



# National Hydraulic Data Repository

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National Hydraulic Research Institute of  
Malaysia  
(NAHRIM)

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# What is NAHRIM's Data Repository?

Combination of ICT approach and Knowledge Management  
in developing platform, where water related digital  
information in Malaysia is  
**accessible, usable and exploitable**

# Project Objectives

To create an Information Repository that contains all the water related information available in NAHRIM.

To digitise all R&D activities. The Information Repository will act as an electronic support system within NAHRIM and can serve as the Information Repository for decision support systems.

To archive information that may otherwise be scattered or even lost.

To provide a single platform to share research data, information, and resources within NAHRIM. This can also reduce duplication of efforts among researchers.

To provide sufficiently comprehensive and granular information so that they are informative and at the same time easily reused or processed for presentation in various formats to meet the user's requirements.

To generate consolidated reports of various resource types.

To manage collective knowledge on water related issues.

# Features of Repository

## *a) Document management*

- The information source for the repository is most likely to be in the form of documents in various formats. It has been designed so that it is able to store and manage the documents in their native format.
- Users will be able to browse and search for the documents available using metadata.
- It will provide support for hyperlinks and the definitions of these links in the other documents in the repository.
- The repository will be able to maintain different filing structure of each division as it depends on their needs and current practices.

## *b) Information architecture and structure management*

- The application to be developed for the various divisions in NAHRIM has taken into account the required customised information architectures to suit their diverse needs.
- In the Information Repository, the information architecture will be used as the navigation structure for users to browse, explore, group and filter the repository. It will also be used as a place holder for the resources to be captured.

## *c) Document-centric computing*

- All information stored in the Information Repository will be in the form of documents. The information type identified will be entered using HTML forms where these HTML forms will have to be designed to meet the requirements of the different resource types over their business processes. These forms may require to be revised from time to time to meet new requirements.
- To ensure productivity and reduce errors in the information capture, these HTML forms must incorporate various constraints and validation rules; provide pick-lists based on the information captured in the Information Repository. Information from existing documents may also need to be transferred to the forms during data entry to reduce inputs and typing errors.

## *d) Water related descriptors*

- A key to the success of the Water Information Repository is for similar information to be described in a similar manner. This will help reduce redundancies and ensure that the collected information can be easily compared or consolidated. This requires the use of water related descriptors.
- Descriptors are not to be confused with the term specification that engineers and researchers are more familiar with. Specification specifies what is required whereas descriptors describe what is already there. The descriptors list shall contain the descriptive fields for all the technical information handled by the division. The descriptors shall be arranged into sections in line with the current practices of the division.
- Where the descriptors are for quantitative information, a description of how the quantitative information is to be determined must be provided together with the recommended units of measurement.
- Some descriptive fields may require a controlled vocabulary or qualitative scales and these must be provided by the specialists together with descriptions of the vocabulary used.
- The highly discriminative descriptors must be identified so that when the descriptors are used, they are mandatory.





*e) Ease and efficiency in populating the Information Repository*

- The Information Repository should be easy to be populated either using a desktop application or a web browser. The desktop application should provide native access to all the information in the Information Repository with extensive searching, navigating, filtering, export and import capabilities which may not be available on the web-based applications.

