



FOSS4G

PDX·2014

SEPTEMBER 8TH - 13TH





WELCOME

It is a pleasure to welcome you to Portland, and to FOSS4G 2014, the 10th anniversary of the largest global gathering focused on open source geospatial software. We are looking forward to an action-packed week and hope you are too.

We have an excellent program this year. We received 287 abstracts, and have built a rich schedule: over 40 workshops, followed by 3 days of presentations and featured talks 8 tracks deep. The large number of high-quality submissions is a welcome sign of the vitality of the FOSS4G ecosystem. Good stuff.

The new Travel Grant program has been a big success. We received over \$1,000 in donations from attendees, plus donations from PGExperts and Amazon.com that have enabled us to provide funding to fifteen people, eight of them from under-represented groups, hailing from four countries and eight states within the US. We're very proud of this, and we hope to see it continue in future FOSS4G events; increasing access to FOSS4G strengthens both the conference and our community.

Included in your registration is admission to the fun-filled FOSS4G Gala Night, hosted at the World Forestry Center, with door to door MAX service from the Oregon Convention Center. Join us at the Gala to celebrate FOSS4G, learn a little more of the history of the Pacific Northwest, and to continue conversations started at the preceding OSGeo Annual General Meeting. Be sure to check the schedule for other events.

We would like to thank the Program Committee, whose members reviewed the many papers and provided valuable planning and feedback over the course of a fast-paced year of preparing for this event. We are grateful in particular to Sam Matthews for his work on the website, to Kristin Bott for organizing the Travel Grants, to Amy Wilson and Monica Pujol for their work on managing the Program, and the many volunteers who have stepped forward to make this event possible. Our committee members are wearing red colored FOSS4G shirts, be sure to thank them when you see them.

Finally, make the most of your time here! While the majority of the year is spent in digital interactions, there is no substitute for personal contact. We have arranged breaks and BOF spaces, lunches, evening sessions, and code sprint spaces to facilitate collaboration in the development of great new ideas. We expect to see the results of these efforts throughout the coming year and at at FOSS4G in Korea 2015 and beyond.

Enjoy your time in Portland,



Darrell Fuhriman
Conference Chair

Eli Adam, Kristin Bott, Tanya Haddad, Matt Saylor
Local Organizing Committee Co-Chairs

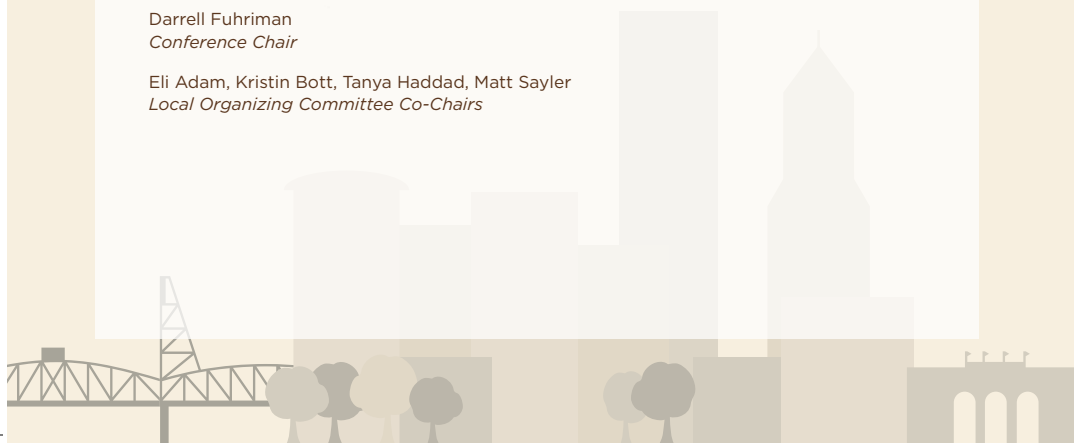




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Google™



SCHEDULE OVERVIEW

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Wednesday, Sept. 10th

- 7:00** Registration Opens
- 7:00** Coffee and Snacks Available
- 8:00** Introduction, announcements, thank-you's
- 8:30** **KEYNOTE: Mike Bostock, The New York Times**
- 9:30** Break
- 10:00 - 11:25** Session 1
- 11:00** Exhibit Hall Opens
- 11:30 - 13:00** Lunch in Exhibition Hall
- 13:00 - 14:25** Session 2
- 14:30** Break
- 15:00 - 16:25** Session 3
- 16:30 - 19:00** Drinks in Exhibition Hall
- 19:00 - 22:00** LocationTech Meetup
Spirit of 77, 500 NE Martin Luther King Jr. Blvd.
- 20:00 - 23:00** Maptime! Null Island! Party!
White Owl Social Club, 1305 SE 8th Ave.

Thursday, Sept. 11th

- 7:30** Registration Open
- 7:30** Coffee and Snacks Available
- 8:00** Exhibit Hall Opens
- 8:15** Introduction, Announcements
- 8:30** **KEYNOTE: Sarah Novotny, NGINX**
- 9:30** Break
- 10:00 - 11:25** Session 1
- 11:30 - 13:00** Lunch in Exhibition Hall
- 13:00 - 14:25** Session 2
- 14:30** Break
- 15:00 - 16:25** Session 3
- 16:30 - 17:30** OSGeo Annual General Meeting
Portland Ballroom
- 17:30** Transport to the Gala Night
- 18:00 - 22:00** Gala Night, World Forestry Center
World Forestry Center, 4033 SW Canyon Rd

SCHEDULE OVERVIEW

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Friday, Sept. 12th

8:00	Coffee and Snacks Available
8:30	Final Registration Day Open
9:00	Exhibit Hall Opens
10:00 - 11:25	Session 1
11:30 - 13:00	Lunch in Exhibition Hall
13:00 - 14:25	Session 2
13:30	Exhibition Hall Closes
14:30	Break
15:00	Closing Announcements, Sol Katz Award, Handover to Seoul
15:15	Pointcloud: The Musical!
15:45	KEYNOTE: Al Shaw, ProPublica
16:45	Adjourn
Evening	Field Trips!
19:00 - ??	Post Conference/WhereCampPDX kick-off Party, sponsored by MapBox <i>The Refuge, 116 SE Yamhill St</i>

Saturday, Sept. 13th

All Day	Field Trips!
8:00	Coffee, Snacks Available
8:00	Code Sprint Open <i>Eliot Center, 1226 SW Salmon Street</i>
9:00	WhereCampPDX Begins <i>Eliot Center, 1226 SW Salmon Street</i>
12:00	Lunch Break
15:00	WhereCampPDX Ends

