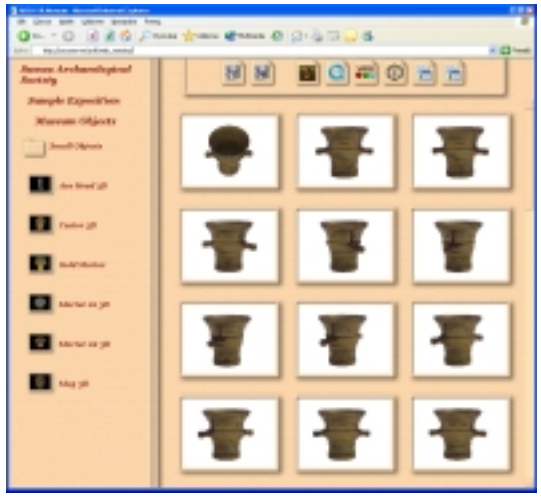
Implementation of XDE

- XML schema reflecting structure of the database
- XML-DB mapping defined in the schema
- Import/export tools independent of the database and XML schema
- Can be used with future versions of the ARCO database and other systems



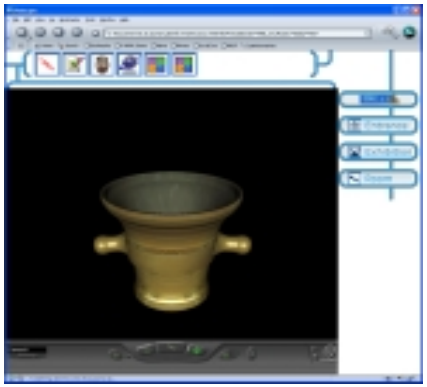
Overview of End-user Interfaces

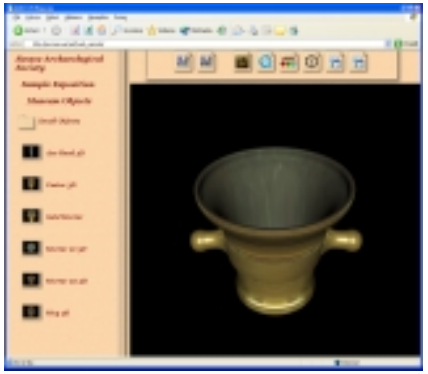
- Two main types of end-user interfaces
  - Web-based interfaces
  - Augmented Reality interfaces
- Presentation domains for presenting the same set of objects in different ways:
  - web-local (for use within the museum, e.g. on a touch-screen display)
  - web-remote (for use on the Internet)
  - other as required (extensible list of domains)

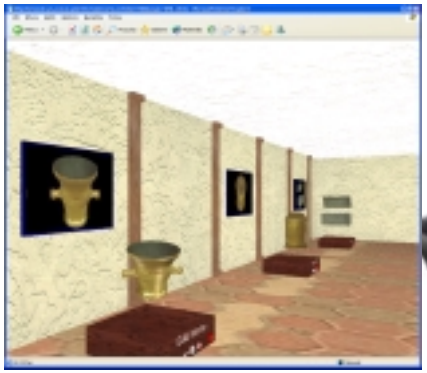


Dynamic Modelling with X-VRML

- X-VRML – high-level XML-based language for creating dynamic VR models and parameterised presentation templates
- Contents of end-user interfaces is dynamically created by ARIF X-VRML server
  by combining data and visualization templates
- Template instances for:
  - Search interfaces
  - Parameterised browsing
  - Virtual exhibitions





