

# Thailand Petroleum Database Management

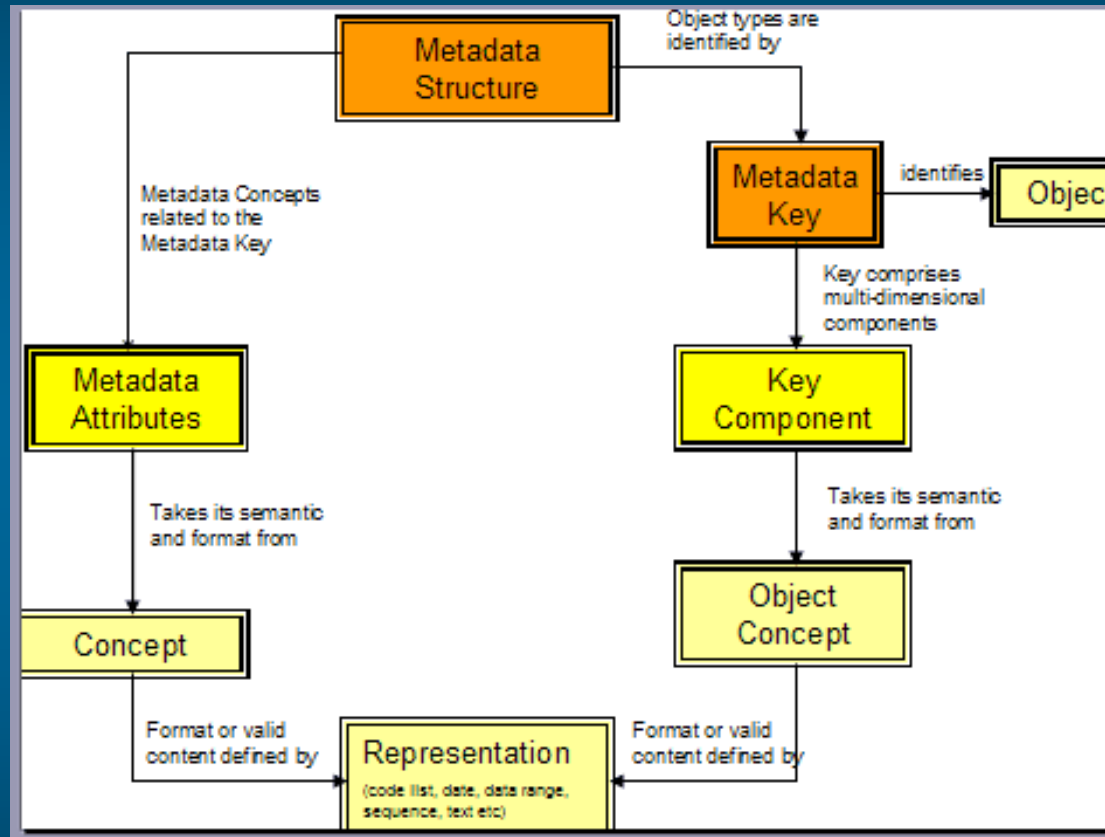
*Orn-anutt Sutha-giam*

Petroleum Data Center  
Department of Mineral Fuels  
April 2009

# Outline

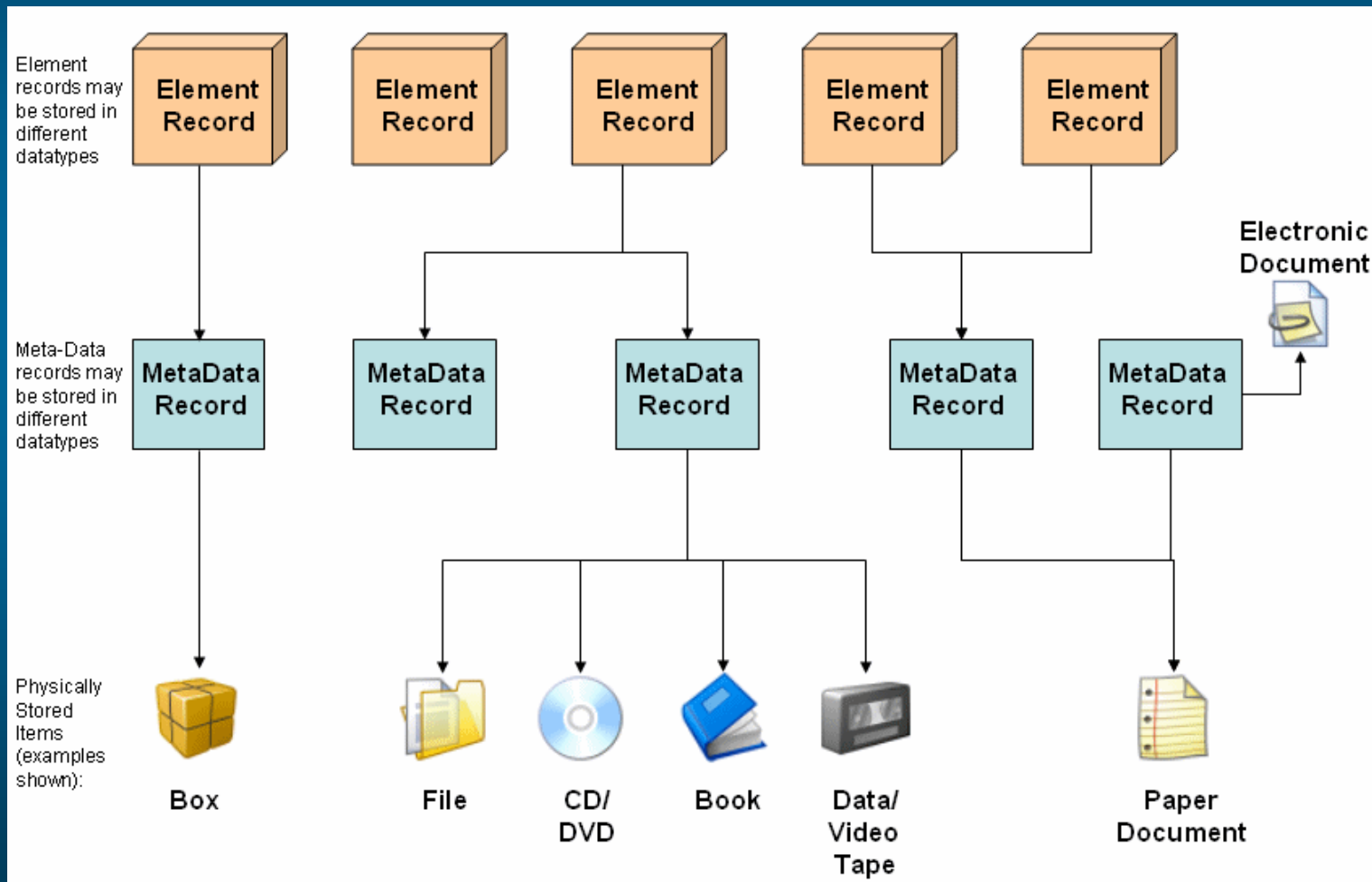
- Metadata Design & Structure
- International Standard used
- Metadata Elements Used
- Quality Control
- System & Technology Used
- Data Flow & Access
- Future Plan