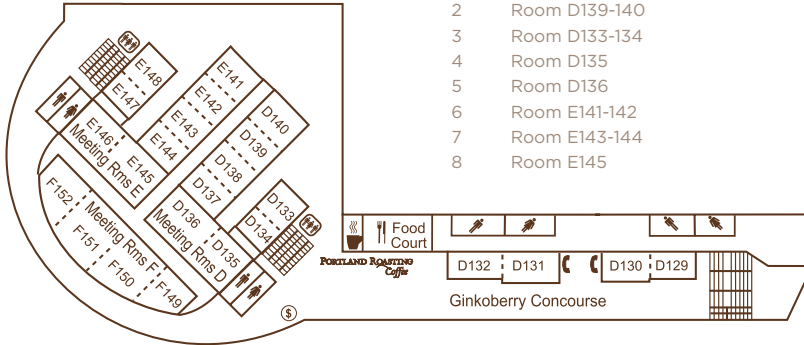
Friday, Sept. 12th

11:00	Field Trip to Portland Breweries
All Day	GeoServer Sunday Code Sprint <i>NedSpace, 619 SW 11th Avenue, Suite 250</i>
Late Morning	WhereCampPDX Game Day Begins <i>Eliot Center, 1226 SW Salmon Street</i>
Early Afternoon	WhereCampPDX Game Day Ends <i>Eliot Center, 1226 SW Salmon Street</i>

OREGON CONVENTION CENTER

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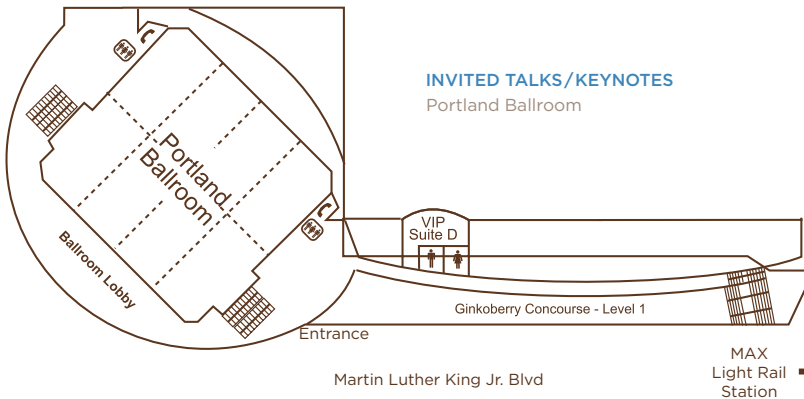
Upper Level



TRACK ROOM

- 1 Room D137-138
- 2 Room D139-140
- 3 Room D133-134
- 4 Room D135
- 5 Room D136
- 6 Room E141-142
- 7 Room E143-144
- 8 Room E145

Lower Level



INVITED TALKS/KEYNOTES

Portland Ballroom

WEDNESDAY – SESSION 1

10:00 – 10:25

10:30 – 10:55

11:00 – 11:25

INVITED TALK

PORTLAND BALLROOM

How Simplicity Will Save GIS
Vladimir Agafonkin, Mapbox

p. 8

TRACK 1

ROOM D137-138

Fiona and Rasterio: Data Access for Python Programmers and Future Python Programmers
Norman Barker

p. 8

Crazy Data: Using PostGIS to Fix Errors and Handle Difficult Datasets
Daniel Miranda

p. 11

Big Size Meteorological Data Processing and Mobile Displaying System Using PostgreSQL and GeoServer
Jaehyun Kwun, Gaia3D

p. 15

TRACK 2

ROOM D139-140

GeoServer Feature Frenzy
Jody Garnett, Boundless
Andrea Aime, GeoSolutions

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Advanced Security With GeoServer
Mauro Bartolomeoli, GeoSolutions Sas

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GeoNetwork Opensource 3.0
Jeroen Ticheler

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TRACK 3

ROOM D133-134

Developing Tools for Humanitarian Decision Making
Dale Kunce

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MapJakarta – Enabling Civic Co-Management Through GeoSocial Intelligence
Tomas Holderness

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Adopting OGC Standards in a Flood Alert System
Ivan Martinez, FCTH/SAISP

p. 16

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ROOM D135

Gimme Some YeSQL! – and a GIS
Vincent Picavet, Oslandia

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The Best of Both Worlds: Combining Geometry and Key-Value Stores Using PostGIS and HStore
Alexander Nossum, Norkart AS

p. 13

Spatial in Lucene and Solr
David Smiley, D W Smiley LLC

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TRACK 5

ROOM D136

Do This, and Also That: Integrating Open Source Tools into Traditional GIS Shops
Sara Safavi, Rackspace

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Using QGIS Server
Karl-Magnus Jönsson

p. 13

The Manager's Guide to PostGIS
Paul Ramsey

p. 16

TRACK 6

ROOM E141-142

An Efficient Python-based Application for Forest Classification and Vitality Mapping
Gideon Okpoti Tetteh

p. 10

Visualizing Geospatial Datasets Using WebGL
Adnan Wahab

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Raster Data In GeoServer And GeoTools: Achievements, Issues And Future Developments
Andrea Aime

p. 17

TRACK 7

ROOM E143-144

Implementing Change in OpenStreetMap
John Firebaugh, Mapbox

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How to Tell Stories and Engage an Audience with Maps
Andrew Hill, CartoDB

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Using OpenStreetMap Infrastructure to Collect Data for Our National Parks
James McAndrew, National Park Service

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TRACK 8

ROOM E145

Shortest Path Search in Your Database and More With pgRouting
Daniel Kastl

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Government as a Contributing Member of the OpenStreetMap (OSM) Community
Bibiana McHugh, TriMet

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A Complete Multi-Modal Carpooling and Route Planning Solution
Julien-Samuel Lacroix

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WEDNESDAY – SESSION 2

13:00 – 13:25

13:30 – 13:55

14:00 – 14:25

INVITED TALK

PORTLAND BALLROOM

Exploring Openness in Geospatial Education

Anthony Robinson, Pennsylvania State Univ.
Robert Cheetham, Azavea
Nuala Cowan, George Washington Univ.

