



The Dynamic WMS

Web Client Development with AJAX

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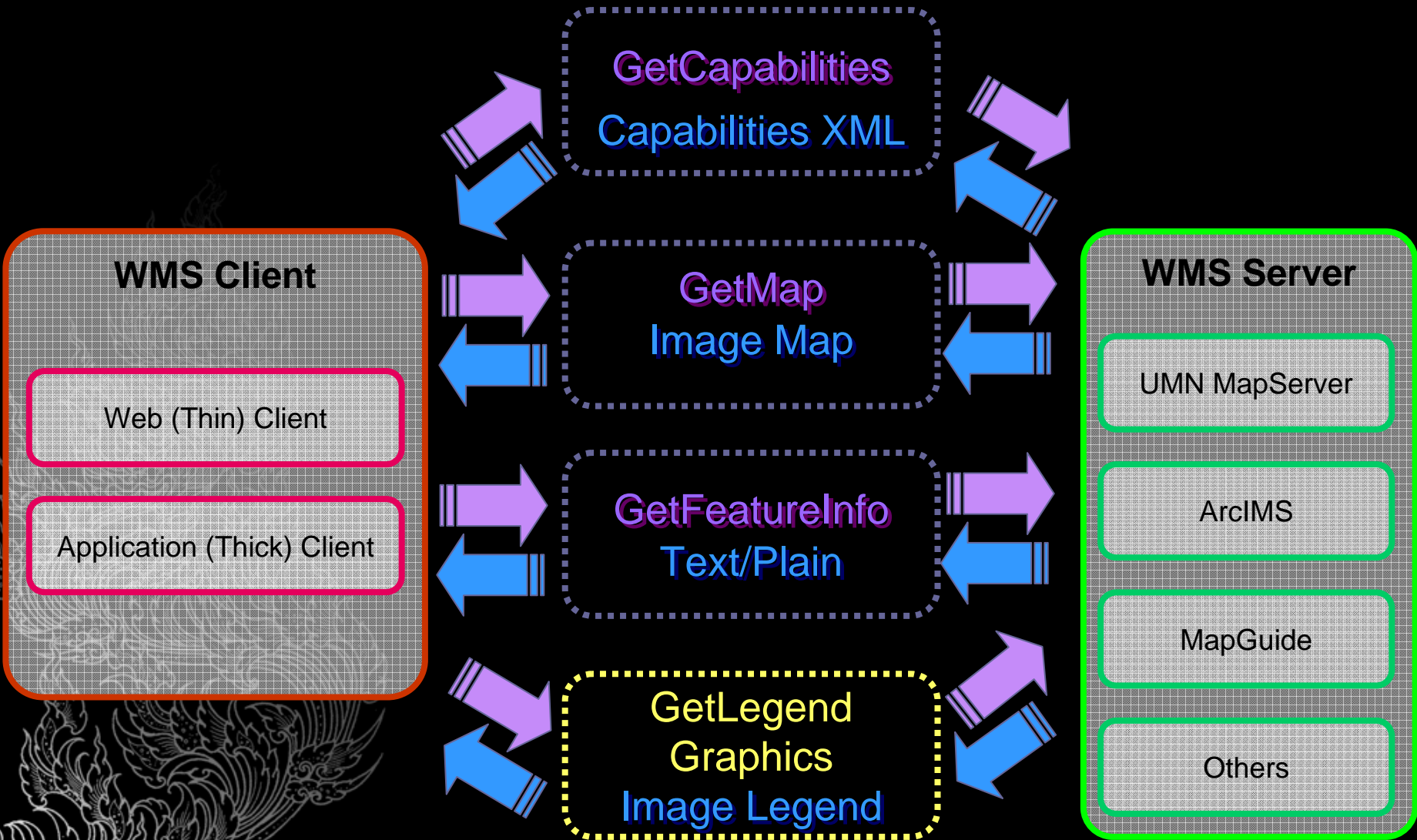
Objective

- Develop WMS web client JavaScript class libraries widely use for most agencies of WMS server
- Improve capability of existing **GISTDA WMS Web client Engine** by using AJAX