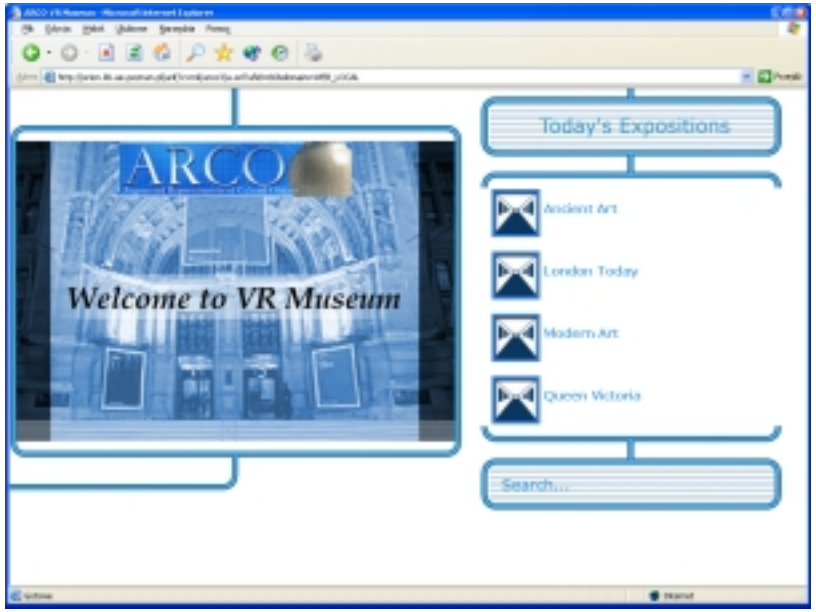


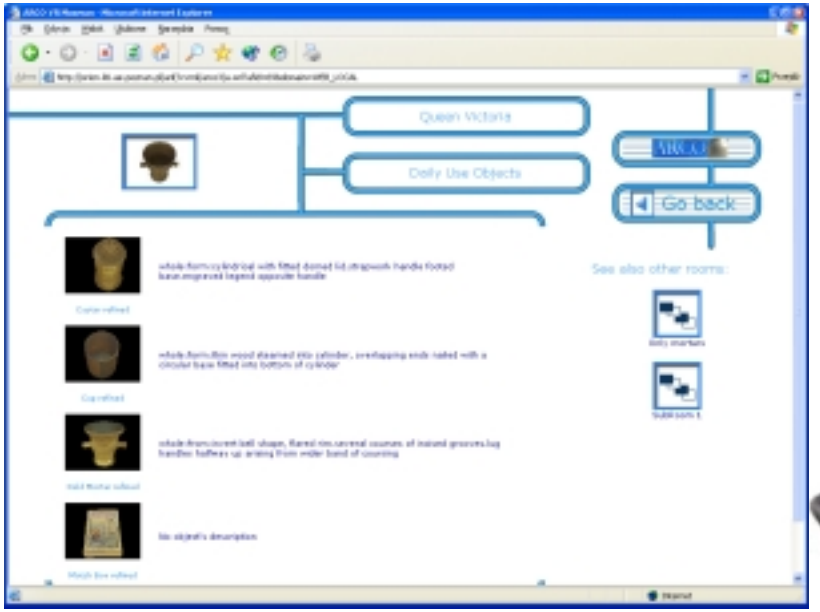
Dynamic ARIF Contents

- Exhibition spaces (web pages, virtual rooms) are created in ACMA Presentation Manger and contain:
  - References to Cultural Objects
  - Template Instances (template + parameter values) for different presentation domains
- Template instances are inherited in sub-spaces if not redefined
- Template parameters can be used to customize the method of visualization (background in 2D, walls in 3D, etc.)
- Exhibition space properties provide information specific to a particular space (description, specific icon, etc.)

Local Web Visualization Template

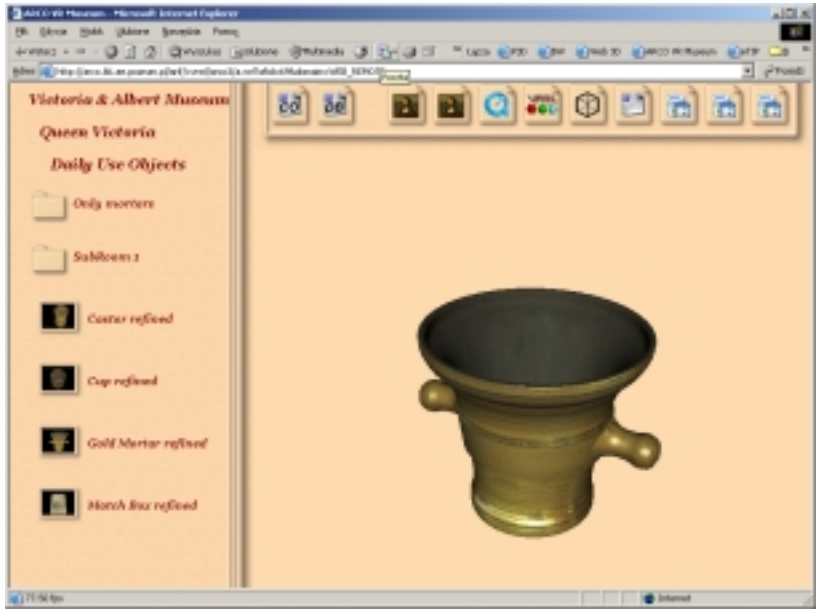
- Designed for use within museums on touch screen displays
- More functionality, e.g. search system
- Limited contents, e.g. no 3ds max objects