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TRACK 1

ROOM D137-138

GeoScript – A Geospatial Swiss Army Knife

Justin Deoliveira

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Community Health Mapping

Kurt Menke, Bird's Eye View

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Assessing the Distribution of Disease Vectors & Fruit crop Pests from Satellite in GRASS GIS 7

M. Neteler, Fondazione & E. Mach

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TRACK 2

ROOM D139-140

OpenSource GIS Surveying – Water Application

Vincent Picavet, Oslandia

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Mobile Vector Map Rendering With Mapbox Tools

Justin Miller, Mapbox

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A Jumpstart for Your Mobile Map App

Greg Allensworth, GreenInfo Network

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Integrating FOSS4G into an Enterprise System for Disaster Management

David Askov

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An Open Source Approach to Communicating Weather Risks

Jonathan Wolfe, National Weather Service

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Geospatial-Semantic Knowledge Management and Linked Data for Humanitarian Assistance

Tim Clark

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TRACK 4

ROOM D135

OpenLayers 3: A Unique Mapping library

Eric Lemoine

p. 19

Leaflet + UTMGrids + d3.js = Liquid Fast, Massively Scalable Interactive Web Map & Data Visualization

B. Wyss, GEM Foundation

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GIS in the Browser – The Good Parts

Matt Priour, Esri, Inc.

p. 25

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ROOM D136

Small Town GIS – Leveraging GitHub, QGIS and Community Members to Manage Local Data

Aaron Racicot

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Managing Public Data on GitHub: Pay No Attention to That Git Behind the Curtain

Landon Reed, Atlanta Regional Commission

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Building Open Source Projects in Government Esri Ecosystems

Lyzi Diamond, Code for America

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ROOM E141-142

Finding the Where in Big Fuzzy Data

Andrew Turner

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Spatial Temporal Network Web Visualization Techniques

Lynnae Sutton

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Anchoring and PostGIS Cure Post-Polygon Stress Disorder

Yao Cui, British Columbia Geological Survey

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MEETING ROOM E143-144

Barriers to FOSS4G Adoption: OSGeo-Live Case Study

Alex Mandel

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OSGeo Incubation

Jody Garnett, Boundless

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Serving High-Resolution Spatiotemporal Climate Data is Hard, Let's Go Shopping

James Hiebert, Pacific Climate Impacts Consortium

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MEETING ROOM E145

Repurposing OpenTripPlanner for Ride Sharing

Daniel Luxemburg, Bandwagon

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Fast Travel Sheds Using GTFS Data in GeoTrellis Transit

John Branigan

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UrbanSim2: Simulating the Connected Metropolis

Fletcher Foti
Paul Waddell

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WEDNESDAY – SESSION 3

15:00 – 15:25

15:30 – 15:55

16:00 – 16:25

INVITED TALK

PORTLAND BALLROOM

Making Space for Diverse Mappers
Alyssa Wright, MapZen

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ScribeUI: MapServer Mapfile Management Made Easy
Julien-Samuel Lacroix

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Running Your Own Rendering Infrastructure

Alan McConchie, Stamen Design
Seth Fitzsimmons, Stamen Design

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"Fast Big Data?" A High-Performance System for Creating Global Satellite Image Time Series

Derick Swanepoel, CSIR

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GIS in Node.js
Calvin Metcalf

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Tileserver on a Diet Using Node.js

Igor Tihonov, Hemnet

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Client-Side vs. Server-Side Geoprocessing: Benchmarking the Browser

Erin Hamilton, Univ. of Wisconsin-Madison

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The Development and Evolution of an Open Source Mapping Application Within the USG – Now With More Google Glass
E. Finnen & B. Tuttle, PhD

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Scaling for NYC While Tracking Plows

Colin Reilly, NYC DoITT

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GeoNode for Humanitarian Crisis and Risk Reduction

S. Dalmasso, EC – JRC
P. Corti, World Food Programme
A. Núñez, World Bank

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Getting Started with OpenLayers 3
Tim Schaub, Planet Labs

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Vector Tiles for Fast Custom Maps

Dane Springmeyer

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Tilez: Serving Seamless Polygons in the Browser with TopoJSON and Node.js

Luca Morandini, Univ. of Melbourne
Luca Morandini

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Adding Value to Open Data Using Open Source GIS
Brent Wood, NIWA

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Empowering People, Popularizing Open Source, and Building a Business

Javier de la Torre, CartoDB
Andrew Hill, CartoDB

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Supporting Open Data with Open Source

Micah Wengren, NOAA
Jeff de la Beaujardiere, NOAA

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GeoMesa: Distributed Spatiotemporal Analytics
Anthony Fox, Commonwealth Computer Research, Inc

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Real-time Scenario Planning with OpenLayers

Scott Fletcher, Point 97

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Trusting the Crowd in a Geospatial Crowdsourcing Application

Shravan Shah, CEPT Univ., India
Dr. Femke Reitsma, Univ. of Canterbury, New Zealand

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Update on new OGC Standards: GeoPackage, OWS Context & Geosync
Raj Singh, Open Geospatial Consortium

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Open Source Geo Certification

Arnulf Christl

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Avoiding Burnout, and Other Essentials of Open Source Self-Care

Kathleen Danielson, OpenStreetMap US

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CS-Map – Coordinate System Libraries
Norman Barker

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Spatio-Temporal Data Visualization in GRASS GIS: Desktop and Web Solutions

V. Petras, NC State Univ.
A. Petrasova, NC State Univ.

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Geodesign: An Introduction to Design with Geography

Matthew Baker, GeoChasm
Brad Barnett, Placematters

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10:00 - 11:00 • *Portland Ballroom*

How Simplicity Will Save GIS

Vladimir Agafonkin, Mapbox

It's 2014 — we have consumer robots and electric cars, private spacecraft, planet colonization projects, and the Higgs Boson is confirmed, but GIS software is still a mess. You might be able to make sense of it all if you're a GIS specialist with an academic background, but other creative individuals — designers, developers, tinkers of all kinds, each with a vision and desire to create meaningful and beautiful maps and visualizations — are constantly losing battles against bloat, clutter, and complexity.

How do we reverse this GIS entropy? What does it take to turn complex technology into something that anyone can use and contribute to? An attempt to answer by the creator of Leaflet, a simple JS library that changed the world of online maps forever.

10:00 - 10:25 • *Room D137-138*

Fiona and Rasterio: Data Access for Python Programmers and Future Python Programmers

Sean Gillies

Fiona and Rasterio are new GDAL-based Python libraries that embody lessons learned over a decade of using GDAL and Python to solve geospatial problems. Among these lessons: the importance of productivity, enjoyability, and serendipity to both experts and beginners.

I will discuss the motivation for writing Fiona and Rasterio and explain how and why they diverge from other GIS software and embrace Python's native types, protocols, and idioms. I will also explain why they adhere to some GIS paradigms and bend or break others.

Finally, I will show examples of using Fiona and Rasterio to read, manipulate, and write raster and vector data. Some examples will be familiar to users of older Python GIS software and will illustrate how Fiona and Rasterio let you get more done with less code and fewer bugs. I will also demonstrate fun and useful features not found in other geospatial libraries.

10:00 - 10:25 • *Room D139-140*

GeoServer Feature Frenzy

Jody Garnett, Boundless
Andrea Aime, GeoSolutions

What can you do with this GeoServer thing? This talk covers some of the basic (and not so basic) ways to use GeoServer to publish your geospatial data and make it look great! GeoServer made its first release in 2001 and has grown into an amazing, capable and diverse program. This also means the "feature list" is spread over years of release announcements, presentations, mailing list archives!



This presentations provides a whirlwind tour of GeoServer and everything it can do today!