WMS Specification





WMS Specification

GetCapabilities

* Required

- `http://webserver/webservice`
`?service=wms`
`&version=1.1.1`
`&request=getcapabilities`

WMS Capabilities XML MIME Type

“ `application/vnd.ogc.wms_xml` ”

This is cause of unnormally parsing in Browser

“ `text/plain` ” and “ `text/xml` ”



WMS Specification

GetMap

* Required

- `http://webserver/webservice`
`?service=wms`
`&version=1.1.1`
`&format=image/png; mode=24bit`
`&request=getmap`
`&bbox=98.19,16.01,102.11,18.36`
`&layers=landsat5,RADARSAT`
`&styles=default,default`
`&width=788&height=462`
`&srs=EPSG:24047`





WMS Specification

GetLegendGraphic

* SLD Only

- `http://webserver/webservice`
`?service=wms`
`&version=1.1.1`
`&format=image/png; mode=24bit`
`&request=getlegendgraphic`

SLD (Styled Layer Descriptors) Supported

- DescribeLayer
- GetLegendGraphic
- GetStyles
- PutStyles



WMS Specification

GetFeatureInfo

* Optional

- `http://webserver/webservice`
`?service=wms`
`&version=1.1.1`
`&info_format=text/plain`
`&request=getfeatureinfo`
`&query_layers=Layer01`
`&feature_count=1`
`&x=100&y=200`
`&.....GetMap Parameters.....`





What Dynamic WMS mean

* Automatically ...

- GetCapabilities at first use
- GetLegendGraphics each layers
- Preloading image map
- Image map format supporting list
- Reprojection BBOX when SRS change
- Visualization with theme support
- Others function ...



Architecture

MapControl

- Map Display

MapTOC

- Layer Manager

MapObject

- Geometry
- MapController
- WMSConnector

Outsource JavaScript Engine

- XML parser
- Map Reprojecter & Proj4





Implementation

* Outsource JavaScript Engine ...

- XML parser

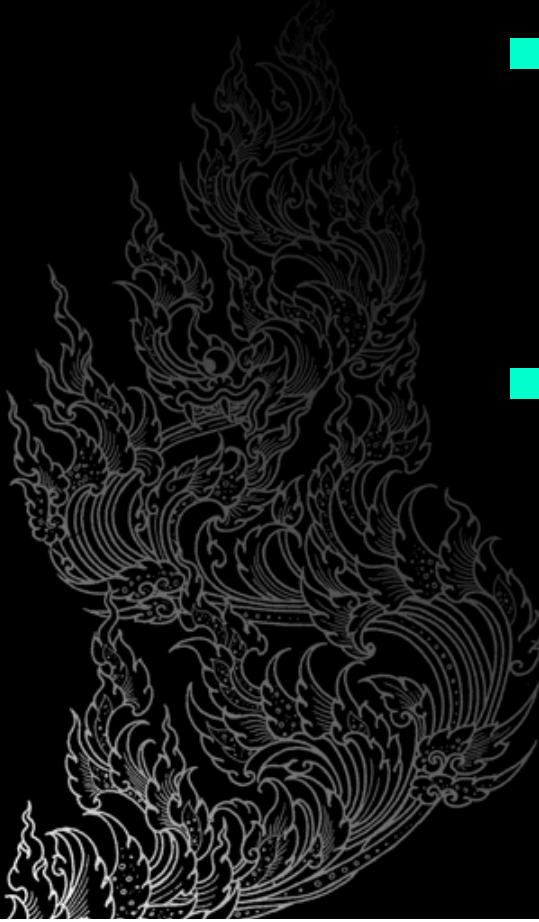
“XML for <Script>” version 3.1

<http://xmljs.sourceforge.net/index.html>

- Map Reprojecter

“General Cartographic Transformation Package - JavaScript Edition (GCTP-JS)” version 0.2.1