# Metadata Concept

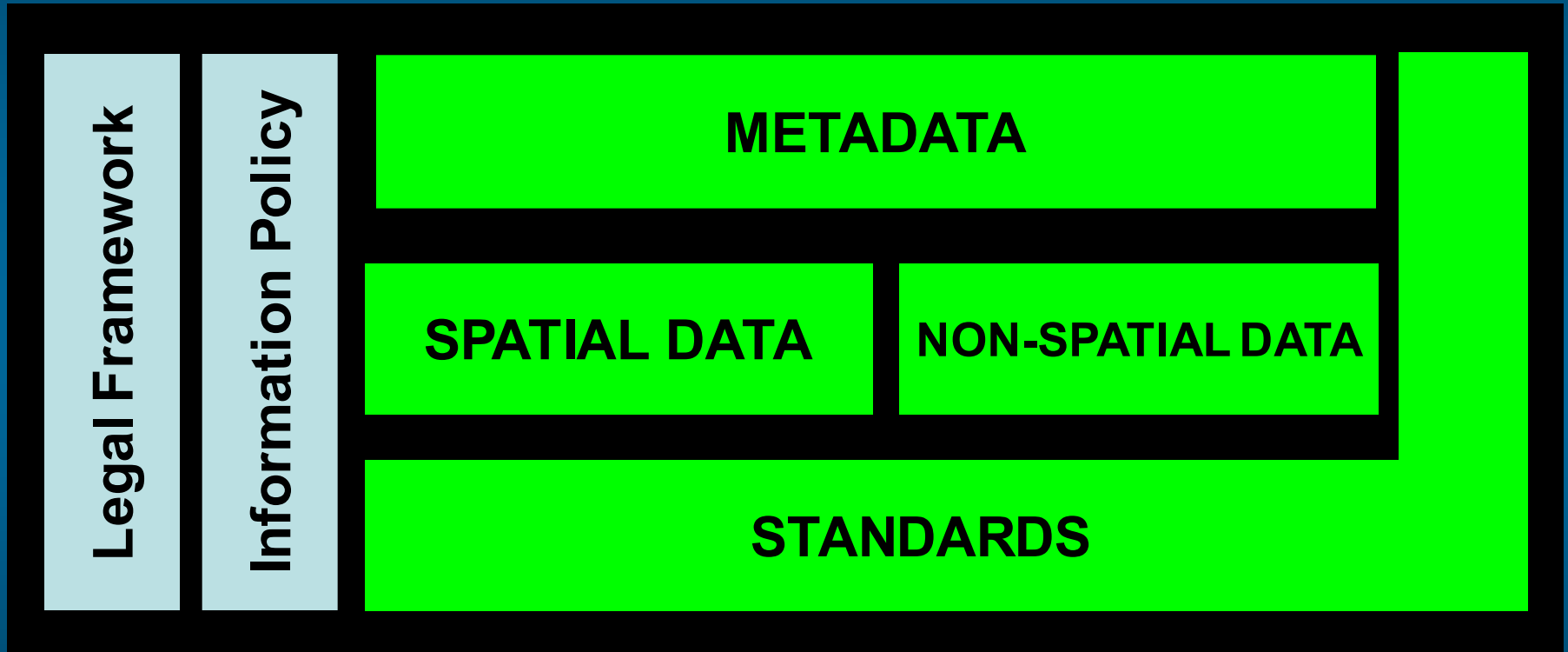


Metadata is "data about data" and therefore can be data about anything.

# Representation of Linked Data Level Relationships



# Metadata Components



# DMF's Standards/Formats of Data

DATA TYPE	FORMAT	METADATA
Seismic	SEG A, B, C, D, Y	Dependent S/W
Well	XLS, TXT, ASCII etc.	Dependent S/W
Wireline Log	LAS, LTS, DLIS, dat, ASCII	Dependent S/W
Annual Report	DOC, XLS, PDF	No
GIS	Coverage/E00/Sha pefile	ISO, FGDC, NSDI, ThaiSDI

# International Standard Used

- GIS
  - OGC: Open GIS Consortium
  - FGDC: The Federal Geographic Data Committee
  - NSDI: National Spatial Data Infrastructure
  - ThaiSDI: Thailand Spatial Data Infrastructure

# Thailand GIS Metadata Standard

- Metadata

- TISI: Thai Industrial Standards Institute

- TISI.19115-2005 (Geo-Informatics standards)