This talk is a visual guide to the features of GeoServer. Are you just getting started with GeoServer, or considering it for the first time? Attend this talk and prioritize what you want to look into first. Are you an expert user who has been running GeoServer since Java 1.4? Attend this talk and see what tricks an optimisations you have been missing out on!

10:00 – 10:25 • Room D133-134

Developing Tools for Humanitarian Decision Making

Dale Kunce

The American Red Cross International Services Department (ISD) and project partners are developing a web visualization tool (Mapfolio) to help to visualize Red Cross's disaster response and humanitarian projects around the world. The solution uses innovative Node.js ETL processing to process information from the Red Cross Salesforce Information Management platform. The Mapfolio is open source built on Node.js, Angular, Leaflet, PostGIS, and a custom PGRestAPI (Chubbs). Other technical advances include a custom Leaflet clipped-polygon labeling as well as a map-view-dependent (not zoom level dependent) display of global administrative boundaries. This session will not only walk through the open source components but will also focus on how the Red Cross defined clear deliverables and scaled-up its support of free and open source software.

10:00 – 10:25 • Room D135

Gimme Some YeSQL! – and a GIS

Vincent Picavet, Oslandia

So long NoSQL, here is YeSQL!

Not long ago, PostgreSQL was the the most advanced OpenSource relational database. With the latest version 9.4, it became an over-powerful mutant: the most advanced OpenSource Object-Oriented relational and/or non-relational, Spatial, SQL and/or NoSQL database. For the sake of simplicity, let us call it a YeSQL database.

This presentation will introduce you to the feature galore of PostgreSQL, giving insights into the latest improvements from a user point of view. Of course some GIS inclination will drive this talk, and show you how you can take advantage of spatial extensions together with PostgreSQL core features.

PostgreSQL 9.4 is an important milestone for various reason: a lot of new outstanding features, and core improvements which prefigure a whole world of new use cases. The main feature from a user perspective, giving PostgreSQL this YeSQL title, is probably the new JSONB storage. A fine marriage between the Hstore extension and JSON support, it literally transforms PostgreSQL into a document database (think MongoDB in PostgreSQL without data losses).

We will therefore present great PostgreSQL 9.4 features, and some ways to use them with spatial data, leveraging the latest PostGIS and PointCloud extensions:

- Exclusion constraints
- KNN search
- Lateral joins
- Window functions
- (writeable) (recursive) CTE
- Automatic updateable views
- Materialized views
- JSON, more JSON, JSON indexing, JSON procedures...
- Foreign Data Wrappers
- Logical decoding and future applications
- More JSON? GeoJSON?

The feature set available to PostgreSQL users is growing with every release, as are performances. And the spatial part of it is not lagging behind. It is a must-use platform for data management, data infrastructures. And a GIS.



10:00 - 10:25 • Room D136

Do This, and Also That: Integrating Open Source Tools into Traditional GIS Shops

Sara Safavi, Rackspace

This talk is intended for GIS users & managers who may be interested in open source GIS but aren't sure what the advantages to them might be, or who think Open Source GIS is nice in principle but are afraid there's no space for it in their workplace. In general, "Do This, and also That..." wants to address concerns of professionals who aren't sure how or why to make the leap from traditional/proprietary GIS tools into the wide world of Open Source GIS.

Drawing from my own experiences, my goal is to gently present an integrated approach to open source GIS. This is not an "all or nothing" scenario: I want to show the audience how effective workflow solutions can involve both open source GIS as well as "traditional" proprietary GIS they are familiar with.

I will briefly discuss common issues faced by GIS users, and explore the benefits of integrating open-source based workflows alongside proprietary GIS. I will cover use-cases for Leaflet and OpenLayers, OGR2OGR, PostGIS, and QGIS. Each use-case will demo a quick and friendly example of how a particular real-world issue might be addressed by the inclusion of one of these open source options into an existing GIS stack.

10:00 - 10:25 • Room E141-142

An Efficient Python-based Application for Forest Classification and Vitality Mapping

Gideon Okpoti Tetteh

An analysis and understanding of forest dynamism over time gives one insightful information on when and how to react to these changing forest trends. For many years now, stakeholders in forestry have used remote sensing for various applications such as the management and assessment of the health of forests, as well as the analysis of forest changes over time. This research delved into the development of an application, chiefly based on Python and its default and external libraries, for forest classification, change detection and time-series analysis, in order to be able to remotely assess the vitality and/or defoliation of forests over time. The developed tool follows a modularized approach such that it contains individual tools for Co-registration, Radiometric Normalization, Classification, and Time-Series Analysis. The tool was developed making use of Python Open Source libraries namely Tkinter, GDAL/OGR, NumPy, SciPy and Scikit-Learn. Tkinter was used in creating the graphical user interface (GUI) of the entire application, GDAL/OGR was used for reading and writing of raster and vector data, NumPy and SciPy were used in the numerical and scientific analysis of the arrays generated from the images, while Scikit-Learn, with its Classification and Regression Tree routine, was used for image classification.

10:00 - 10:25 • Room E143-144

Implementing Change in OpenStreetMap

John Firebaugh, Mapbox

In 2013, I was involved in two substantial technical changes to OpenStreetMap: a new default editor and a redesign of the website. Because OpenStreetMap is a collaborative project, these were as much social as technical efforts. This talk will explore the social dynamics of collaborative open source projects and the techniques that helped us successfully implement technical change in a social environment that by nature tends to be change averse.



10:00 - 10:25 • Room E145

Shortest Path Search in Your Database and More With pgRouting

Daniel Kastl

pgRouting extends the PostGIS/PostgreSQL geospatial database to provide shortest path search and other network analysis functionality.

This presentation will show the inside and current state of the pgRouting development, from its wide range of shortest path search algorithms to driving distance calculation or “Traveling Sales Person” (TSP) optimization. Additionally we will give a brief outlook and introduction of upcoming new features like the “Vehicle Routing Problem” (VRP) solver, and what we have in mind for future releases.

We will explain the shortest path search in real road networks and how the data structure is important to get better routing results. Furthermore we will show how you can improve the quality of the search with dynamic costs and make the result look closer to the reality. You will also learn about difficulties and limitations of the library, and when pgRouting might not be the right tool to solve your routing problem.

10:30 - 10:55 • Room D137-138

Crazy Data: Using PostGIS to Fix Errors and Handle Difficult Datasets

Daniel Miranda

Intelgeo is a system that stores a lot of information used by the Brazilian Federal Police Forensics to fight crime, initially in the environmental arena with a later expansion to other types of crime. During the construction of the database a lot of problems appeared for which PostGIS was the key to the solution.

This presentation describes problems encountered by the team while loading 850+ shapefiles into the database, linking with external databases and building 950+ views of the data. Although the content of the recipes is very technical, the general concepts will be explained in an accessible language and correlated to real world cases.