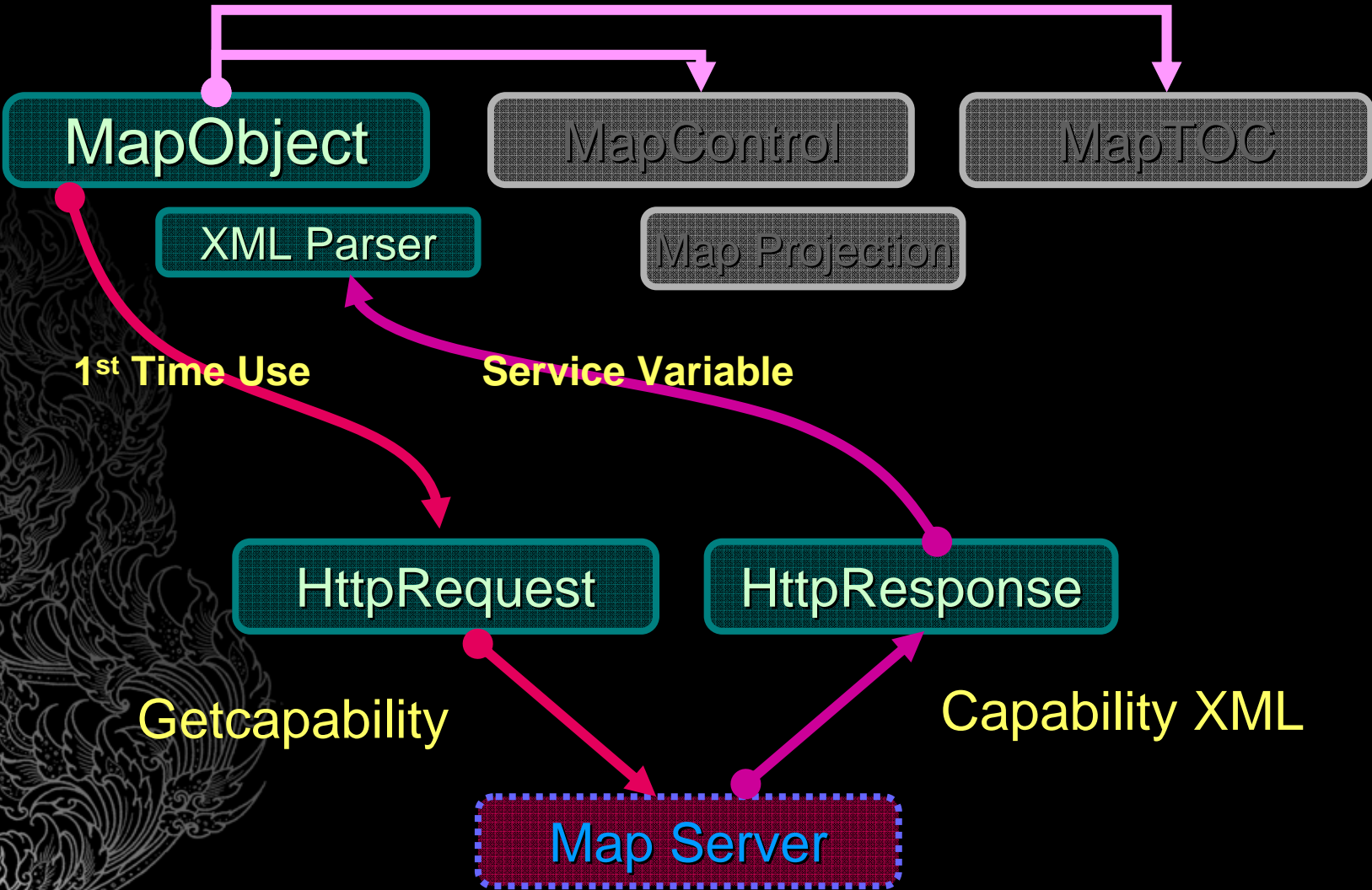
<http://datashare.gis.unbc.ca/gctp-js/index.php>