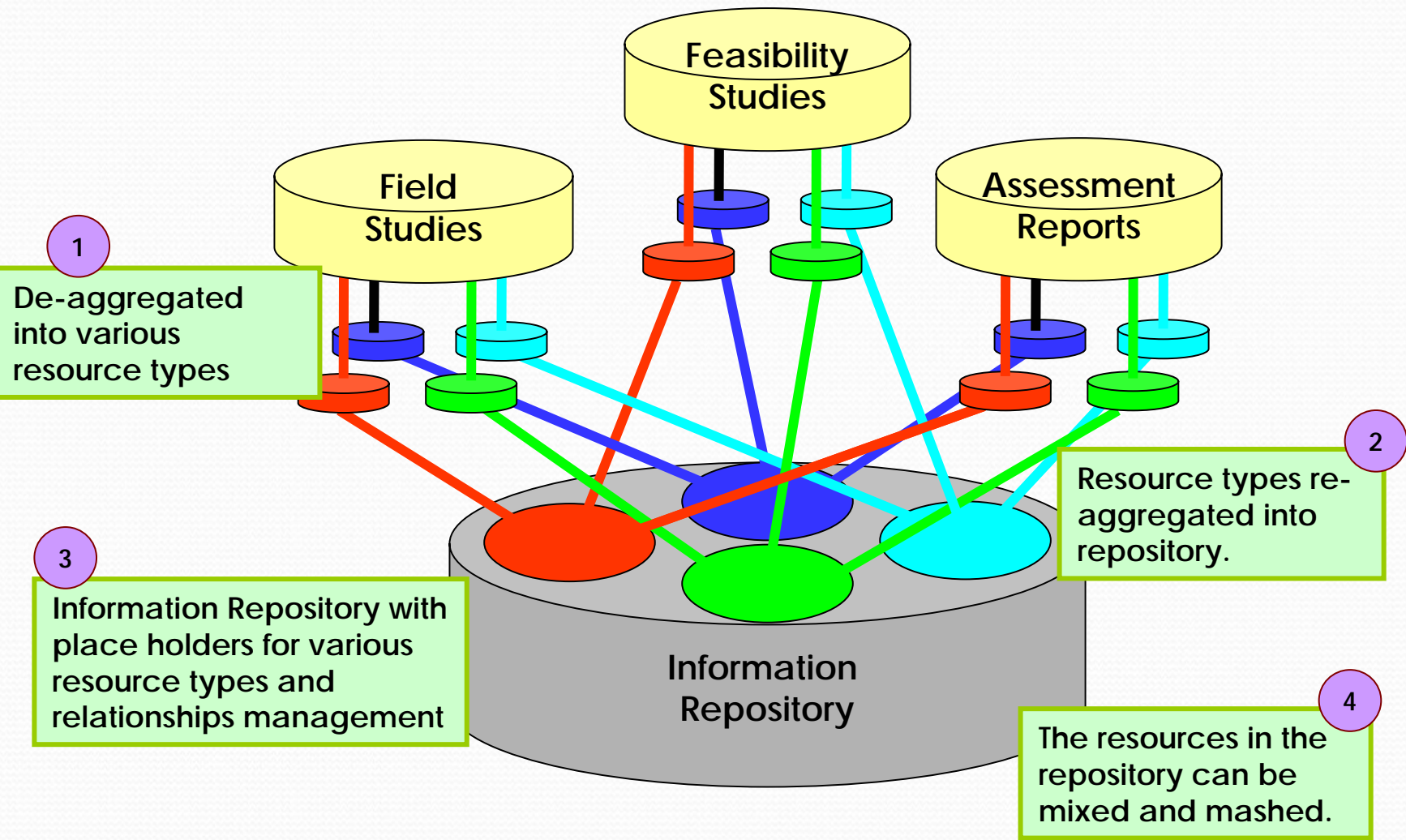
## *f) Flexible querying and reporting abilities*

- The Water Information Repository collects all related information throughout NAHRIM. It organises the information for study and make it completely flexible for intensive reporting and analysis. In order to do so, a searching facility needs to be provided for the user, for example searching information by full text or by common sets search.
- The information can also be grouped under multiple categories and can be related to any other information based on its relationship. This can be use to describe, summarise and compare data, hence providing a more meaningful report generation.

