



Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive



Health Atlas Ireland Built from OSS



Mel McIntyre - OpenApp

- Founder and manager of OpenApp, IT service company in Dublin, Ireland since 2002
- Director at OpenForum Europe – OFE Ireland partner
- 18 years at Amdahl Corporation – the original 'alternative' to big blue iron (IBM in '70s) - 3 years Rise Technology – Silicon Valley Startup uProcessor design



- Successful Enterprise class Geographic Information and Analysis built on **Open Source Software** (OSS) components
- OSS enables and supports **Collaboration** leading to a better project

Health Atlas Ireland

A statistical and geographic analysis system, integrating health event data (hospital, cancer etc) with support data (census, geo-coding, maps) and analysis tools to support health service planning and reacting.

A high level look at the delivery of Health Atlas Ireland



Software components

User interface integrates external data feeds

Fast response through caching technology

Fully integrated

- Security
- Membership
- Print
- Management

Open Standards

- OSGEO

Relational Database

Zope/OpenLayers

**Tile, Feature, Web
Caching**

Zope **Mapserver**
Application **GRASS**
GDAL/OGR

PostGIS R

Linux - XEN

**External
Data
Feeds**

Google
GeoRSS
Virtual Earth
Excel/csv
WMS
WFS
KML

**User
Directory
LDAP**

Dataset Cascade

Agency



Section



Folder



System Tools

Folders

- Local Roles,
- Datasets assignment,
- Local Groupings

Project

- Map view,
- List view,

Data layers

- Parameters
- Analyses

Results

- thematics
- Pivot tables
- Charts

Event datasets

- Hospital activity
- Births
- Mortality
- Cancer
- Perinatal
- Road collisions
- Prescribing
- ..
- ..
- Upload external

Support datasets

Health Services Directory



GeoDirectory



Maps

Ordnance Survey
Google et al

Census



Members roles



Viewer



Analyst



Controller

Analysis



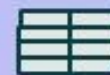
Counts, rates, ratios
Standardisation
Cluster tests
Network analysis



Outputs



Maps



Tables



Downloads



Print



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[Workspaces](#) [Agency](#) [Section Folder](#) [Folder](#)



HOME

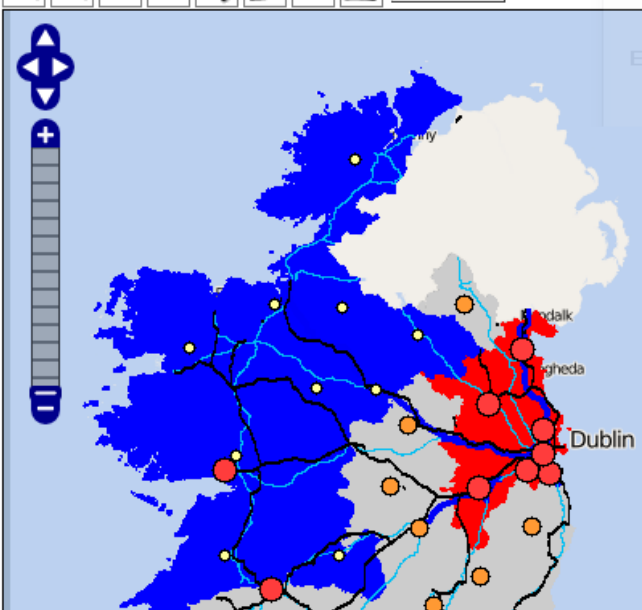
FOLDERS

Project:
Portland1

Edit Geo layer Dataset

Project Contents
Map

Zoom to...



- Ireland Maps
- Boundaries
- Buildings
- Transport
- Other
- Analysis + Geo layers
- Cartogram of Irl Pop
- Males in Ireland
- Females in Ireland
- Persons per km2
- Females in Ireland
- Persons per km2
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- Persons per km2
- Males in Ireland

Project:
Portland1

Census query:
Males in Ireland

Edit Geo layer Dataset List Parameters Analysis Results

Census / Totals : Males in Ireland / Females in Ireland

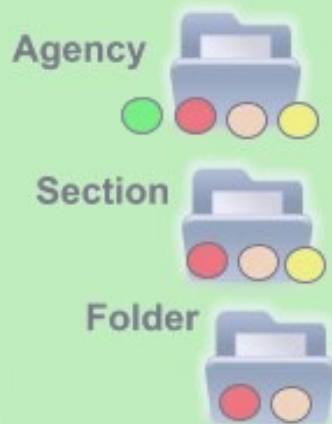
Selected parameters

Data set = Census
 Analysis = Totals
 Geography = All of Ireland
 Parameters which use only default values may not be shown.
 Year = 2006
 Display by = Local Authority (34)
 Gender = Female

Table

No rows	Female	Persons per km2
34	2118677	
Geographical name	Female	Persons per km2
Carlow	24738	27.59
Cavan	31088	16.09
Clare	54902	15.91
Cork City	60969	1548.16
Cork County	179512	24.05
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Dataset Cascade




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Event datasets

-  Hospital activity
-  Births
-  Mortality
-  Cancer
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Support datasets