Data Flow Diagram

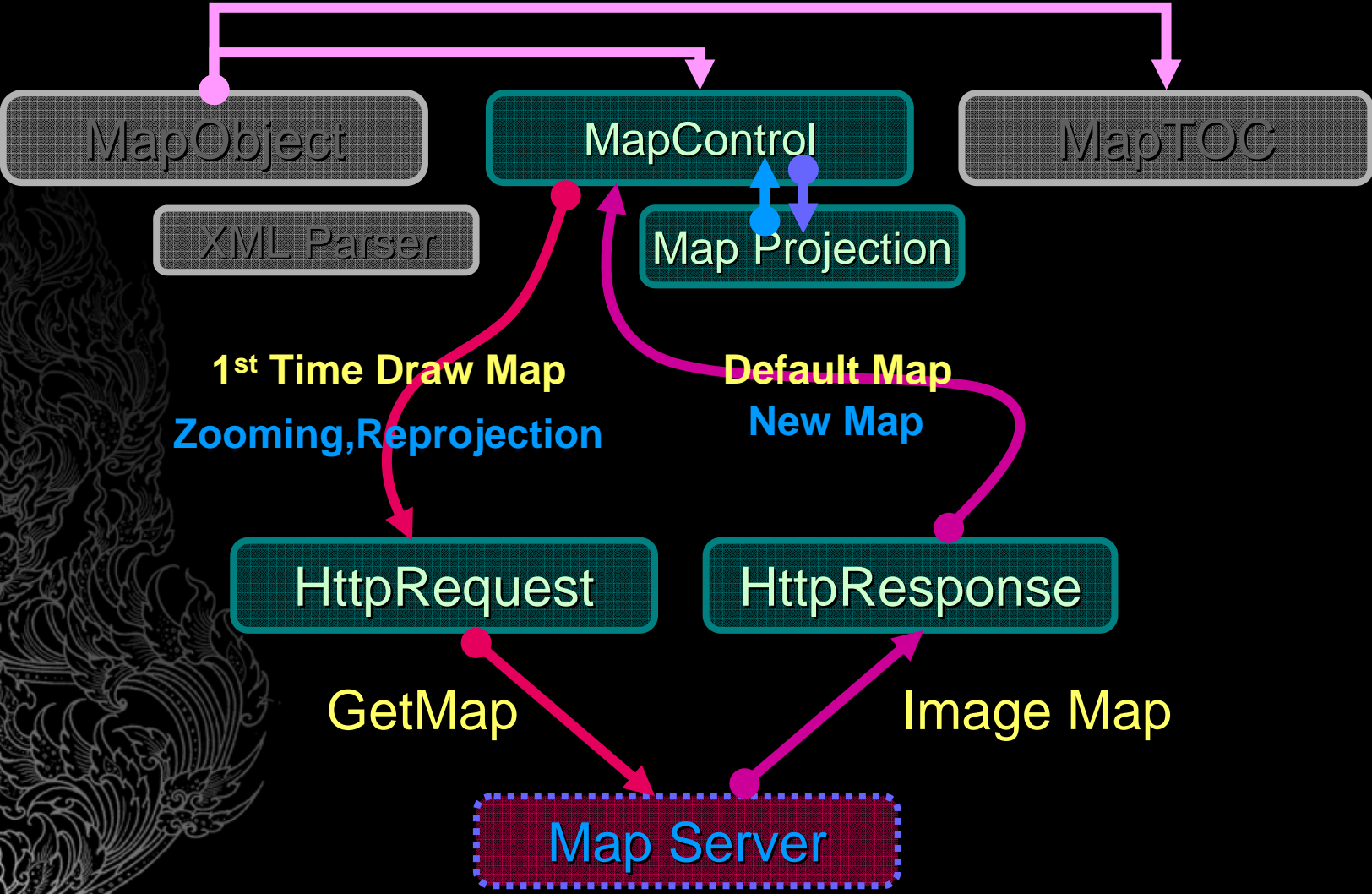
GISTDA Engine
AJAX





Data Flow Diagram

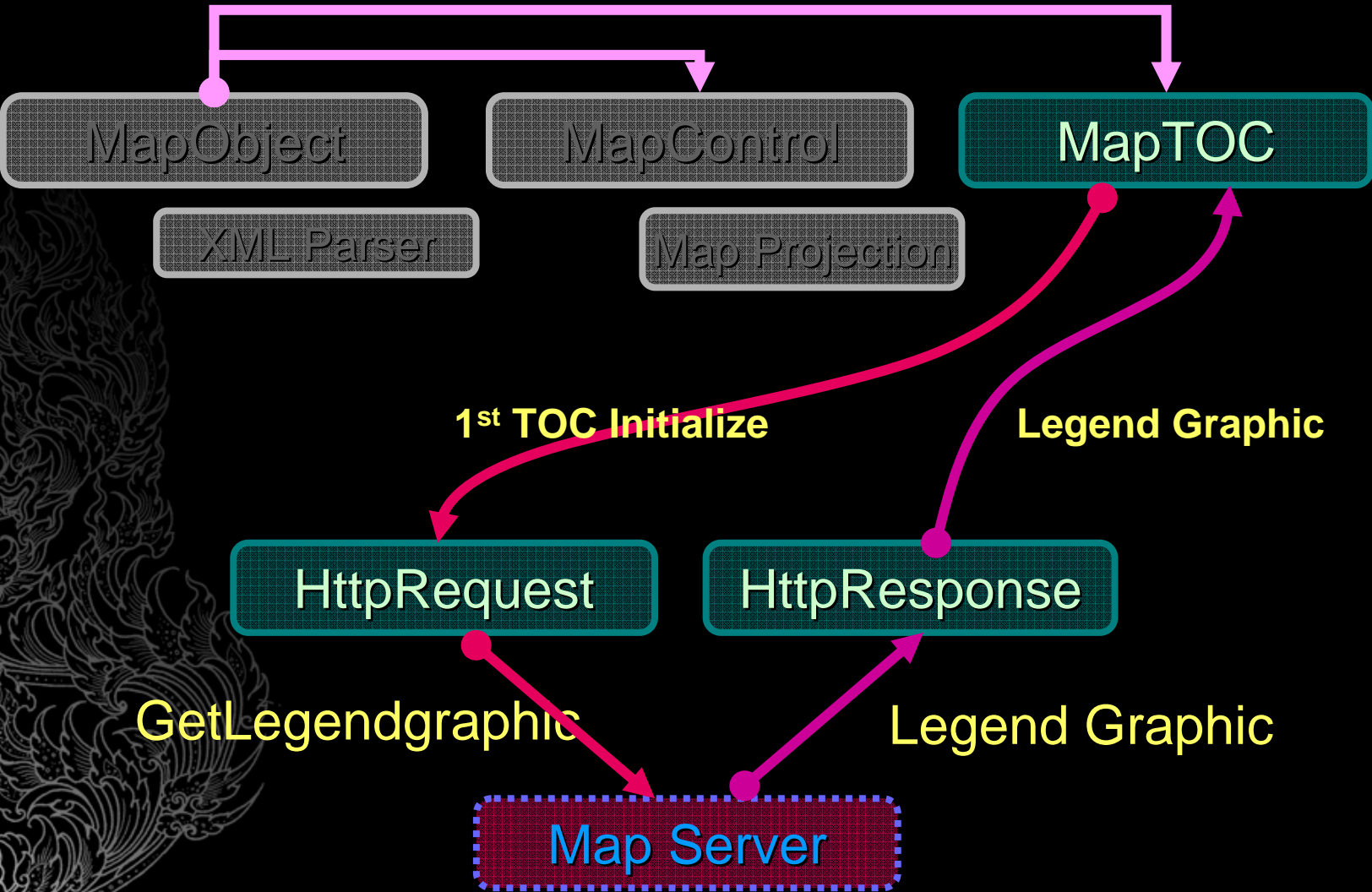
GISTDA Engine
AJAX





Data Flow Diagram

GISTDA Engine
AJAX





Interface

The screenshot displays a GIS application interface. At the top, a toolbar contains icons for navigation and map manipulation. Below the toolbar, a metadata bar shows the following settings: Service: Thailand / GISTDA Flood Area; Projections: WGS 84 / Geographic; Format: png; 24bit; Active Layer Styles: default.