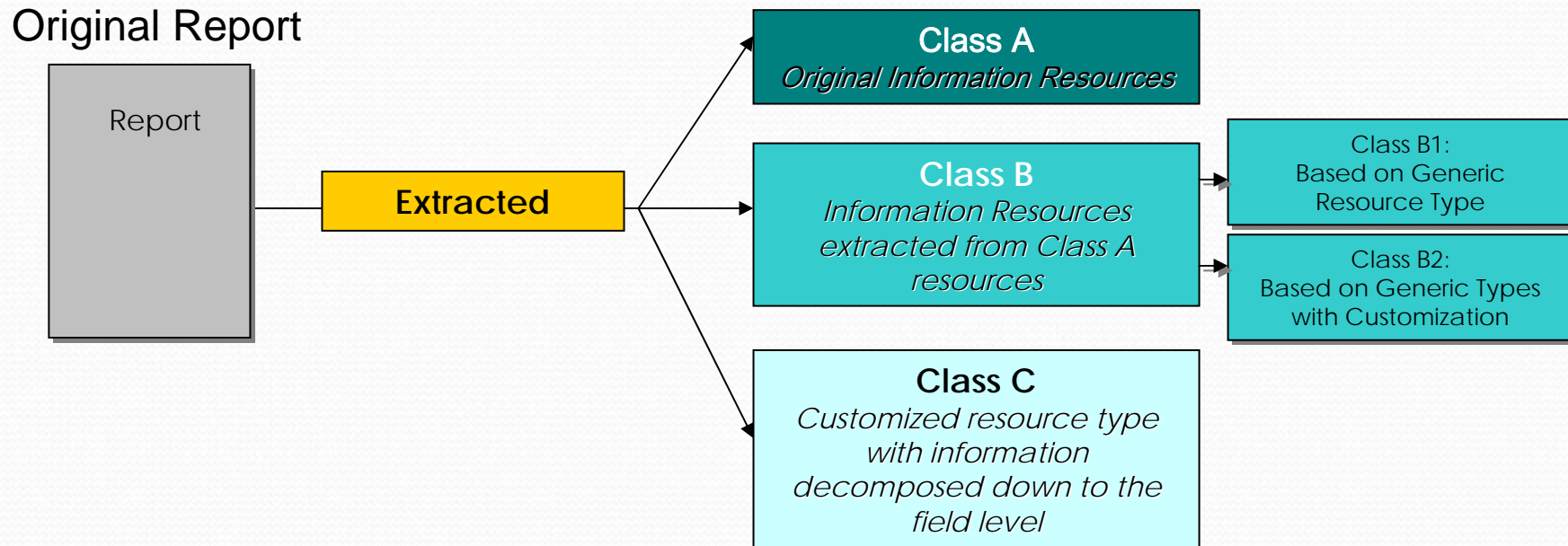
## g) Spaces and Security Policies

- The system takes into account that each division in NAHRIM would preferably want to work in an application customized for their business processes and needs. In other words, the divisions would be given their own spaces.
- The system takes into account that at the management level, is more interested in the final information and the status of the projects in progress. They need to look at the information across all the divisions. As such, the management space is different from the division spaces. Collaborators and other users will also require their own space.
- The information stored in the data repository will require information in different subject areas to be stored in different models. The security policies will need to be defined at model, folders, document types and resource type's levels. Security policies can also be defined for the various actions that can be used for work-flow and documents updates.