Topics:

- Definition of crazy data in our context
- Quick recipes
 - Spike removal
 - Invalid geometry detection and fixing
 - Filling holes
 - Raster image footprints
 - Hammering data into correct topologies
 - Speeding data visualization with ST_Simplify and PGSQL 9.3's materialized views
 - Rough georeferencing using an auxiliary table
 - Creating constraints
- How is crazy data generated and our experience in handling each case
 - Large datasets
 - Lack of validation
 - Reprojection
 - Geometric operations
 - Topological errors
 - Imprecise definitions
 - Legacy databases
 - Bad georeferencing

We will also discuss why is handling crazy data important for the Brazilian Federal Police, our efforts in cleaning up data at the source and the implications of geographical data in general for fighting crime.



10:30 - 10:55 • Room D139-140

Advanced Security With GeoServer

Mauro Bartolomeoli, GeoSolutions Sas

The presentation will provide an introduction to GeoServer own authentication and authorization subsystems. We'll cover the supported authentication protocols, such as from basic/digest authentication and CAS support, check through the various identity providers, such as local config files, database tables and LDAP servers, and how it's possible to combine the various bits in a single comprehensive authentication tool, as well as providing examples of custom authentication plugins for GeoServer, integrating it in a home grown security architecture.

We'll then move on to authorization, describing the GeoServer pluggable authorization mechanism and comparing it with proxy based solution, and check the built in service and data security system, reviewing its benefits and limitations.

Finally, we'll explore an advanced authentication tool called GeoFence, and see how it can plug into GeoServer to provide graphical configuration abilities for use complex authorization rules over data and OGC services, taking into account spatial filters, attribute filters, attribute hiding as well as cropping raster data to areas of interest. Finally we'll show how using LDAP both GeoFence and GeoServer can use a common users database, simplifying administrators job, and provide some real world examples.

10:30 - 10:55 • Room D133-134

MapJakarta – Enabling Civic Co-Management Through GeoSocial Intelligence

Tomas Holderness

Mapping urban infrastructure systems is a key requirement to advance our capacity to understand and promote the resilience of cities to both extreme weather events as a result of climate change and to long-term infrastructure transformation as a process of climate adaptation. Yet, while developing nations will bear the brunt of the interwoven, climatic, economic and social challenges of the 21st century, many of these countries lack the sensor networks required to monitor and model the response of the urban system to change. The nexus of people and place embedded in social media communication which is widespread and ubiquitous in many developing nations offers one potential solution. In this context, location-based social media often in the form of big-data, can be used to map emerging spatio-temporal trends to support situational management. Critically, however, the collection and application of such data raises significant questions around privacy, trust and security of the information gathered. The MapJakarta.org project will be presented as a demonstration of the capabilities of free and open source geospatial technology to employ real-time social media data in a secure and anonymous manner for the purpose of decision support.

MapJakarta.org is a pioneering web-based platform that harnesses the power of social media by gathering, sorting and displaying information about flooding for Jakarta residents and governmental



agencies in real time. The project, in partnership with the Flood Management Office in Jakarta (BPBD DKI) will radically change real-time data collection and feedback for flood monitoring in the most densely populated city in Southeast Asia. The platform runs on the open source software known as CogniCity - a GeoSocial Intelligence framework developed by the SMART Infrastructure Facility, University of Wollongong - which allows situational information to be collected and disseminated by community members through their location enabled mobile devices via social media networks. Furthermore, the framework also enables governmental actors to perform rapid infrastructure surveys and asset management for pre- and post-flood assessment using the same networks. CogniCity is built on the NodeJS platform, and utilizes the PostGIS spatial database for storage, and the LeafletJS map library for visualisation.

In this presentation we will explain how these open source components are combined to form a geographical information system within the existing flood management framework, enabling the collection and analysis of social media for flood response and civic co-management in the megacity of Jakarta.

10:30 - 10:55 • Room D135

The Best of Both Worlds: Combining Geometry and Key-Value Stores Using PostGIS and HStore

Alexander Nossum, Norkart AS

The "national geospatial foundation" of Norway consists of multiple semi-structured and semi-standardized thematic data sets made available in a variety of formats. Storing, extracting and performing lightweight analyses across the different data sets adds value and usefulness to the data sets, which is a prime motivation for releasing the data freely to the public. Earlier approaches have stored the different data sets in a traditional relational manner resulting in hundreds of PostgreSQL/PostGIS tables - some with dozens of attributes. Updating and querying the data sets becomes unnecessary complicated and often a tedious, manual task.

In an effort to deal with these issues, we have looked at other ways of storing and querying the data. A schemaless storage mechanism, like NoSQL-databases, fits perfectly to the task. However, oSQL-database implementations have major drawbacks related to geometry handling when compared with PostGIS. We wanted the geometry handling of PostGIS combined with the schemaless storage mechanisms of a NoSQL database.

Postgresql fits this combination perfectly with PostGIS' handling of geometry and HStores handling of key-value stores. HStore is an extension that implements a binary data type in PostgreSQL that allow storing an arbitrary number of key-value pairs. In contrast to the JSON data type, HStore enable indexing on the key-value stores. Combining PostGIS geometry with HStore's key-value storage for non-geometry attributes was a perfect match for storing the highly varying data sets. The flexibility gain is tremendous and a huge success allowing our data developers to find new ways of combining and making value of the data sets. Future work on the JSONB data type will combine the benefits of both the HStore and the JSON data type, enabling solutions that are even more advanced as well as bridging the gap between NoSQL-databases and relational spatial databases.

This talk will present our success in combining geometry and key-value stores in PostgreSQL by using PostGIS and HStore - which lead to a neatly structured geospatial data collection with excellent performance for extractions, both in materialized views, but also running real-time extractions and lightweight analyses used in production decision-making.

10:30 - 10:55 • Room D136

Using QGIS Server

Karl-Magnus Jönsson

Kristianstad municipality in Sweden has since 2013 been using QGIS and QGIS Server as a base in our GIS platform. Our goal is to have a user friendly, yet powerful, set of applications from server via desktop and web to mobile applications. All based on open source. QGIS and QGIS server has



several functions that makes it easier for both the users and administrators of the systems. That could be saving styles and attribute forms to the database, styling and publish WMS and WFS directly from the desktop QGIS application. With a combination of different types of caching mechanisms we achieve fast and flexible services for our web applications. These open source projects, sMap and sMap-mobile, have also been designed to be fast, flexible and user friendly.

10:30 - 10:55 • Room E141-142

Visualizing geospatial datasets using WebGL

Adnan Wahab

Data analysts must navigate increasingly large data sets, sometimes with billions or more records. I present methods for interactive visualization of large data sets, following the idea that perceptual and interactive scalability should be limited by the chosen resolution of the information, not the scale of the data.