- .. *collecting data from 11 government agencies*

- ISO 19115: 2003 Geographic Information – Metadata

- Metadata Editor Program

**GISTDA\***

- ISO 19115: Geographic Information Metadata and ISO19115-2 Part 2: Extension For Imagery and Gridded Data of ISO/TC211

\* GISTDA: Geo-Informatics and Space Technology Development Agency



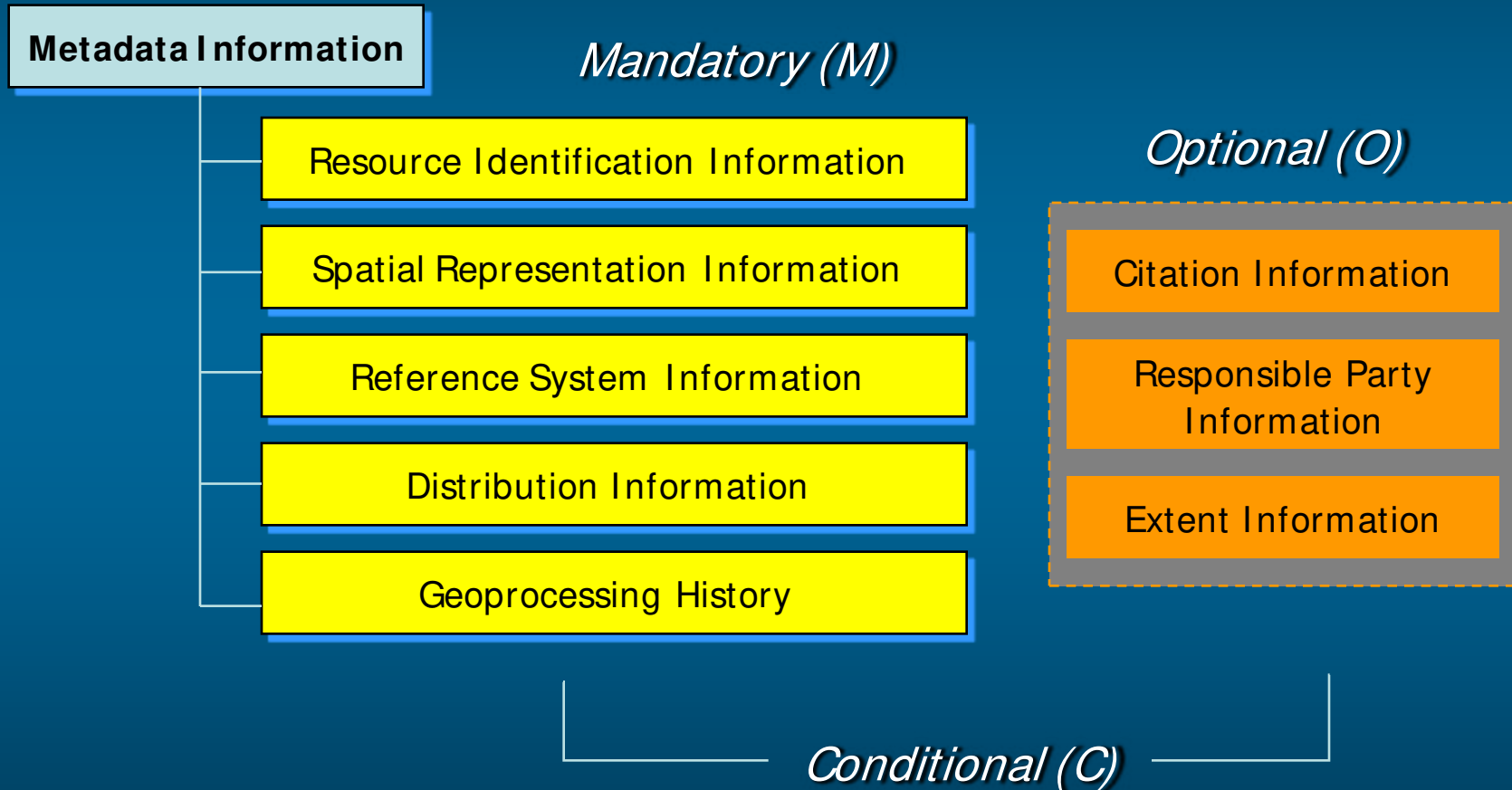
# Metadata Editor Program

- 2 versions, Thai and English
- Stand-Alone Metadata Management system and Online system
- communicate and link to other internal Databases within GISTDA and 11 government agencies
- structure - XML(Z39.50) file and storage – RDMS
- import/export both in ISO19115 and FGDC formats in the form of XML and HTML files

# Metadata Elements Used

- Mandatory (M)
  - *Title/Layer*
  - *Language*
- Conditional (C)
  - *Bounding\_Coordinates:*
    - *West\_Bounding\_Coordinate: 95.532590*
    - *East\_Bounding\_Coordinate: 105.643685*
    - *North\_Bounding\_Coordinate: 20.468404*
    - *South\_Bounding\_Coordinate: 6.236047*
- Optional (O)
  - *Purpose*

# Metadata Structure



# Metadata Information

- \*Metadata language: Thai
- \*Metadata character set: utf8 - 8 bit UCS Transfer Format
- \*Last update: 20090324
- \*Scope of the data described by the metadata: dataset
- \*Scope name: dataset
- \*Name of the metadata standard used: ISO 19115 Geographic Information - Metadata
- \*Version of the metadata standard: DIS\_ESRI1.0

# Resource Identification Information

- Citation:
- \*Title: DMF.concession\_GCS\_Indian1975
- \*Presentation format: digital map
- \*Dataset language: Thai
- \*Spatial representation type: vector
- \*Processing environment: Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 2; ESRI ArcCatalog 9.2.2.1350
- Resource's bounding rectangle:
- \*Extent type: Full extent in decimal degrees
- \*Extent contains the resource: Yes
- \*West longitude: 95.53259
- \*East longitude: 105.643685
- \*North latitude: 20.468404
- \*South latitude: 6.236047