# Information: De-Aggregating and Re-Aggregating



# Decomposition of Reports into various Classes



# Decomposition of Reports into various Resource Types

**Class A  
(Original)**

Report

**Class B  
(Intermediate)**

Chapters

Appendices

Maps

Images

Tables

Graphs

Charts

Diagrams

Drawings

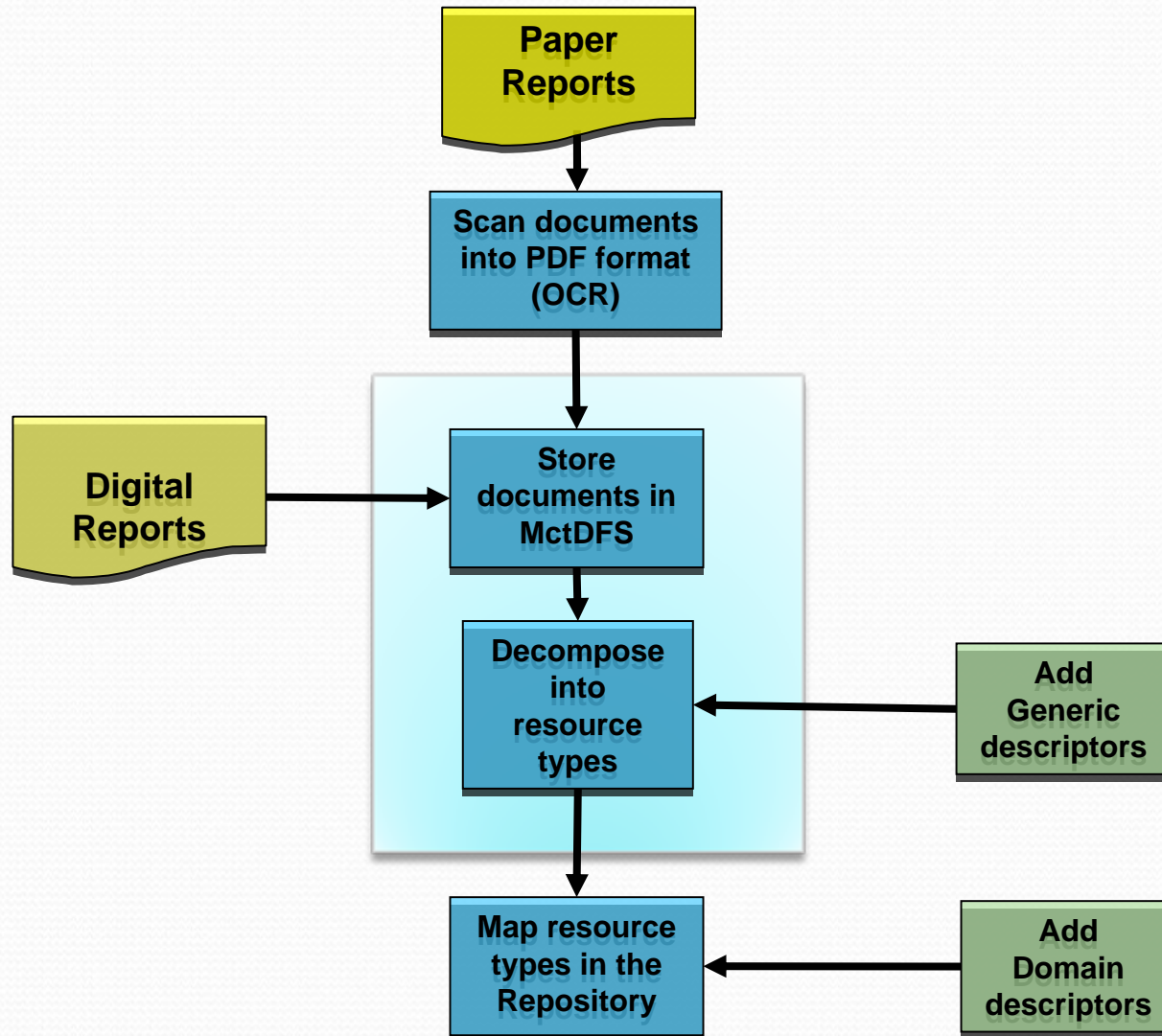
Resource  
Types  
(Metadata)

**Class C  
(Field level)**

Resource Types  
(Characterization)