I first describe methods for interactive querying using binned plots through a combination of multivariate data tiles and parallel query processing. I then present a design space of scalable visual summaries that use data reduction methods (such as binned aggregation or sampling) to visualize a variety of data types.

10:30 - 10:55 • Room E143-144

How to Tell Stories and Engage an Audience with Maps

Andrew Hill, CartoDB

Maps and stories go together like two peas in a pod. Why is that and how do we take advantage of it? Through my work at CartoDB, I have been able to think deeply about the role of storytelling for today's map makers. Here, I will talk about the insights we have gained through teaching CartoDB users, building libraries such as Torque and Odyssey.js, and creating innovative maps online. Some of my maps have included FOSS4G award winners (NYCHenge and PLUTO Data Tour) as well as dozens of unique and interesting experiments to combine interaction and multimedia with maps or trying to find the limits of what we call a map. If we plan to keep mapping relevant and exciting, it is important that we keep finding the exciting new ways to bend technology to engage people. The map has an interesting future over the coming years and here I will talk about some of the ways we should expect it to go and what it means for us as geospatial software developers.

10:30 - 10:55 • Room E145

Government as a Contributing Member of the OpenStreetMap (OSM) Community

Bibiana McHugh, TriMet

OpenStreetMap (OSM) is now TriMet's standard source for routable base map data. TriMet utilizes OSM for internal systems and applications that necessitate a routable base map including, but not limited to: Computer-Aided Dispatch/Automatic Vehicle Location (CAD/AVL) system; Call Center and Field Trip applications; LIFT paratransit mobile data terminals (MDTs); OpenTripPlanner, an open source, multimodal trip planner; and fixed route scheduling system for on-street service.

TriMet is now a committed, contributing member of the OSM community. Working with the community and local jurisdictions is a standard business practice supported with a full-time employee (FTE) that is dedicated to OSM maintenance and associated datasets in the seven counties area. This effort sustains the increasing number of systems in the agency that require routable networks, and it supports seamless multi-agency trip planning and analysis in the region.



This presentation will include:

- Emerging technologies on the market that require a seamless routable network, and why OSM is an obvious solution to fulfill new system requirements
- TriMet's OSM Improvement Projects for the seven county regional area in Portland in support of vehicle, walking, biking and transit routing in the four county metro area
- Benefits of collaboration between the OSM community and government
- The business justification for a dedicated FTE in support of continued maintenance of OSM
- The financial support for this position which demonstrates the recognition of OSM's importance from both an agency and regional perspective.
- Facilitation of progress in this area with open data policies, data portals, and enhanced software tools

11:00 - 11:25 • Room D137-138

Big Size Meteorological Data Processing and Mobile Displaying System Using PostgreSQL and GeoServer

Jaehyun Kwun, Gaia3D

Gaia3D has developed meteorological data mobile web service using PostgreSQL and GeoServer for weather forecaster in Korea Meteorological Administration(KMA).This system displays weather charts, weather prediction information, weather images, observation data on mobile web for rapid decision of weather forecasters when they are out of office or in remote environment. I will deliver a presentation about experience to develop and launch mobile web service showing weather charts by tuning daily updated big spatial data in terms of database.

Weather charts generated by this system are displayed using OpenLayers Mobile after inserting big size vector data into PostGIS and rendering these data by GeoServer. This system processes 67 million lines of spatial data(approximately 35GB) and generates more than five thousands weather charts everyday.

On previous system, it took five hours to insert data into PostGIS and took tens of seconds to publish single weather charts by GeoServer. Also, there was another problem that file size on PostGIS has unlimitedly increased.

Gaia3D decided to fix the problems and improve this system in terms of data input, data management, and data display. Consequently, the performance of data input has increased about hundred times and the performance of data display has increased about two hundred times. Finally, KMA could successfully and stably manage the system without increase of file size of three days data. (This system shows data up to previous 72 hours.)

11:00 - 11:25 • Room D139-140

GeoNetwork Opensource 3.0

Jeroen Ticheler

The presentation will provide an insight of the new functionality available in the latest release of the software. Publishing and managing spatial metadata using GeoNetwork opensource has become main stream in many Spatial Data Infrastructures. GeoNetwork opensource 3.0 comes with a new, clean user interface based on AngularJS, Bootstrap and D3. Other topics presented are related to performance, scalability, usability, workflow, metadata profile plugins and catalogue services compliance. Examples of implementations of the software will also be given, highlighting several national European SDI portals as well as work for Environment Canada and the collaboration with the OpenGeoPortal project.



11:00 - 11:25 • Room D133-134

Adopting OGC Standards in a Flood Alert System

Ivan Martinez, FCTH/SAISP

This presentation is about the adoption of the OGC - Open Geospatial Consortium standards in Sao Paulo Flood Alert System which was based on matrix coordinates and static maps.

The Flood Alert System has more than 300 telemetric stations composed by rain gauges, water level sensors placed on rivers and reservoirs, water quality sensors, weather stations and a S-band weather radar reaching 240 kilometers of scanning range. The system offers Real Time support for a large metropolitan area and its Emergency Centers, Civil Defense groups, Government, Service companies and general public.

We have integrated Geotools (for data conversion), Geoserver (services like WMS, WFS), DB2, OpenStreetMap, uDig, Quantum GIS and some other softwares in our architecture. This set of tools provides many possibilities to easily integrate our data with other systems and external data, like some Hydraulic and Hydrological models that return geospatial data with flooding area forecast and vulnerable buildings.

Talking about the architecture, the adoption process, some of the issues, applied solutions and further development.

11:00 - 11:25 • Room D135

Spatial in Lucene and Solr

David Smiley, D W Smiley LLC

Apache Lucene is a Java toolkit that provides a rich set of search capabilities such as keyword search, query suggesters, relevancy, and faceting. It also includes a spatial module for searching and sorting with geometric data using either a flat-plane model or a spherical model. The capabilities therein are leveraged to varying degrees by Apache Solr and Elasticsearch--the two leading search servers based on Lucene.

In this talk I'm going to start by briefly covering some core features of this search platform so that the audience appreciates the unique role it plays in the crowded world of information-retrieval. I will then show examples of using some spatial features in Apache Solr such as:

- indexing points, polygons, and other shapes into a Lucene document
- filtering search results by a query shape, to include using different search predicates
- sorting by distance between indexed points and a query point

Next I will review some spatial features in Lucene spatial and Elasticsearch such as:

- sorting bounding boxes by overlap percentage with a query box
- aggregating geohash grid counts for heatmaps

The talk will also note the internal architecture and dependencies of Lucene spatial, and discuss a key dependent library called Spatial4j. At the end of the talk I will note some limitations to be aware of, as well as planned improvements. Finally, key advances in geodesic (spherical geometry) information retrieval in Spatial4j will be highlighted.

11:00 - 11:25 • Room D136

The Manager's Guide to PostGIS

Paul Ramsey

Your staff keep talking about this "PostGIS" thing, but what is it? Does anyone (important) else use it? What for?