# Spatial Representation - Vector:

- \*Level of topology for this dataset: geometry only
- Geometric objects:
- \*Name: DMF.seismic\_WGS84
- \*Object type: complexes
- \*Object count: 565

# Reference System Information

- Reference system identifier:
- \*Value: WGS\_1984\_UTM\_Zone\_47N

# Distribution Information

- Distributor:
- Contact information:
- Individual's name: กลุ่มบริหารจัดการข้อมูลธรณีฟิสิกส์ ศูนย์ข้อมูลและสารสนเทศเชื้อเพลิงธรรมชาติ (ศข.)
- Organization's name: กรมเชื้อเพลิงธรรมชาติ
- Contact's position: บริหารจัดการและให้บริการการขอใช้ข้อมูลธรณีฟิสิกส์ ในรูปแบบกระดาษ และดิจิทัล
- Contact's role: distributor
- Contact information:
- Phone:
- Voice: 02-791-8376
- Fax: 02-791-8378
- Address:
- Delivery point:
  - อาคารชินวัตรทาวเวอร์ 3 ชั้น 26 แขวงจตุจักร
- City: เขตจตุจักร
- Administrative area: กรุงเทพมหานคร
- Postal code: 10900
- Country: Thailand
- e-mail address: malai@dmf.go.th
- Available format:
- \*Format name: SDE Feature Class
- Format version: ArcGIS9.2
- Ordering process:
- Terms and fees: เจ้าหน้าที่ ศข. แจ้งความประสงค์มายัง ศข. บุคคลภายนอกทำหนังสือมายังกรมเชื้อเพลิงธรรมชาติ
- Instructions:
  - บุคคลภายนอกมีสิทธิ์ใช้ข้อมูลตามระเบียบกรมเชื้อเพลิงธรรมชาติว่าด้วยการขอใช้ข้อมูลปิโตรเลียม พ.ศ. 2547
- Transfer options:
- Online source:
  - \*Online location (URL): Server=dmfgis; Service=5151; User=dmf; Version=SDE.DEFAULT
  - \*Connection protocol: ArcSDE Connection
- Function performed: offline access
- Description: Downloadable Data
- Medium of distribution:
- Medium name: CD-ROM



# Geoprocessing History

- Process:
- \*Date: 20080207
- \*Time: 154631
- \*Tool location: C:\Program Files\ArcGIS\ArcToolbox\Toolboxes\Data Management Tools.tbx\CopyFeatures
- \*Command issued: CopyFeatures "Database Connections\DMFDB@5151@DMFGIS.sde\DMF.seismic" "Database Connections\DMFDB@5151@DMFGIS.sde\DMF.Data\_UTM\_WGS84\DMF.DMF\_seismic" # 000

## DMF.sei

**Data format:** SDE Feature Class

**Coordinate system:** WGS\_1984\_UTM\_Zone

**Theme keywords:** Line name, Block, 2D, 3D

**Location:** Server=dmfgis; Service=5151; Us

**Abstract:** การสำรวจวัดคลื่นไหวสะเทือน เป็นการสำรวจ การทำให้เกิดสัญญาณคลื่น แล้ววัดระยะเวลาที่คลื่นเดินทาง การเดินทางของคลื่นเสียงผ่านชั้นหินชนิดต่างๆ และโครงสร้างของคลื่น ซึ่งข้อมูลการสำรวจคลื่นไหวสะเทือนในชั้นหิน โครงสร้างธรณีวิทยาของชั้นหิน นักธรณีฟิสิกส์ หรือนักธรณี ทางธรณีวิทยา ที่น่าจะเป็นแหล่งกักเก็บปิโตรเลียมได้

### ISO and ESRI Metadata:

- [Metadata Information](#)
- [Resource Identification Information](#)
- [Spatial Representation Information](#)
- [Reference System Information](#)
- [Distribution Information](#)
- [Geoprocessing History](#)

Metadata elements shown with blue text are de  
Standardization's (ISO) document 19115 Geogra  
text are defined by ESRI and will be documente  
a green asterisk (\*) will be automatically updat

### Metadata Information

- \***Metadata language:** Thai
- \***Metadata character set:** utf8 - 8 bit
- \***Last update:** 20090326

#### Metadata contact:

**Individual's name:** กลุ่มบริหารจัดกา

## DMF.shotpoint\_WGS84

**Data format:** SDE Feature Class

**Coordinate system:** WGS\_1984\_UTM\_Zone\_47N

**Theme keywords:** Company, Block, 2D/3D, Survey year

**Location:** Server=dmfgis; Service=5151; User=dmf; Version=SDE.DEFAULT

**Abstract:** แผนที่แสดงจุดไหวสะเทือน เป็นแผนที่ที่แสดงตำแหน่งจุดกำเนิดคลื่น (Source) หรือจุดระเบิด ที่ทำให้เกิด สัญญาณคลื่น บนพื้นผิวโลก

### ISO and ESRI Metadata:

- [Metadata Information](#)
- [Resource Identification Information](#)
- [Spatial Representation Information](#)
- [Reference System Information](#)
- [Distribution Information](#)
- [Geoprocessing History](#)

Metadata elements shown with blue text are defined in the International Organization for Standardization's (ISO) document 19115 *Geographic Information - Metadata*. Elements shown with green text are defined by ESRI and will be documented as extensions to the ISO 19115. Elements shown with a green asterisk (\*) will be automatically updated by ArcCatalog.