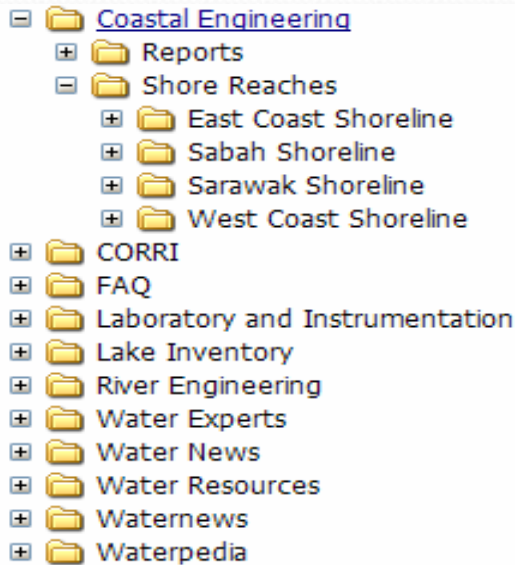
*Units of Information*

# Reports Processing



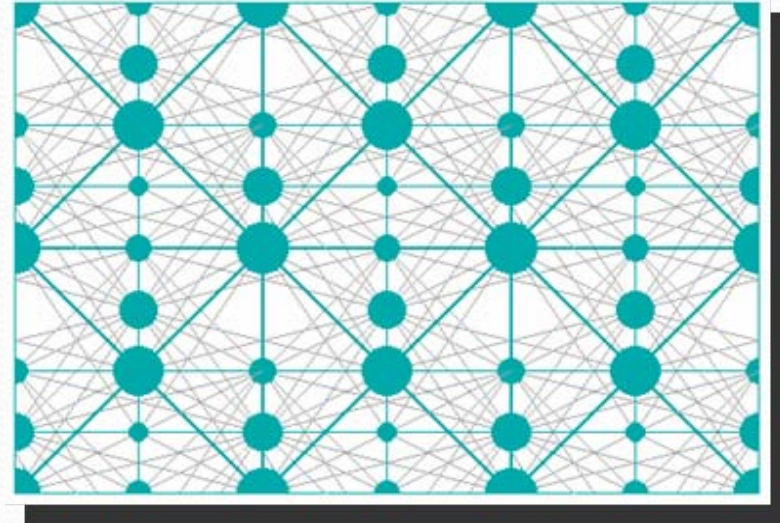
# Information Storage and Mapping

## Document Filing System



- Hierarchical Structure
- Based on fixed structure
- Generic resource type based on presentation format.

## Multicentric Information Repository



- Network Information structure supporting browsing, grouping, filtering and list processing
- Information relationship management
- Virtual view of information network
- Generic and customized resource type for subject domain



# Information Repository Modules

Coastal Engineering
River Engineering
Water Resources
Lake Inventory
Coastal Resources Risk Index
Laboratory and Instrumentation
Registry of Experts
Waterpedia
Water News
NAHRIM Information Portal
FAQ (Help system)

# 1. Coastal Engineering

- Research Center for Coastal Management will own and manage Coastal
- Engineering Information Repository. Types of information stored are as follows:
  - Project Information
  - Environmental Data
  - Physical Data
  - Engineering Data
  - Structure Data
  - Coastal Development
  - Management Data
  - Biological Information
  - Socio-Economics
  - Findings and Recommendations

## 2. River Engineering

Research Center for River Management will handle and manage River Engineering

Information Repository. The types of information consist of:

- Project Information
- Physical Data
- Biological Data
- Human Activities
- Key Issues and Option
- Integrated River Basin Management

# 3. Water Resources

- The Water Resources Information Repository own and manage by Research Center for Water
- Resources Management will store information related to water resources in Malaysia
- covering different aspect and issues. The information been store are:
  - • Project Information
  - • Environment
  - • Socio-Economics
  - • Water Availability and Environment
  - • Water Use
  - • Simulation
  - • Water Resources Development
  - • Water Resources Management

## 4. Lake Inventory

Lake Inventory module is owned by Research Center for Water Quality and Environment. This module will store information about lakes in Malaysia. Types of information stored include:

- Physiographic Data
- Lake Water Quality
- Socio Economic Data
- Lake Utilization
- Deterioration of Lakes Environments and Hazards
- Developments
- Legislative and Institutional Measures for Upgrading Lake Environment
- Monitoring Stations

## 5. Coastal Resources Risk Index

Besides Lake Inventory, Research Center for Water Quality and Environment also manage Coastal Resources Risk Index. Information stored in this module is:

- Project Information
- Coastal Classification Schemes
- Coastal Vulnerability
- Methodology
- Water Quality
- Biological Resources
- Fisheries Socio Economics
- Recommendations
- Guidelines
- Proposal

## 6. Laboratory and Instrumentation

Objective of Laboratory and Instrument Information Repository is as follows:

