Outline

- Google map
- What is GIS?
- What we want to with GIS for SPring-8
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- Two systems using MapServer
  - Equipment location manager
  - Real time alarm display
- Conclusion
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QUESTION
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Do you like Google map?
I like it.
I wish I could have Google map for SPring-8.
SPring-8

- 4+1 accelerator complex
  - Injector linac
  - Booster synchrotron
  - 8 GeV storage ring
  - 1.5 GeV New Subaru
  - SCSS prototype accelerator
- 266 VME cpus
- 87 PLC's
- Distributed in 1km x 1km area.
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We build our own map system
Evaluating the Potential of Commercial GIS for Accelerator Configuration Management

T. Larrieu, Y. Roblin, K. White, R. Slominski
Jefferson Lab, USA
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- *from Wikipedia*

- Geographic Information System (GIS) is a system for creating, storing, analyzing and managing spatial data and associated attributes.

- In the strictest sense, it is a computer system capable of integrating, storing, editing, analyzing, sharing, and displaying geographically-referenced information.

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- Locate equipment distributed in the SPring-8 site.
  - Where is the X?
  - Information integration.
    - Where is the drawing of X?
    - Where is the maintenance history of X?
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    - Map based is more straightforward than text based system
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- A VME cpu on beam-line 40XU got trouble.
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- **Technical requirement.**
  - **Google map like**
    - Web based.
      - No client application installation.
      - Access from everywhere.
    - zooming, panning, multi-layer
  - **Open source**
  - **Easy to manage**
    - Installation
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- Web based map display system like google map.
- Developed at University of Minnesota.
  - Originally developed for forest resource management
  - [http://mapserver.gis.umn.edu/](http://mapserver.gis.umn.edu/)
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- Multi data sources
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MapServer two books

MapServer: Open Source GIS Development
Bil Kropla
Apress

Web Mapping: Illustrated
Tyler Mitchell
O'REILLY
MapServer mechanism

http server

Application

map server

map file

Vector data  Raster data  database  xml datafile
MapServer mechanism

HTTP request

http server

Application

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Vector data  Raster data  database  xml datafile
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API call by mapscript
PHP, perl, java, python

http server

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Mapfile

- **Configuration file**
  - Text file format.

- **Integrate data files and database**
  - Defines location of data.
  - Image size
  - Layer
  - Font
  - Color
  - etc.
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### Mapfile example

```
MAP
  NAME "MapTest"
  STATUS ON
  IMAGECOLOR 255 254 203
  IMAGETYPE gif
  EXTENT -500000 -600000 1300000 800000
  UNITS meters
  SHAPEPATH "D:/shp_data/"
  SYMBOLSET "D:/symbols/symbols35.sym"
  FONTSET "D:/etc/fonts.txt"
  RESOLUTION 96
  INTERLACE OFF
```

```
WEB
  TEMPLATE "map.html"
  IMAGEPATH "D:/ms4w/tmp/ms_tmp/
  IMAGEURL "/ms_tmp/"
  METADATA
  END # Metadata
```

END
LEGEND
  STATUS ON
  POSITION UL
  KEYSIZE 18 12
  LABEL
    TYPE BITMAP
    SIZE MEDIUM
    COLOR 0 0 89
END
END # Legend

REFERENCE
  IMAGE  ./images/sp8.bmp
  EXTENT -500000. -600000. 1300000. 800000.
  SIZE 150 128
  STATUS ON
  COLOR 200 200 200
  OUTLINECOLOR 255 0 0
END
MapServer mechanism

Read data from data sources

- Vector data
- Raster data
- Database
- XML datafile

http server

Application

Map server

Map file

Read data from data sources
Data sources

- **Vector data**
  - Standard data format
    - Shape file
      - CAD data (.dxf file converted shape file)
    - Mapinfo TAB

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  - jpg, png, gif, tiff...

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  - MySQL, postgresql, Oracle...

- **Files**
  - Gxml (geographic XML)
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Vector data  Raster data  database  xml datafile

generates temporary image file
MapSever applications

- Open source MapSever applications
- Mapscrip application (server) + Javascript (client)
  - p.mapper
  - ka-map
  - many more.
- Standalone (no Web) systems are also available.
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musmap
primagis

intergrated into plone
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  - Query functions (identify, select, search)
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  - Location
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    - Production serial number
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layer
reference map
Select zoom in area
Select layer
PLC appeared
Zoom out by slider
raster image overlay
select information
get information window
Alarm display for SCSS prototype linac
Alarm display for SCSS prototype linac

Heartbeat icon
Real time alarm display

Browser requests periodically by ajax.

http server

Application

map server

map file

read from database and write gxml file

Vector data

Raster data

database

xml datafile
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- Begin with little knowledge on PHP and javascript.
- Understanding mapfile.

About 1 week to develop alarm display.

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  - Personal data entry system
    - Everybody can enter data from web.
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