### Metadata Information

- \***Metadata language:** Thai
- \***Metadata character set:** utf8 - 8 bit UCS Transfer Format
- \***Last update:** 20090326

#### Metadata contact:

**Individual's name:** กลุ่มบริหารจัดการข้อมูลธรณีฟิสิกส์ ศูนย์ข้อมูลและสารสนเทศเชื้อเพลิงธรรมชาติ (ศข.)

**Organization's name:** กรมเชื้อเพลิงธรรมชาติ

**Contact's position:** บริหารจัดการและให้บริการการขอใช้ข้อมูลธรณีฟิสิกส์ ในรูปแบบกระดาษ และดิจิทัล

# Quality Control

**GEODATABASE METADATA**

**MAP CATALOGUE**

**CONVERSION TO WGS84 DATUM & DATA ORGANIZATION AS PER ESRI SCHEMA**

**QUALITY CHECK**

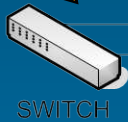
**DATA SOURCES & DATA INGEST IN MDS**


# QC of GIS Data

- Data passes through Quality Check Procedures (manual + software)
  - Checking of Spatial Frames as per institution level or country level
    1. Datum
    2. Projection
    3. Index Map Sheet
    4. TICS (Location & Values)
    5. TIE-Point Intervals (Location & Values)
  - Checking of Data Structure
    1. Coding of thematic attributes
    2. Polygons with codes
    3. Extra Codes not given in the standards document
    4. Digit used for specifying code
    5. Description of attributes
  - Checking of weed Tolerances, Fuzzy Tolerance & Sliver Polygon threshold
  - Checking of Seamlessness across boundaries, SOI GRIDS ON 50K OR 250K
  - Checking of blank areas (no data)

# System & Technologies Used

## Enterprise GIS Solution






### 1 ArcInfo 2 ArcEditor 13 ArcView

**Client**

**Hardware & Software Specification**

- PC HP XW4400 Workstation
  - CPU Intel Core 2 Duo 2.40 GHz.
  - RAM 2 GB
- PC HP XW4600 Workstation
  - CPU Intel Core 2 Duo 2.66 GHz.
  - RAM 2 GB
- OS – Windows XP SP2
- ArcInfo 9.2 : 1 License
- ArcEditor 9.2 : 2 License
- ArcView 9.2 : 13 License
- 3D Analyst 9.2 : 11 License
- Spatial Analyst 9.2 : 11 License
- ArcGIS Publisher 9.2 : 1 License
- Data Interoperability 9.2 : 1 License
- ArcReader 9.2 : 100 License



### ArcGIS Server 9.2


Web & Map Server

**Hardware & Software Specification**

- HP ProLiant DL360 Generation 5
- CPU Dual-Core Intel Xeon 5160 3.0GHz@2
- RAM 8 GB
- OS – Windows 2003 Server
- Web Server IIS
- ArcGIS Server 9.2 Standard Enterprise SP3
- ArcSDE 9.2 SP3

**Machine Information**

- Hostname : DMFGIS
- Private IP Address : 10.1.200.10 / 255.255.0.0
- Gateway/DNS : 10.1.0.1 / 10.1.1.51 + 10.1.1.130
- OS User/Password : administrator / admin
- ArcGISServer Web Manager
  - User/Password : administrator / admin
- ArcGISServer Object Manager
  - User / Password : som / som
- ArcSDE User / Password : sde / sde123



### Oracle 10g


Database Server

**Hardware & Software Specification**

- HP ProLiant DL360 Generation 5
- CPU Dual-Core Intel Xeon 5160 3.0GHz@2
- RAM 8 GB
- OS – Windows 2003 Server
- Oracle 10g R2 10.2.0.3

**Machine Information**

- Hostname : DMFDB
- Private IP Address : 10.1.200.11 / 255.255.0.0
- Gateway/DNS : 10.1.0.1 / 10.1.1.51 + 10.1.1.130
- OS User/Password : administrator / admin
- Oracle User/Password : sys / sys




### Server Farm

Storage

**Hardware Specification**

- EMC CLARION CX3 Modclio
- RAID 5 : 2TB
- Ultra320 SCSI
- Private IP Address : 10.1.200.8



### Hand Held

### 5 ArcPad

Pocket PC

**Hardware & Software Specification**

- Pocket PC HTC TyTN II
  - CPU Qualcomm® MSM 7200 - 400MHz
  - ROM 256 MB
  - RAM 128 MB
- Pocket PC HTC
  - CPU Samsung® SC32442 - 500 MHz
  - ROM 256 MB
  - RAM 64 MB
- OS – Windows Mobile 6
- ArcPad 7.0.1 : 5 License
- Garmin : 10 License