On the left side, a 'Flood Date' panel lists several layers with checkboxes and color-coded indicators:

- Village (yellow dot)
- Province Boundary (red line)
- Amphoe Boundary (yellow line)
- Tambon Boundary (black line)
- 26 JUNE 2006 (blue square)
- 19 JUNE 2006 (blue square)
- 26 MAY 2006 (blue square)
- 25 May 2006 (blue square)
- 17 October 2005 (blue square)
- SPOT Image 260506 (1) (blue square)
- SPOT Image 260506 (2) (blue square)
- ~ALOS Image 250506 (blue square)

The main map area shows a satellite-style flood map of Thailand with various geographical labels in Thai. An orange arrow points from the top toolbar to a pink rounded rectangle labeled 'Titlebar' which is overlaid on the map.

Copyright: GISTDA 2006



Interface

The screenshot displays a GIS application interface. At the top, there is a toolbar with various icons for navigation and editing. Below the toolbar, the main map area shows a satellite-style map with overlaid data layers. On the left side, there is a legend titled "Flood Date" with a list of layers and their corresponding symbols. A yellow callout box labeled "Toolbar" is positioned over the main map area, highlighting the toolbar icons.

Toolbar

- NorthArrow
- Default Extent
- Pan
- Overview
- 2X Zoom In
- Drag Zoom In
- Snapshot
- 2X Zoom Out
- Drag Zoom Out
- Feature Info

Flood Date Legend:

- Village
- Province Boundary
- Amphoe Boundary
- Tambon Boundary
- 26 JUNE 2006
- 19 JUNE 2006
- 26 MAY 2006
- 25 May 2006
- 17 October 2005
- SPOT Image 260506 (1)
- SPOT Image 260506 (2)
- ~ALOS Image 250506



Interface

The screenshot displays a GIS web application interface. At the top, there is a toolbar with various icons for navigation and map manipulation. Below the toolbar, the main map area shows a satellite image of a region in Thailand, overlaid with flood data. The map is titled "Thailand / GISTDA Flood Area" and uses the "WGS 84 / Geographic" projection. The format is set to "png; 24bit" and the active layer styles are "default".

On the left side, there is a "Flood Date" panel with a list of dates and corresponding flood images. The dates are: 26 JUNE 2006, 19 JUNE 2006, 26 MAY 2006, 25 May 2006, 17 October 2005, SPOT Image 260506 (1), SPOT Image 260506 (2), and ~ALOS Image 250506. Each date has a small blue square next to it, indicating the flood image for that date.

A yellow callout box labeled "Toolbar" is positioned over the map area, highlighting a dropdown menu. The menu is titled "Service" and lists the following options: World / NASA Imagery, Thailand / GISTDA Flood Area, Thailand / GISTDA IKONOS, Thailand / GISTDA LANDSATS, World / ESRI GeoElev, World / ESRI GeoForest, World / NASA Imagery (highlighted), World / DEMIS WorldMap, World / CubeWerx DemoMap, and Mar / CubeWerx Landing. A mouse cursor is pointing at the "World / NASA Imagery" option.



Interface

The screenshot displays a GIS web application interface. At the top, a toolbar contains various icons for navigation and map manipulation. Below the toolbar, the main map area shows a satellite-style map of a region in Thailand, overlaid with flood data. A yellow callout box labeled "Toolbar" highlights the "Projections" dropdown menu, which is open and shows a list of coordinate systems. The dropdown menu includes the following options:

- WGS 84 / Geographic
- WGS 84 / UTM zone 47N
- WGS 84 / UTM zone 48N
- Indian 1954 / Geographic
- Indian 1954 / UTM zone 47
- Indian 1954 / UTM zone 48
- Indian 1975 / Geographic
- Indian 1975 / UTM zone 47
- Indian 1975 / UTM zone 48

On the left side of the interface, there is a "Flood Date" panel with a list of dates and corresponding map images, each with a checkbox and a small blue square icon. The dates listed are: 26 JUNE 2006, 19 JUNE 2006, 26 MAY 2006, 25 May 2006, 17 October 2005, SPOT Image 260506 (1), SPOT Image 260506 (2), and ~ALOS Image 250506. An orange arrow points from the "Flood Date" panel towards the map area.