- Inventory Listing for various equipments and instruments managed by the division.
- The inventory list of the instruments in the custody of the other division can also be managed if required.
- Specifications and usage records of the Physical Modeling Facilities available in the Laboratory such as Tidal River basin facility, 2D flume, Coastal Wave Basin Facility, Tilting Flume and Port and Harbor Deep Basin Facility.
- Physical Modeling Report
- Research Project Information

Type of information available in this module is about Equipment available at NAHRIM. This module is managed by Hydraulic and Instrumentation Laboratory

# 7. Registry of Experts

As for Registry of Experts, this module will store information about experts in water related. The objectives of this module are:

- To maintain a repository water related experts in Malaysia. These experts may be from NAHRIM or other organizations.
- To facilitate the process of identifying the right experts through profile searching facility.
- To provide a resume bank of staff in NAHRIM.

Types of information stored in this module are:

- List Resources Persons Themes and Sections GWP IWRM Tools
- Field of Study Country of Study Age Groups
- Current Status

## 8. Waterpedia

Waterpedia module is a module that can be called as water dictionary or water encyclopedia where it store general information about water. The objectives of Waterpedia Information Repository are as follows:

- To maintain a glossary of water related terminology, facilities, instruments and equipments, software, organizations, people, law and information about major projects in the Malaysian context.
- To provide Gazetteer facility for users to search for geographics names or places and associates them with geographics locations and other descriptive information. This includes the register of rivers, the river basin management unit and shore reaches.
- To provide facilities for the administrator to add, edit and delete all various static and dynamic resources.
- To provide a suggestion form to add new subject matters and technical terms.

Types of information available under this module are:

Technical Terms	Acronyms and Abbreviations	Legislation	Guidelines and Technical Specification
Gazetteer	Facilities	Major Projects	
Instruments and	Software and Databases	Water Bodies	
Organizations	Distinguish Personalities	Publications and Journals	



## 9. Water News

Waternews is a repository of news related to water issues in Malaysia and the region. It is a compilation of news items from various news sources. Similar news is grouped together into customizable news categories, events and issues which are of interest to water community.

The objectives of Waternews Information Repository are as follows:

- To provide a repository news resources related to water in Malaysia and the region. The news item will be grouped into customizable news categories. The news can be further grouped into secondary groups such as issues, locations, organizations and personalities.
- To provide facilities for the administrator to add, edit, delete and organize news.
- To display current news at the front page with the facility to expire the news item after specified time frame.
- To enable users to search for archived news with various options.
- To complement the news clipping related activities in NAHRIM.

Types of information available are:

Climate Change	Environment	River Engineering
Water Policy	Water Quality	Flash Flood
Cyclone Nargis	Sichuan Earthquake	