Health Services Directory 

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Members roles



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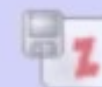
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Data Management

PostgreSQL with PostGIS

□ **Health Event Datasets**

- Hospitals (6 GB), Cancer, Accidents, Prescribing(3 GB per month), Births and more

□ **Support Datasets**

- Census, GeoDirectory, Health Services, External (excel, csv),

Maps

Ordnance Survey Ireland

- ◆ Rasters, vectors
- ◆ Derived maps, Boundaries

Worldmaps

- ◆ OpenStreetmaps
- ◆ NGA (NIMA)
- ◆ Google et al



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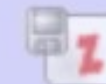
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Analysis functions

- **PostGIS** – geometric operations
- **R** – extensive library of statistical analysis functions
- **GRASS** – extensive library of spatial analysis functions
- **GeoLayers** – OpenApp additions – draw features to interact or analyse other layers
- Charts, **Pivot Tables**, Frequency sorters

GeoLayers

Interact with other data layers(Zope)

- **Spider Web** – road catchments
 - Analysis function for union, intersection, excluded areas
- **Compass** – concentric circles
- **Spider leg** – points about a point
- **Mask** – by defined areas
- **Area** – hand draw areas
- **Cartograms** and **Link Layers**



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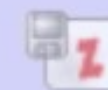
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Deployment

- Data secure in server environment
- Hosted outside the Health network for multi agency access
- VPN, Certificates, Lock down
- Virtualisation - XEN instances of Linux servers – supports test and deployment
- QGIS , Mapnik

Security

Access to sensitive data on a public network

- ◆ Zope security
 - Inheritance, Local roles, Local datasets
- ◆ LDAP integration
- ◆ Network security
 - Ossec, nagios,
- ◆ Folder Structure
 - Agency, Section, Group
- ◆ Roles
 - Controller, Analyst, Viewer
- ◆ Permissions (LDAP)
 - Small numbers,
 - high resources,
 - confidentiality



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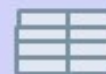
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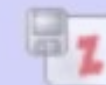
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System design

Zope2, Nuxeo CPS and Zope3

- ◆ Folders
 - ◆ Local Roles, Datasets assignment, Local Groupings
- ◆ Project
 - ◆ Map view, list view,
 - ◆ Data layers
 - ◆ From health events, support datasets, external source
 - Parameter selection, multiple analyses, multiple results, multiple thematics
 - Outputs
 - ◆ Snapshots, email, PDF Print to A0 photo quality

User Interface

- ◆ Browser only
- ◆ Public view – lookup
- ◆ Research view - tools
- ◆ Zope page templates - Python
- ◆ OpenLayers for Maps
 - Framework for app development
- ◆ jQuery for widgets
- ◆ Ajax, JSON, XHTML, CSS