Interface

The screenshot displays a GIS application interface. At the top, a toolbar contains various icons for navigation and map manipulation. Below the toolbar, the main map area shows a satellite-style map with overlaid flood data. A yellow callout box labeled "Toolbar" highlights two format selection menus. The left menu is for "png; 24bit" and the right is for "jpeg". Both menus show a list of available formats: png, gif, png; 24bit, jpeg, and tiff. A mouse cursor is positioned over the "png; 24bit" option in the left menu and the "geotiff" option in the right menu. On the left side of the interface, a "Flood Date" legend is visible, listing various dates and image sources with corresponding color swatches.

Copyright: GISTDA 2006

Service Thailand / GISTDA Flood Area Projections WGS 84 / Geographic Format png; 24bit Active Layer Styles default

Flood Date

- Village
- Province Boundary
- Amphoe Boundary
- Tambon Boundary
- 26 JUNE 2006
- 19 JUNE 2006
- 26 MAY 2006
- 25 May 2006
- 17 October 2005
- SPOT Image 260506 (1)
- SPOT Image 260506 (2)
- ~ALOS Image 250506

Copyright: GISTDA 2006

Format png; 24bit

- png
- gif
- png; 24bit
- jpeg
- tiff

Format jpeg

- jpeg
- png
- geotiff
- tiff



Interface

The screenshot displays a GIS application interface. At the top, there is a toolbar with various icons for navigation and editing. Below the toolbar, the main map area shows a satellite-style map with overlaid data layers. On the left side, there is a 'Flood Date' panel with a list of layers and their corresponding dates. A yellow callout box labeled 'Toolbar' is positioned over the map area, highlighting the toolbar icons.

Service: Thailand / GISTDA Flood Area
Projections: WGS 84 / Geographic
Format: png; 24bit
Active Layer Styles: default

Flood Date

- Village
- Province Boundary
- Amphoe Boundary
- Tambon Boundary
- 26 JUNE 2006
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- ~ALOS Image 250506

Toolbar

Active Layer Styles

- default
- all
- ss1
- ss2
- ss3
- ss4

pseudo

- visual
- Pan
- Red
- Green
- Blue
- IR1
- IR2
- IR3
- ThL
- ThH

default

- Jan
- Feb
- Mar
- Apr
- May
- Jun
- Jul
- Aug
- Sep
- Oct
- Nov
- Dec



Interface

The screenshot shows a GIS application interface. At the top, there is a toolbar with various icons for navigation and map manipulation. Below the toolbar, the main map area displays a satellite-style map of Thailand with overlaid flood data. The map includes labels for various locations in Thai, such as 'ปทุมธานี' (Pathum Thani), 'นนทบุรี' (Nonthaburi), and 'เชียงใหม่' (Chiang Mai). A legend on the left side, titled 'Flood Date', lists several layers with checkboxes and color-coded symbols. An orange arrow points from the legend to a callout box.

Service: Thailand / GISTDA Flood Area | Projections: WGS 84 / Geographic | Format: png; 24bit | Active Layer Styles: default

Copyright: GISTDA 2006

Table Of Content

- Checkbox to visible or invisible layer
- Single click to activate layer
- To time single click to hide/show legend graphic
- Doubleclick to show LayerInfo

Flood Date

- Village
- Province Boundary
- Amphoe Boundary
- Tambon Boundary
- 26 JUNE 2006
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Interface

The screenshot displays a web-based GIS application interface. At the top, there is a toolbar with various navigation and tool icons. Below the toolbar, the main map area shows a satellite-style map of Thailand with several layers overlaid. A legend on the left side, titled "Flood Date", lists various layers with checkboxes and color-coded symbols. A "LayerInfo Dialog" window is open over the map, displaying metadata for the "us_elevation" layer. The dialog includes a warning icon, the layer name, title, abstract, projection, and style information. An orange arrow points from the "26 JUNE 2006" layer in the legend to the "us_elevation" layer in the dialog.