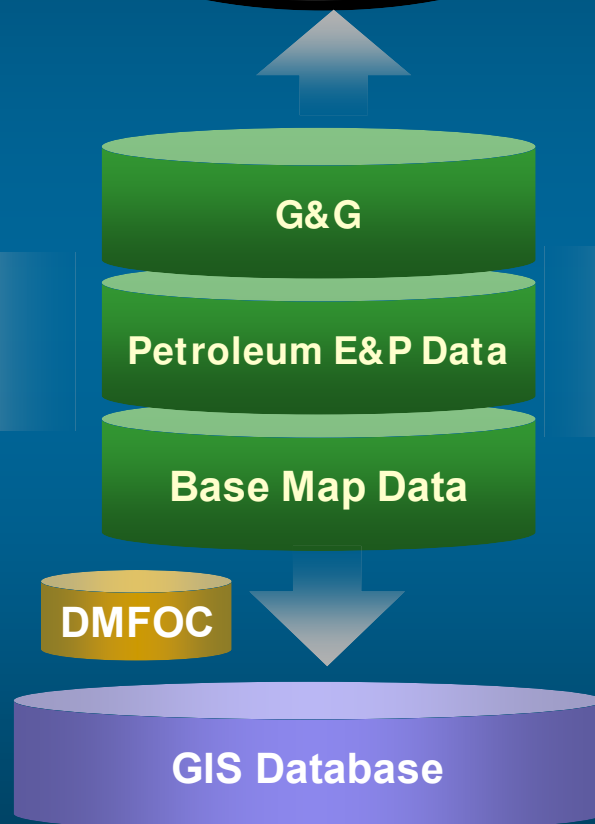
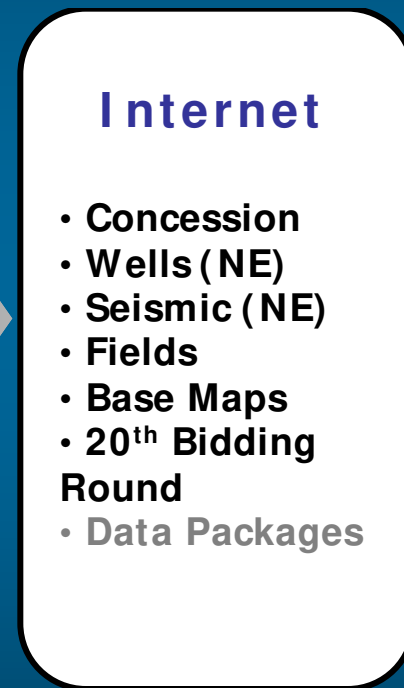
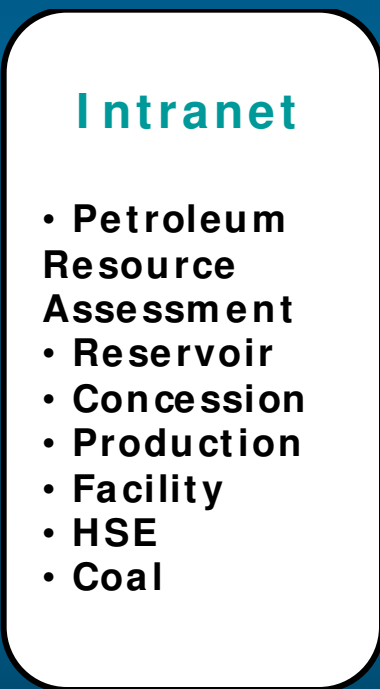
# Metadata in ArcCatalog

The image shows two overlapping windows of the ArcCatalog application. The background window is titled "ArcCatalog - ArcInfo - W:\Master\Geodatabase\Petroleum.mdb\Geology\Fld\_3SE". The foreground window is titled "ArcCatalog - ArcInfo - W:\Master\Geodatabase\Petroleum.mdb\Concession\Block".

The foreground window displays the metadata for the "Block" feature class. The "Contents" tab is active, showing a tree view of the geodatabase structure. The "Metadata" tab is selected, showing the following information:

- Title:** Block
- Personal GeoDatabase Feature Class**
- Description** (selected):
  - Keywords:**
    - Theme:** Petroleum Block, Concession Block, Oil & gas concession area, Petroleum Concession Block, Thailand petroleum, Gulf of Thailand petroleum, Thailand petroleum concession,
    - Place:** Gulf of Thailand, Thailand
  - Description:**
    - Abstract:** Petroleum Concession Blocks in Gulf of Thailand are 2-dimensional spatial object, the coordinate serve from all concessionaires of Thailand such as Petroleum Authority of Thailand Exploration and Production Public Company (PTTEP),

