Standards based spatial data management, GIS and web mapping

or

Spatial data management, analysis & sharing the free & easy way!
Standards based spatial data management, GIS and web mapping

Premise: Traditional GIS is inherently flawed, especially when it comes to many fisheries/maritime datasets
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Premise: Traditional GIS is inherently flawed, especially when it comes to many fisheries related datasets

Reason: The fundamental GIS model is that of a geographic feature linked to some aspatial attributes. Limited model suitable for limited terrestrial data
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Reason: The fundamental GIS model is that of a geographic feature linked to some aspatial attributes. Limited model suitable for limited terrestrial data.

Problem: A feature may have more than one spatial representation:
- fishing event: start & finish points, trackline, polygons
- seabeed photo: vessel, platform, calculated positions
- seamount: peak (points) base (polygon)
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Premise: GIS is inherently flawed, especially when it comes to many fisheries related datasets

What do we need?

Data management system underlying a GIS which allows multiple text strings, numbers, times, dates AND GEOMETRIES to pertain to an object
i.e. A geometry is simply another attribute of an entity, not the defining object.
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What do we need?

Data management system underlying a GIS which allows multiple text strings, numbers, times, dates AND GEOMETRIES to pertain to an object

Good news: a tried & proven solution is already here!
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3 of the world's largest computer companies sell such tools:
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3 of the largest computer companies sell such tools:

- Microsoft
- IBM
- Oracle
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3 of the largest computer companies sell such tools:

- Microsoft: SQL Server, Access (SQL Server 2008!)
- IBM: DB2, Informix (both!)
- Oracle: Oracle (spatial)

These three companies provide 5 solutions, four of which have spatial data support available.
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Relational Database Management Systems:
the Relational Model with OGC SFS
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Given a suitable tool (spatially enabled RDBMS), how should we be using it?
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Premise:
the value (financial, social, etc) of data (observations, raw, processed, analysed) is largely determined by how widely used they are

Corollary:
improving access to data makes it more available to be used thus enabling its potential value to be realised
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Standards based spatial data management, GIS and we
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Why standards?

Whose standards?

What standards?

Which tools?

Examples...

What else?
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Why standards?

consistency

code reuseability

interoperability

data sharing (availability)
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The internet:

access!

sharing!

interoperability!

STANDARDS!!
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What do we do as fisheries GIS practitioners?

obtain data : observations or processed

analyse data : output = more data
   (models, contours, ecozones....)

legislate : output = more data
   (boundaries: MPA's, EEZ, FAO, ...)

WE GENERATE SPATIAL DATA...
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obtain data : observations or processed

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ONLY AS USEFUL AS THEY ARE AVAILABLE!
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The internet:

Driving force & primary tool for access to data/information
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The internet:

Driving force & primary tool for data/information access

Web I. pull mode - go to site & get information
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The internet:

Driving force for data/information access

Web 1. pull mode - go to site & get information
Web 2. push/pull mode – P2P, blogs, Web Services

INTERACTIVE: data is published/shared
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The internet:

Driving force for data/information access

Web 1. pull mode - go to site & get information
Web 2. push/pull mode – P2P, blogs, Web Services

web maps: Google Maps/Earth, Virtual Earth, World Wind

Not just show your data on their site but
API to add THEIR maps to YOUR site
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The internet:

the old paradigm:
Our data is web enabled, come & see it on our website!
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The internet:

the old paradigm:
Our data is web enabled, come & see it on our web site!

the new paradigm:
Our data is web enabled: feel free to use it, display it on YOUR web site!

making data more accessible!
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Whose standards?

ANSI/ISO (etc)

industry (OGC, EPSG, OSGEO, WWWC)

industry (defacto/informal)

architectural (libraries)

enterprise

client
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What standards?

ANSI SQL, OGC SFS,
SQL/MM

SOAP/WSDL/UDDI/WS/...

W3C (HTML)

OGC WMS/WFS/...

shapefiles

Proj.4/GDAL/FME
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Why standards?
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Which tools?

Postgres/PostGIS (Oracle/Informix/DB2/SQL Server/MySql...)

GEOS/GDAL/Proj.4 (FME)

UMN Mapserver (Deegree, GeoServer, ArcIMS, Mapinfo...)

OpenLayers (Chameleon, KaMap, MapLab, ...)

QGIS (JUMP, uDIG, COSMO, gvSIG, Mapinfo, Arc...)
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Why standards?

- PostGIS
- Shapefiles/coverages
- MapInfo
- Web services
- Middleware (GDAL/OGR/Proj.4)
- Desktop (MapInfo QGIS)
- Web services (WMS/WFS/...)
- Analysis (GRASS/R)
- Web mapping/web GIS...

INTEROPERABILITY!
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PostGIS backend (with libraries)

- proj.4
- GDAL/OGR
- GEOS

Spatial database (PostGIS)

Access

- local psql client
- mapserver
- WMS/WFS/...
- script
- php/ruby/JAVA
- remote psql client
- ODBC/JDBC
- export
  - SHP/mapinfo/...

End User

- user applications
  - user data

NIWA
Taihoro Nukurangi
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Atlas
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DASmap
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The future:

Foundation of properly managed spatial data

No more portals or closed sites for access to data, share your data & use their data.

Your GIS/web site: your, our & their data!