Public service

Wicklow

Address

Area

Hospitals

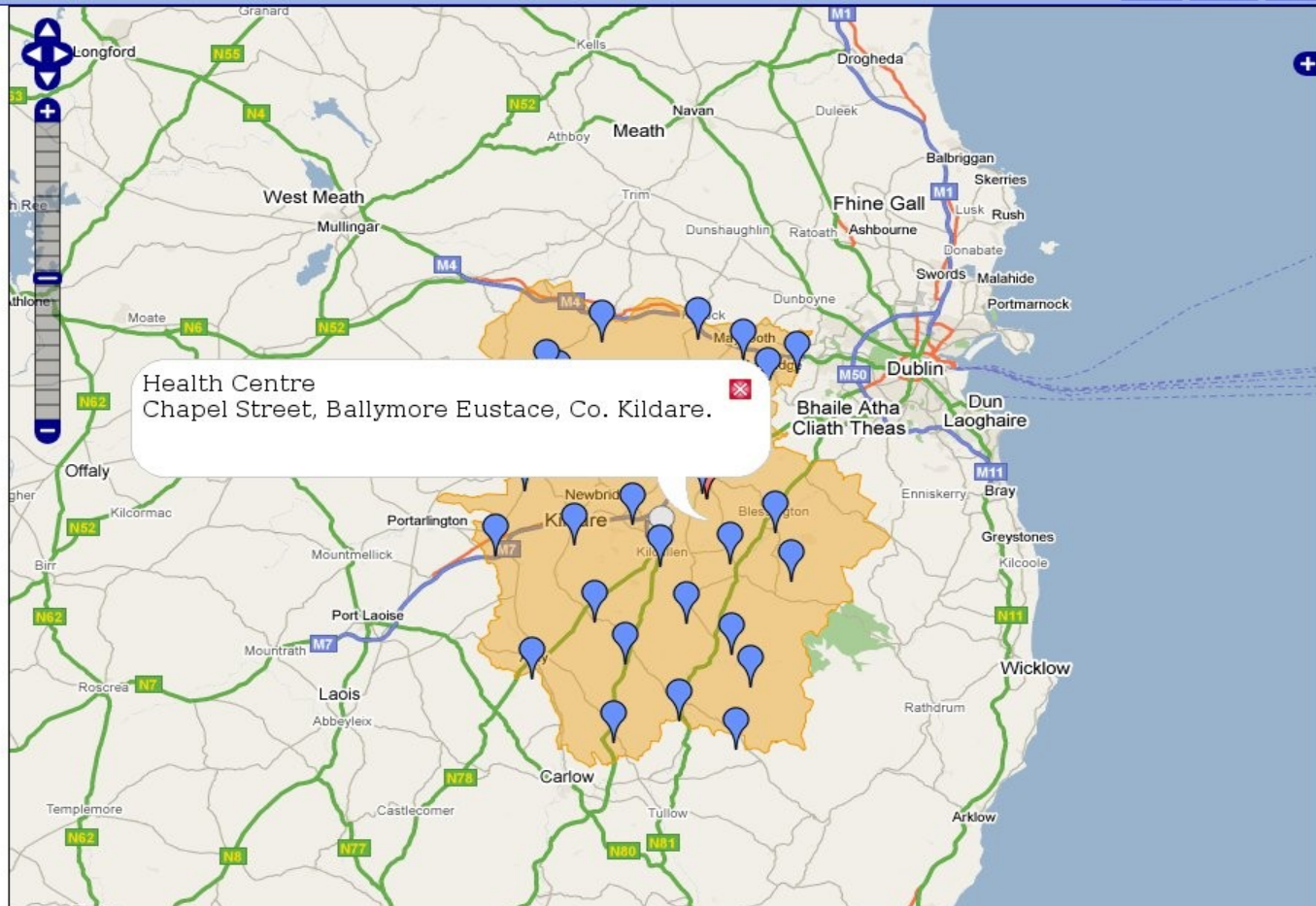
Services

[Get Directions](#)

[Print Email Link](#)

Results: 2

- [Kildare/West Wicklow](#)
Local Health Office Area
- [Wicklow](#)
Local Health Office Area





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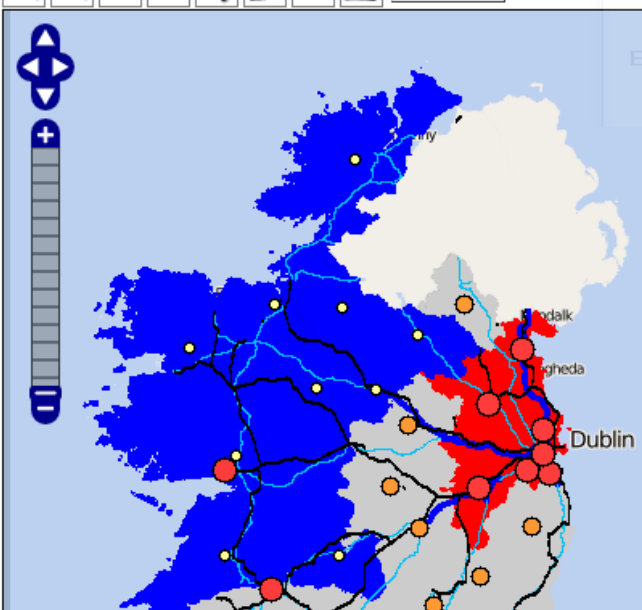
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Print



Anonymous Lookup



Research



Other output

Certificate Service (**OpenSSL**)
- Admin

Directory Service (**OpenLDAP**)
- Admin (**Php_Ladp_Admin**)

Security Monitor (**Ossec**)

Web Statistics (**AWStats**)

Monitoring - Alerts (**Nagios**)

System statistics (**Cacti**)

Backup (**cron scripts**)

Geo Directory Service

Zope/OpenLayers

Tile, Feature, Web
Caching

Zope Mapserver
Application GRASS
GDAL/OGR

PostGIS R

Linux - XEN

Documentation (**Mediawiki**)
www.healthatlasireland.ie/wiki

Discussion Forums (**PhpBB**)
www.healthatlasireland.ie/forums

Training Classes (**Moodle**)
www.healthatlasireland.ie/moodle

Online Conference (**DimDim**)
www.healthatlasireland.ie/dimdim

Project Management (**Trac**)

**We believe the use of
Open Source has aided
collaboration with and
of other agencies**



Collaboration

Tried and trusted model
Law - Universities - Science

- ◆ Collective wisdom
- ◆ Shared ideas and skills
- ◆ Engagement
- ◆ Shared costs
- ◆ Culture of Openness

User Collaboration

The heros of the future will be the collaborators

□ Who

- ◆ Academia – NUIM, DCU, TCD, UCD, IPA
- ◆ Health – HRB, HPSC, Cancer, Primary Care
- ◆ Public sector – An Garda, EPA, CSO
- ◆ International

□ How

- ◆ Design methodologies
- ◆ Using – curriculum, use cases
- ◆ Financing – HPSC, HRB
- ◆ Content – CSO, OSI, Health Agencies

Supplier Collaboration

- ◆ Core contributions to Zope
- ◆ Bug reports and fixes on many components used
- ◆ Ambition to release components
- PloneGov
 - 54 administrations
- Universities
- EU Open Source Observatory (OSOR)
- GIS Workshop
<http://www.epractice.eu/cases/healthatlas>

Thanks for listening