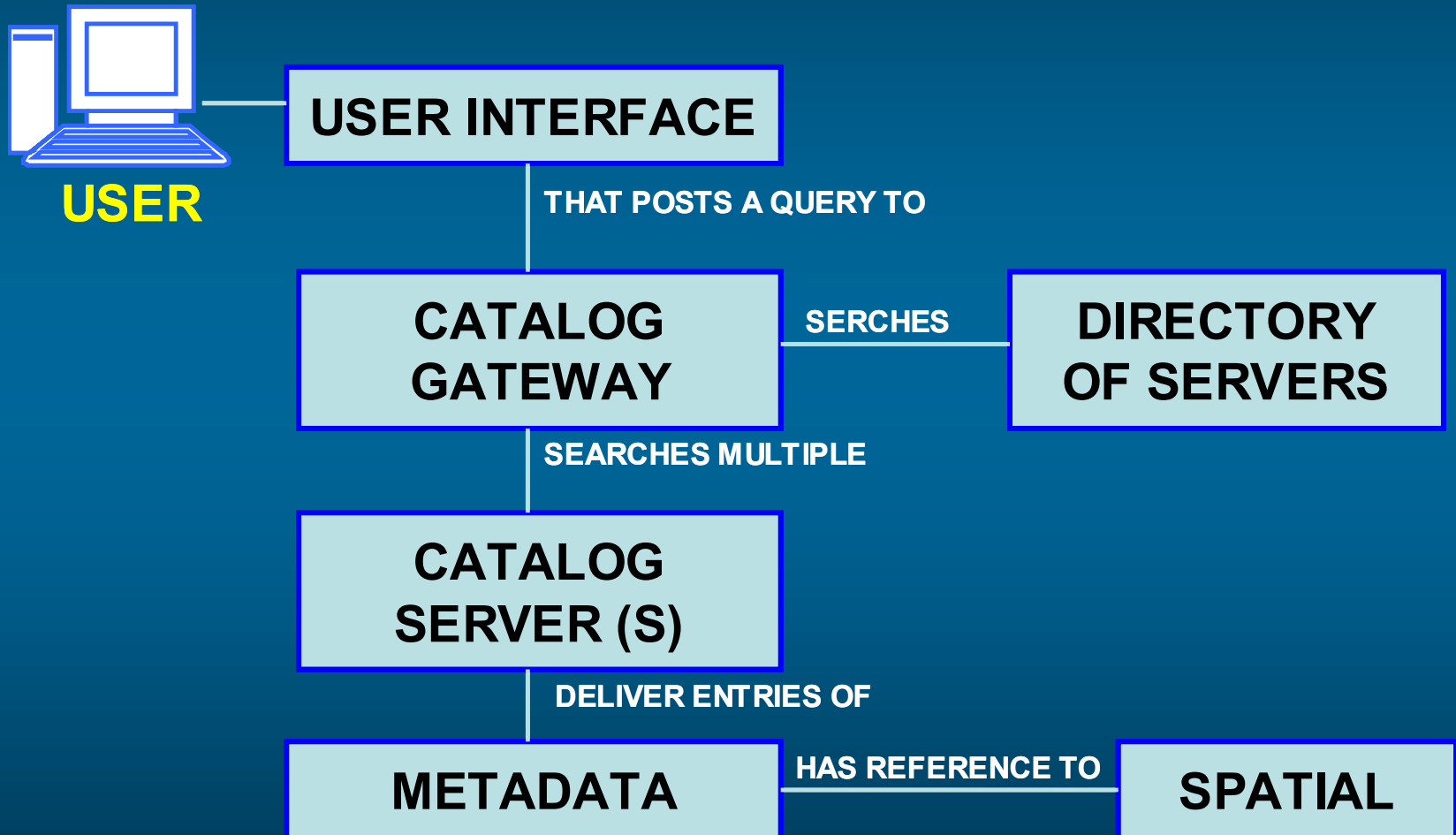
# DMF's GIS



**Enterprise Solution**

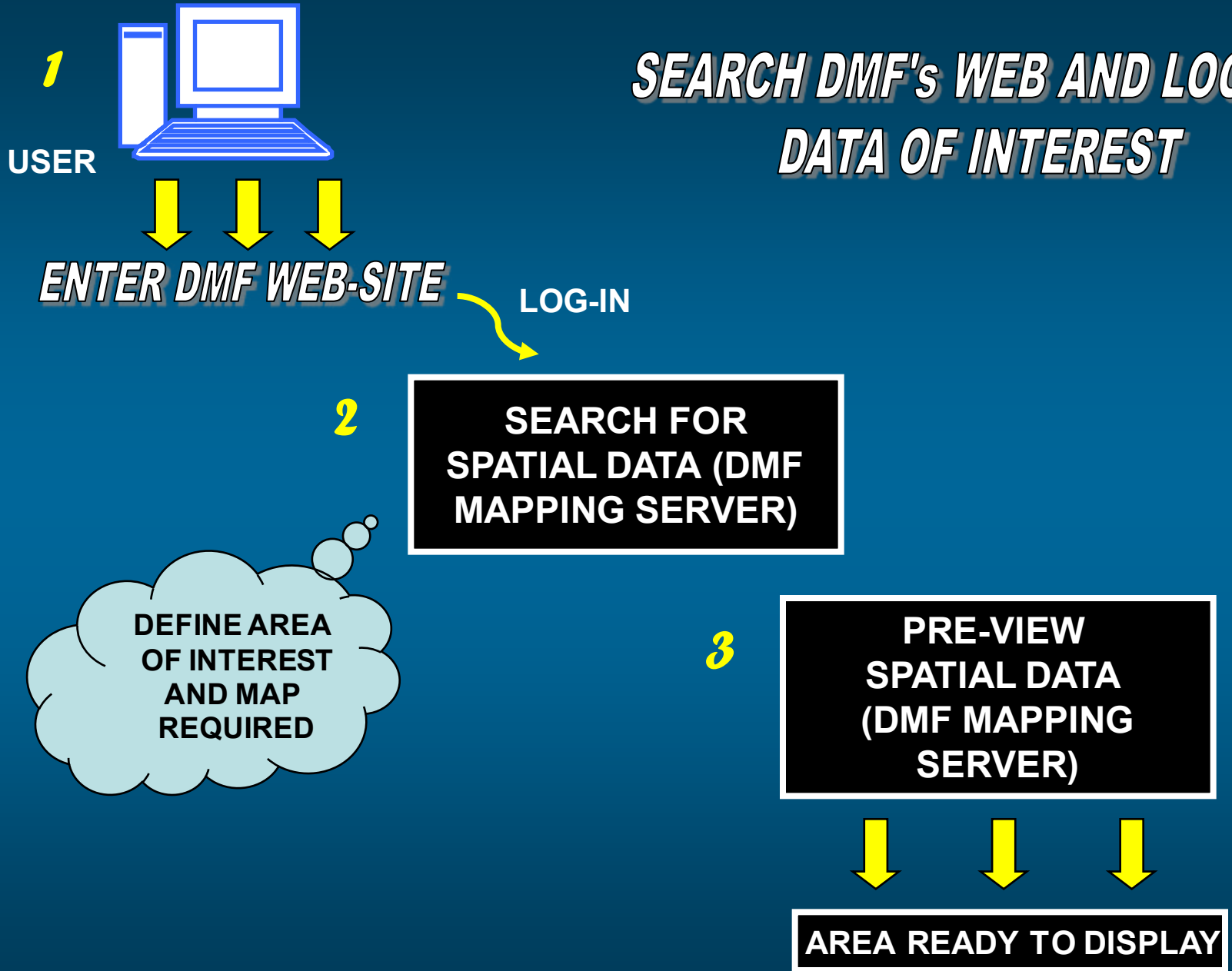
# Data Flow & Access

## *GIS access mechanism*





# SEARCH DMF'S WEB AND LOCATE DATA OF INTEREST



# Application in Intranet

- <http://dmfgis/gisweb>

- Search & Query
  - Concession
  - Royalty
  - Production
  - Seismic
  - Reservoir
  - Data Package
  - Facility
  - Decommissioning
  - Safety & Environment
  - Coalbed Methane

The screenshot displays the DMF GIS web application interface. The top navigation bar includes the Department of Mineral Fuels logo and the text 'ระบบประเมินปริมาณทรัพยากร' (Resource Assessment System). Below this, there are several menu items: 'ระบบสัมปทานปิโตรเลียม' (Petroleum Concession System), 'ระบบ Reservoir', 'ระบบการผลิต' (Production System), and 'ระบบกำกับ' (Regulation System). The main content area shows a map of Thailand with a yellow highlighted region in the north. A detailed view of the 'Chiang Muan basin' is shown, including a table of data:

Chiang Muan basin	
Province	: Phayao
Resource	: undevelop
Measured	: 25.28
Indicated	: 17.99
Heating value	: 1,526-4,985 kcal/kg
Coal rank	: Lignite B to Sub-bituminous B

The interface also includes a search bar, a map scale indicator (1:277,601), and coordinates (X: 1,781,136; Y: 1,422,029; Lat: 12° 36' 7.8"; Long: 110° 43' 13.7"). The bottom status bar shows the case name 'coabasin\_detail' and the 'Local intranet' connection.