This talk gives a brief overview of the place of PostGIS in spatial IT architecture, how PostGIS



compares to proprietary alternatives, who is using PostGIS, and how organizations transition to open source databases.

11:00 - 11:25 • Room E141-142

Raster Data In GeoServer And GeoTools: Achievements, Issues And Future Developments

Andrea Aime

The purpose of this presentation is, on a side, to dissect the developments performed during last year as far as raster data support in GeoTools and GeoServer is concerned, while on the other side to introduce and discuss the future development directions.

Advancements and improvements for the management of raster mosaic and pyramids will be introduced and analyzed, as well as the latest developments for the exploitation of GDAL raster sources.

Extensive details will be provided on the latest updates for the management of multidimensional raster data used in the Remote Sensing and MetOc fields.

The presentation will also introduce and provide updates on the JAITools and ImageIO-Ext projects. JAITools provides a number of new raster data analysis operators, including powerful and fast raster algebra support. ImageIO-Ext bridges the gap across the Java world and native raster data access libraries providing high performance access to GDAL, Kakadu and other libraries.

The presentation will wrap up providing an overview of unresolved issues and challenges that still need to be addressed, suggesting tips and workarounds allowing to leverage the full potential of the systems.

11:00 - 11:25 • Room E143-144

Using OpenStreetMap Infrastructure to Collect Data for Our National Parks

James McAndrew, National Park Service

The National Park Service has many well-known sites, but many parks do not have the GIS resources to maintain their map data. The Places project aims to solve this problem by empowering non-technical park employees and the public with the ability to make changes to the map. The Places project uses custom versions of existing OpenStreetMap tools for data collection and uses them to create an up-to-date base map for National Park web sites. This presentation will discuss how we plan to motivate mappers, how we deal with data validation, and how we plan to continue working with OpenStreetMap.

11:00 - 11:25 • Room E145

A Complete Multi-Modal Carpooling and Route Planning Solution

Julien-Samuel Lacroix

Sustainable transportation is a nice idea but can be hard to apply in real life to your daily commute to work or school. For many it involves multiple transportation modes and it can be a challenge to combine the time tables from multiple sources in order to plan the most efficient route. We took the challenge and worked with stakeholders from the Saguenay region to build a portal that provides a simple yet really optimal way to get around in both urban and rural areas be it by bus, bike, share taxi and even carpooling or by combining multiple modes in order to promote sustainable transport. The system built on pgRouting, PostGIS, Django and OpenLayers3 allows users to register offers or search for the best available match in existing offers, comparing and combining as well with city buses and all your other favorite transportation options. It is a solution that will help and inspire city



planners or city transport organizations to bring all their transportation systems together to get people moving the right way.

13:00 – 14:00 • *Portland Ballroom*

Exploring Openness in Geospatial Education

Anthony Robinson, Pennsylvania State University

Robert Cheetham, Azavea

Nuala Cowan, George Washington University

This panel discussion will explore efforts to embed openness into geospatial education, including courses on open geospatial solutions as well as innovative teaching methods that help expand the audience who can engage with open geospatial systems such as MOOCs and open courseware.

13:00 – 13:25 • *Room D137-138*

GeoScript – A Geospatial Swiss Army Knife

Justin Deoliveira

GeoScript adds spatial capabilities to dynamic scripting languages that run on the JVM. With implementations in Python, JavaScript, Scala, and Groovy, GeoScript provides an interface to the powerful data access, processing and rendering functionality of the GeoTools library.

GeoScript provides concise and simple apis that allow developers to perform tasks quickly making it a great tool for the day to day data juggling that comes with geospatial data. This talk will focus mainly on real world examples that showcase the power of the library.

Come check this talk out if you are interested in learning about a new tool to add to your geospatial hacking toolbox. Maybe you have tried to use GeoTools but find it too difficult and complex to use. Or perhaps your java skills are not where you would like them to be. If that is the case this talk, and GeoScript, might be just what you are looking for.

13:00 – 13:25 • *Room D139-140*

OpenSource GIS Surveying – Water Application

Vincent Picavet, Oslandia

It became possible lately to deploy a full OpenSource application stack for field surveying. This presentation describes a water distribution and waste-water management project from a technical point of view, with a strong integration of mobile tools within an industrialized GIS.

This project features a GIS part, with a centralized reference data storage leveraging PostgreSQL/PostGIS, and uses QGIS as a user interface. This combination allows to manage custom data with high volumes efficiently. The project also includes an important mobile side. Implemented on a rugged tablet, a custom tool has been setup to capture and enrich field data. The software is based on ROAM, a new OpenSource software designed for field survey.

The tablet is connected on a 3G/4G network and takes advantage of a GNSS antenna to increase GPS precision. It also features an autonomous offline data management module, so as to be able to work in bad network access conditions. The tablet also embeds all required data for greater efficiency.

One specificity of this project is the implementation of a synchronization tool between the data used in mobile situation and the reference data, in a multi-user environment.

This synchronization tool, developed with PostGIS and SpatialLite, let users manage data history, data modifications, data merges, offline mode, as well as branches, for parallel versions of the same data. The latter enables the design of evolution scenarios of the network. A classic issue of the sur-



veying work in mobile situation is therefore solved, being able to work in a disconnected mode with multiple land surveying teams smoothly, while keeping data traceability.

The project currently evolves towards water simulation integration, interconnection with SCADA industrial systems, and sensor data automated integration (through webservices).

All These components therefore constitute a full software package, fully opensource. The various components can be used for other applications than water management. The new features developed thanks to this project can solve mobile GIS issues, and optimize the TCO of GIS solutions for industrial projects, for real-world critical applications.

13:00 - 13:25 • Room D133-134

Integrating FOSS4G into an Enterprise System for Disaster Management

David Askov

ROGUE (Rapid Open Geospatial User-Driven Enterprise) was a project funded under the Joint Capability Technology Demonstration (JCTD) Program from the U.S. Department of Defense. Boundless and LMN Solutions, LLC implemented the project, with the Pacific Disaster Center (PDC) serving in the role of project Transition Manager. The project's goal was to improve the abilities of the OpenGeo Suite to ingest, update, and distribute non-proprietary feature data in a distributed, collaborative, and occasionally disconnected environment. Under this project, PDC integrated the following technologies into its decision support system for emergency managers named DisasterAWARE:

- GeoGit: Versioned replication of spatial data across multiple sites, supports disconnected editing and conflict resolution.
- Arbitrator: Android app for field data collection, syncs to GeoNode.
- MapLoom: GeoNode GUI for spatial data editing and management.
- KML Uploader: Functionality to upload KML for storage in PostGIS and served via GeoServer.
- GeoServices REST (GSR): Extends GeoServer to publish data using the REST methodology of ArcGIS Server.