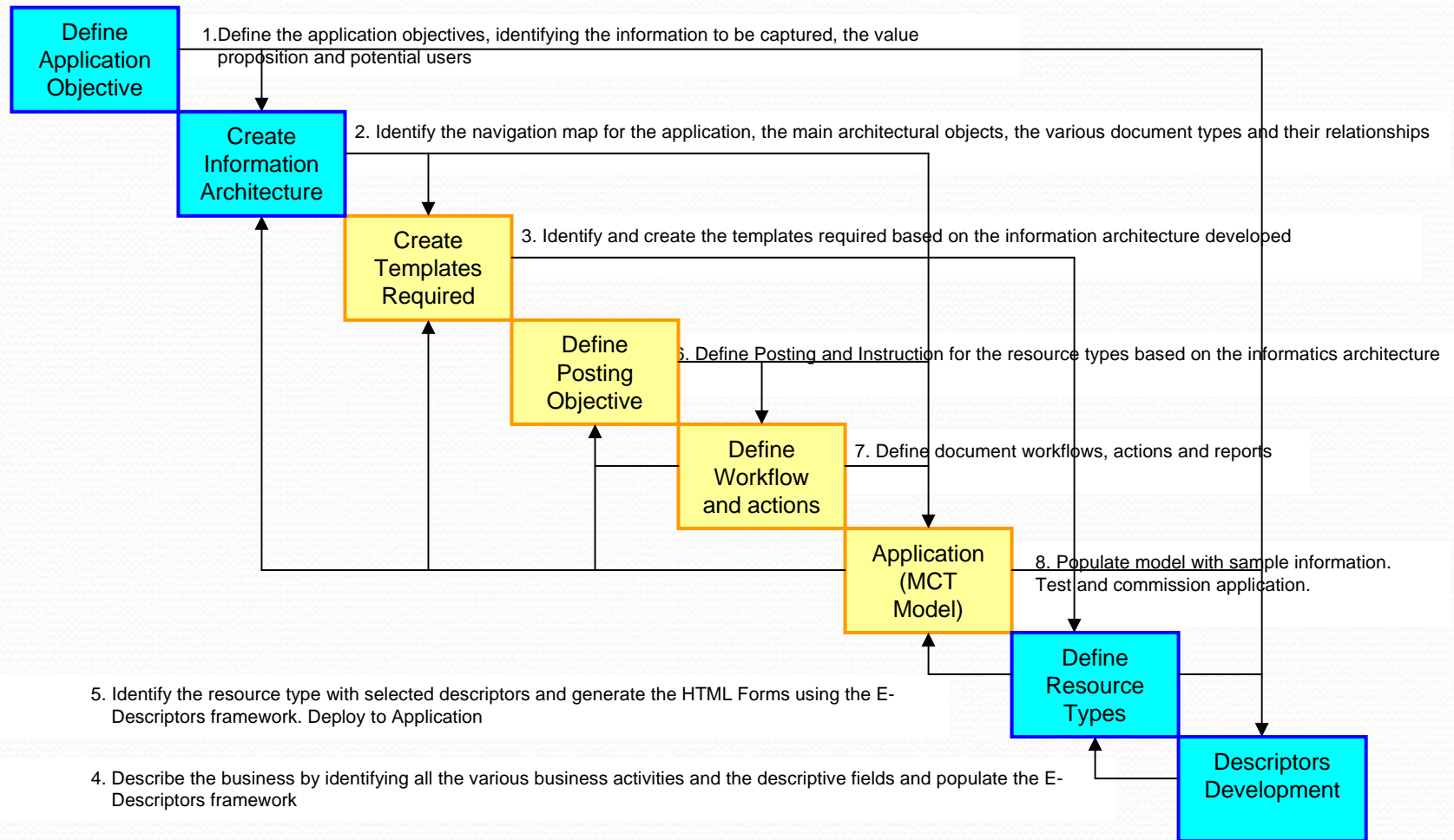
## 10. NAHRIM Information Portal


This portal will act as the gateway to the Repository and the sub-repositories. The applications for the various divisions are designed as the work space for the divisions. The portal will allow users to view and search the information across divisional boundaries.


# Information Sources

- Reports and studies available from
  - Internal Reports within the division within NAHRIM
  - Key Government agencies such as DID, PWD, EPU, DOE, Fisheries, Town & Country Planning Dept., etc
- Preferably in MSWord or PDF Format

# Project Methodology



 Specialists input required

 ICT Team Responsibility

# Challenges & Issues

- Content development must be based on industry practice and usage. This includes descriptors categories in each information repositories.
- Active participation from various divisions to process the reports and to populate the repository and to take the ownership of the repository.
- To ensure desk officers and support staffs are familiar with the information architecture of their respective application and the various functionalities provided.
- Acquiring more reports and information in digital format to be used for populating the repository.
- Creating a critical mass of information in the repository so that it will become the primary reference for water related technical information by the researchers.
- Enforcing quality control measures to ensure the accuracy of the information in the repository. This will determine the success of this project where the success is measure through quality, usefulness and also quantity of information available in the information repository.

# Current Status of Development

Modules	Percentage
Waterpedia	85%
Water News	90%
Coastal Engineering Information Repository	59%
River Engineering Information Repository	59%
Water Resources Information Repository	59%
Coastal Resources Risk Index	52%
Registry of Experts FAQ	50%
Lake Inventory	54%
(Help system)	50%
Laboratory and Instrumentation	19%
NAHRIM Information Portal	WIP

**Overall Status: 71%**



# Short Demo



Thank you