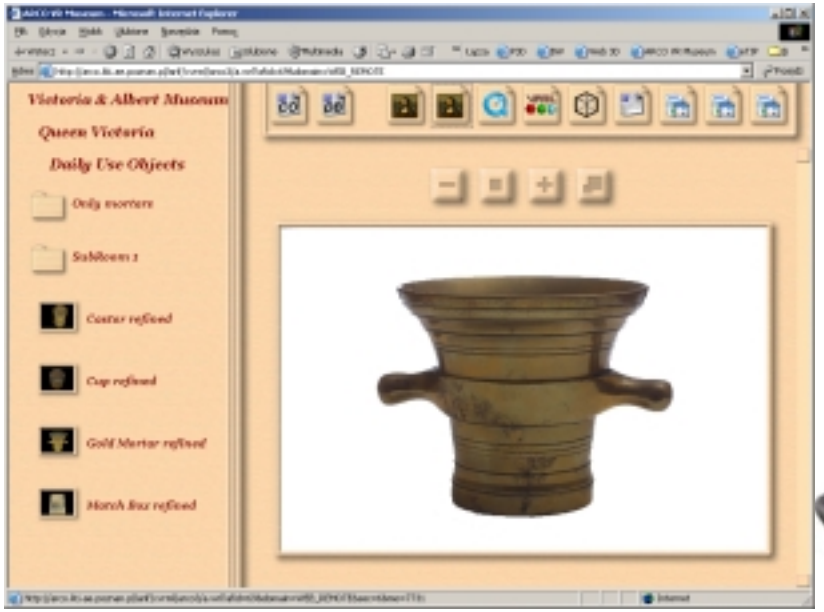




Remote Web Visualization Template

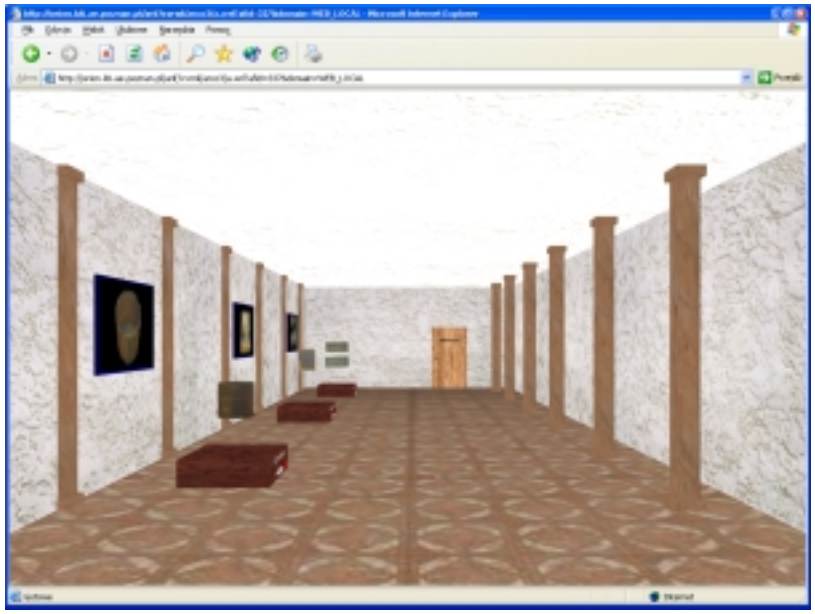
- For use on the Internet in a Web browser
- Designed to work in unknown hardware/software environment
- Lightweight graphics elements for better response times

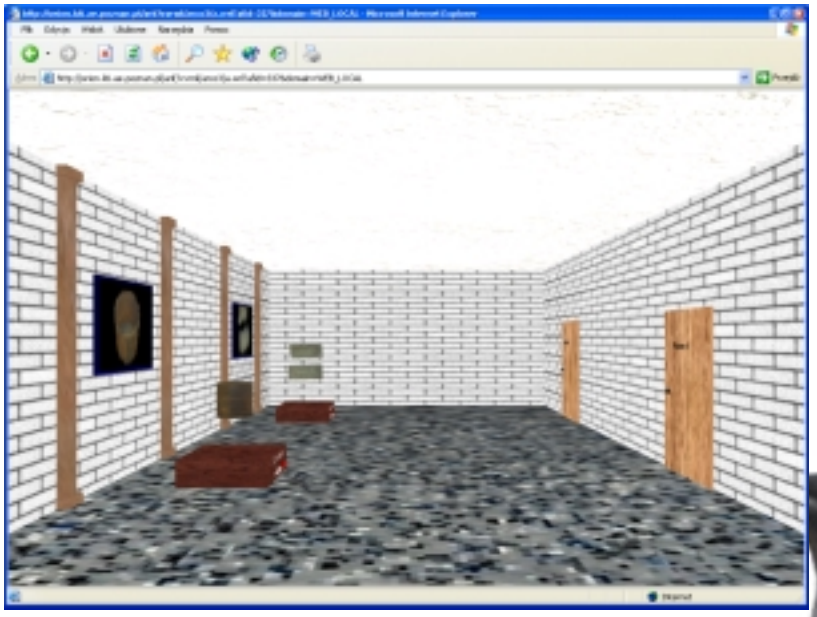




3D Gallery Template

- Different metaphor for visualizing the same data
- Direct representation and manipulation of 3D object models
- Can be used in both web-local and web-remote domains





Demonstration of ACMA and ARIF

Conclusions

- ARCO is providing an integrated system for managing multimedia virtual representations of cultural object in a consistent way
- Extensibility of the data model guarantees that both current and future museum practices will be supported
- XDE provides data interoperability making the system both internally and externally open
- ACMA allows to manage cultural objects and virtual exhibitions in a user-friendly way
- End-user ARIF interfaces allow to display the contents to museum visitors and on the Internet