Service: Thailand / GISTDA Flood Area | Projections: WGS 84 / Geographic | Format: png; 24bit | Active Layer Styles: default

Copyright: GISTDA 2006

Table Of Content

Microsoft Internet Explorer

! Name : us_elevation
Title : Digital Elevation Map of the United States, DTED dataset, 3 second resolution, grayscale
Abstract :
DTED Level 3 US elevation. The default style is scaled to 8 bit.
It is possible to request the elevation data in meters by the short_int tyle and requesting PNG format.
The resulting PNG file will be a unsigned 16 bit per pixel image. The values are elevation in meters, zero clipped (no negative values).
Projection :
EPSG:4326
Style :
default
short_int
feet_short_int

OK

LayerInfo Dialog

- Village
- Province Boundary
- Amphoe Boundary
- Tambon Boundary
- 26 JUNE 2006
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Interface

The screenshot displays a GIS application interface. At the top, there is a toolbar with various icons for navigation and map manipulation. Below the toolbar, the main map area shows a satellite-style map with overlaid data layers. The map includes labels for various locations in Thailand, such as 'ปทุมธานี', 'นนทบุรี', and 'ปทุมธานี'. A legend on the left side, titled 'Flood Date', lists several layers: 'Village', 'Province Boundary', 'Amphoe Boundary', 'Tambon Boundary', '26 JUNE 2006', and '19 JUNE 2006'. The '26 JUNE 2006' layer is currently selected and highlighted in blue. A purple callout box with a white background and a black border is overlaid on the map, containing the text 'Map Viewer' and 'Mouse & Keyboard Control'. A red arrow points from the text 'Map Viewer' to the main map area, and a purple arrow points from the text 'Mouse & Keyboard Control' to the toolbar. The interface also shows a status bar at the bottom with information like 'Service: Thailand / GISTDA Flood Area', 'Projections: WGS 84 / Geographic', 'Format: png; 24bit', and 'Active Layer Styles: default'.



Conclusion



- Able to connect web map servers developed by various vendors.
- Create TOC by particular request legend graphics
- Preloading image for better visualization
- On the fly projection supported
- Easy to change user interface by skin
- 100% OOP very simply to integrated into each others

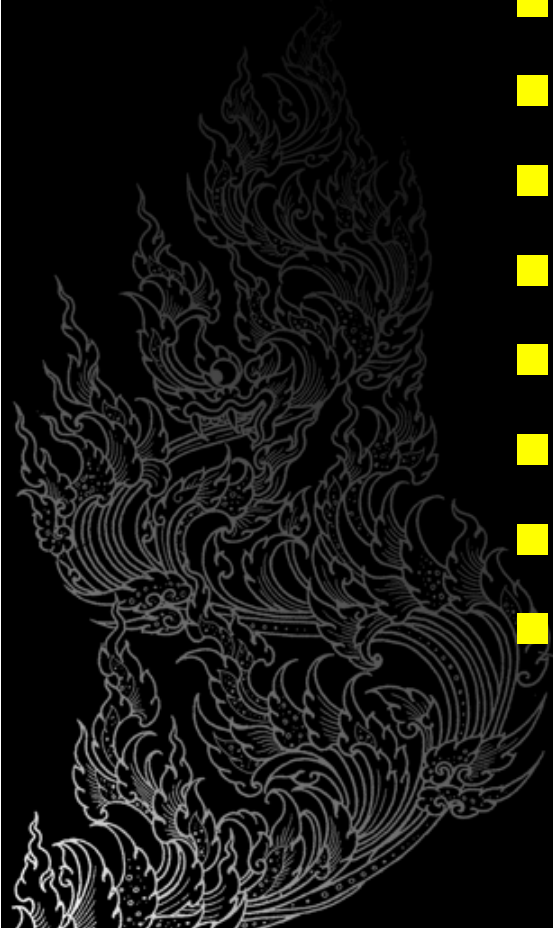




Next Step

* Improve & Develop ...

- 100% Thai supported XML parser
- Client tile download image map
- More map projection support
- User logon with deferent theme
- Display map from many sources
- Layer arrangement
- Support WMS, WFS , WCS and Others
- Virtual web map server for offline using without installation by C# (Standalone Application)





Thank You .