# Application in Internet

- <http://203.146.235.111/gisInternet>

The screenshot shows a web browser window displaying a GIS application. The address bar shows <http://sharing/gisInternet/>. The main content area features a map of Thailand with a search results window overlaid. The search results window displays the following information:

**82-PTH-101**

Company	PHILLIPS PETROLEUM COMPANY
Type	2D
Region	NORTHEAST
Line	82-PTH-101
Length	100,984.76 m.
SP	0-980
Data available	DIGITAL & PRINT

Below the table, there is a search bar with 'Search' and 'Cancel' buttons. The search results list shows 'Results 1-5 of 636' with the following entries:

1. 82-PTH-101
2. 82-PTH-102
3. 82-PTH-103
4. 82-PTH-103E
5. 82-PTH-104

The map shows various locations in Thailand, including Yasothon, Ubon Ratchathani, and Surin. The application footer contains the following information:

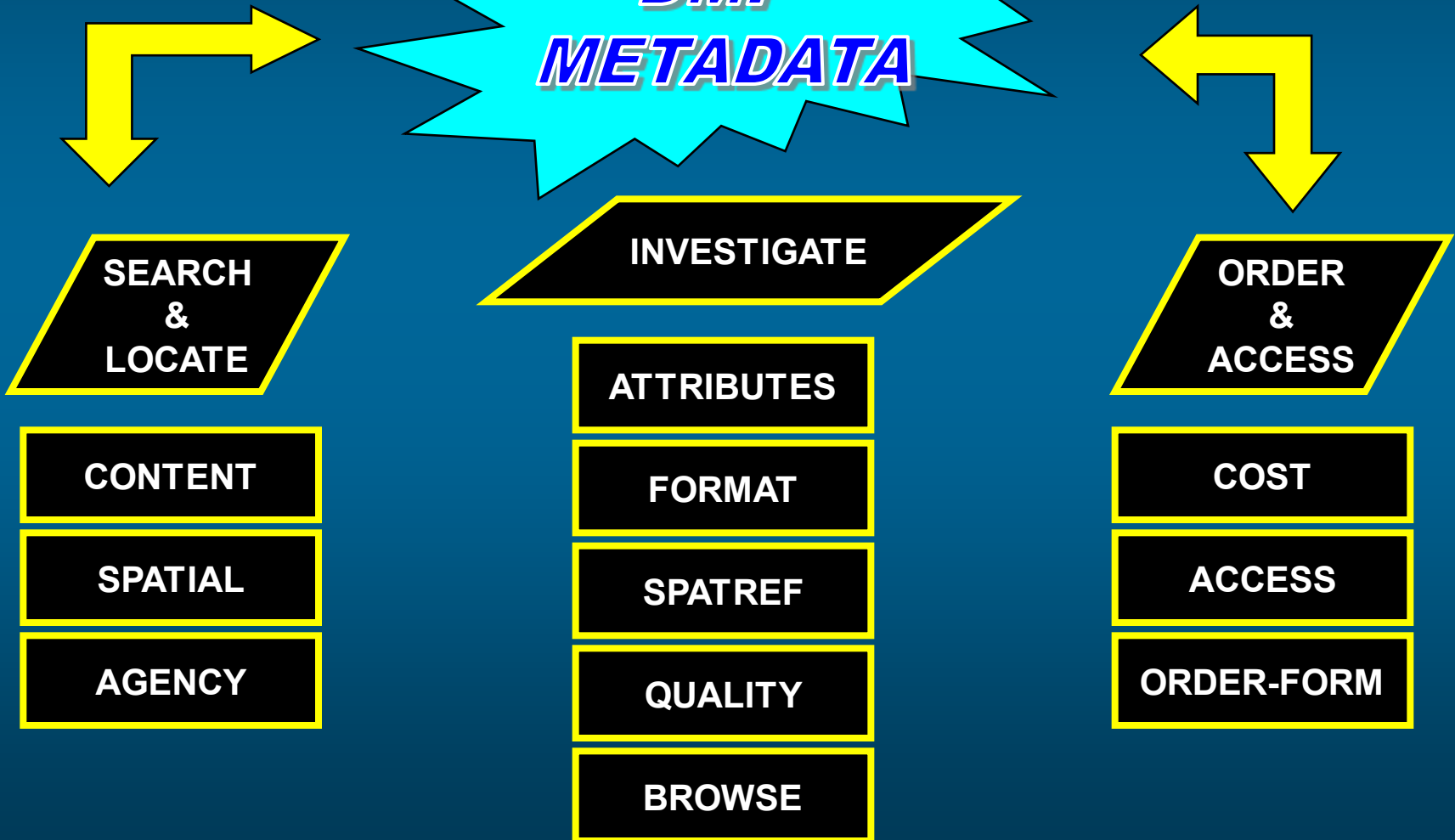
Department of Mineral Fuels  
24th-26th floor Shinawatra Tower III, 1010 Vipavadi Rangsit Road, Chatuchak, Bangkok 10900  
Tel. 02-791-8300 Ext.4207 Fax. 02-791-8389

- Register
  - Authorizing
- Login
- Search & Query
  - Concession
  - Seismic (NE)
  - Well (NE)
  - Base Maps
- Download Map
- Order Map

# Future Plan

# Future Plan

**DMF  
METADATA**



Questions??