This presentation will cover the integration of these components into DisasterAWARE, along with the security framework implemented for all components.

13:00 - 13:25 • Room D135

OpenLayers 3: A Unique Mapping library

Eric Lemoine

We've rewritten OpenLayers from the ground up with the goal of offering a powerful, high-performance library leveraging the latest in web technologies. This talk will present the latest advances of the library, focusing on aspects that make OpenLayers 3 stand out. OpenLayers 3, for example, uses technologies, techniques and algorithms that enable high-quality and high-performance vector rendering. Come learn about the optimizations and techniques OpenLayers 3 uses internally, and how you can leverage them in your next web-mapping applications.

13:00 - 13:25 • Room D136

Small Town GIS – Leveraging GitHub, QGIS and Community Members to Manage Local Da

Aaron Racicot

Langley is a small rural community on Whidbey Island in Washington State. Like so many other small

rural communities, Langley is faced with limited resources but a great need to better understand the geospatial context of the local environment. Through the use of open source tools, including QGIS, GDAL/OGR, PostGIS, GRASS, and others, as well as free open data hosting at GitHub, Langley has started to better leverage existing data and attract community members to participate in gathering new and useful data. Small scale “civic hacking” is alive and well... and provides opportunities and challenges that are both similar and different than that of the larger urban counterparts engaged in large scale civic hacking.

This talk will go over the technical aspects of the workflows that have proven fruitful for engaging local community members of small rural communities in both data creation and curation. We will also look at the social aspects of getting local governments engaged in the process of leveraging community resources for open access to data and tools.

<https://github.com/langleywa>

13:00 - 13:25 • Room E141-142

Finding the Where in Big Fuzzy Data

Andrew Turner

We've gone to plaid.

It is now easier to store any and all information that we can because it *might* be useful later. Like a data hoarder, we would rather keep everything than throw any of it away. As a result, we now are knee-deep in bits that we are not quite sure are useful or meaningful.

Fortunately, there is now a mature, and growing, family of open-source tools that make it straightforward to organize, process and query all this data to find useful information. Hadoop has been synonymous with, and arguably responsible for, the rise of 'The Big Data'. But it's not your grandfather's mapreduce framework anymore (ok, in internet time). There are a number of open-source frameworks, tools, and techniques that are emerging that each provide a different speciality when managing and process fast, big, voracious data streams.

As a Geo-community we understand the potential for location to be the common context through which we can combine disparate information. In large amounts of data with wide variety, location enables us to discover correlations that can be amazing insights that otherwise were lost when looking through our pre-defined and overly structured databases. And by using modern big data tools, we can now rapidly process queries which means we can experiment with more ideas in less time.

This talk will share open-source projects that geo-enable these big data frameworks as well as use case examples of how they have been used to solve unique and interesting problems that would have taken forever to run or may not have even been possible.

13:00 - 13:25 • Room E143-144

Barriers to FOSS4G Adoption: OSGeo-Live Case Study

Alex Mandel

OSGeo-Live is a Linux distribution, available in virtual machine, bootable DVD, or bootable USB formats, containing a curated collection of the latest and best Free and Open Source Geospatial (FOSS4G) applications. This talk investigates the correlations between worldwide download distribution, and community participation against indicators of economic, technical knowledge and socio-cultural barriers to geospatial technology and FOSS adoption. Better understanding the barriers of technology transfer are important to the outreach efforts of the FOSS4G community, and understanding the market development potential of FOSS4G around the world. Results of an analysis of the OSGeo-Live community will be shown but the techniques discussed can be applied to any software project.



13:00 – 13:25 • Room E145

Repurposing OpenTripPlanner for Ride Sharing

Daniel Luxemburg, Bandwagon

OpenTripPlanner is an open source application for building multi-modal itineraries using OpenStreetMap data about walking and driving routes and General Transit Feed Specification (GTFS) data for public transit data. With some creative adjustments, OpenTripPlanner can also be used to generate itineraries for ride sharing based on a pool of existing rides.

This talk will demonstrate taking advantage of OpenTripPlanner's flexibility in this fashion. The example of repurposing OpenTripPlanner will serve as the basis for a more general discussion of ways that functionality relating to geospatial data can be reused in unanticipated ways.

13:30 – 13:55 • Room D137-138

Community Health Mapping

Kurt Menke, Bird's Eye View

This talk will cover a FOSS4G case study in which a workflow was implemented in several minority public health organizations in 2013. The three organizations were: 1) the Urban Indian Health Institute (Seattle, WA), 2) Papa Ola Lokahi (Honolulu, HI) and 3) The Nature Conservancy of Hawaii (Honolulu, HI). The end users were not GIS professionals but public health staff. Such community based public health organizations do not typically have dedicated GIS staff or budgets for GIS. However, they have each identified mapping needs. The overarching goals of the project were to demonstrate that FOSS4G tools could be effective in minority public health applications, and that they could be used by non-GIS public health staff. Therefore, a focus was placed on identifying the most intuitive and low cost solution meeting their needs.

The workflow started with field data collection and included spatial analysis and online data presentation. Field data collection was performed using smart phones and tablets that the end users already owned. Analysis was done via QGIS and final data presentation was done via GIS Cloud. Training sessions were conducted and support was provided throughout the year. However, each organization was able to use the tools with very little follow up support. Each project produced good results, and each is planning on continuing with additional projects in 2014. The workflow will be introduced and results of the three case studies shared. This work was funded by the National Library of Medicine's Division of Specialized Information Services via their Outreach and Special Populations Branch.

13:30 – 13:55 • Room D139-140

Mobile Vector Map Rendering With Mapbox Tools

Justin Miller, Mapbox

Rendering maps from vector data is the next wave in custom cartography, and nowhere is this more important than on mobile devices. Modern mobile devices have high-powered GPUs for hardware-accelerated rendering and a multitude of sensors for environmental input, but also need to be keenly aware of network bandwidth constraints and have the ability to go offline.

Mapbox is working on a new suite of mobile tools that render constantly up-to-date vector OpenStreetMap data into maps on the device. These maps can be customized completely client-side and even tap into ambient sensors such as GPS, compass, and pedometer.

This session will show what's possible with this new open source toolkit, including client-side map style customization and influencing the user experience with sensor inputs, and will talk about high-level design goals of the tools and where they are headed next.



13:30 - 13:55 • Room D133-134

An Open Source Approach to Communicating Weather Risks

Jonathan Wolfe, National Weather Service

Weather data is a critical element in the decision making process for a vast number of entities and its timely and accurate portrayal is essential. The U.S. National Weather Service has utilized a combination of Open Source projects including: OpenLayers, Qooxdoo, PostGIS and Flot among others to create a mash-up called the Enhanced Data Display or EDD (preview.weather.gov/edd) to promote the development of a Weather Ready Nation.

The EDD provides a platform to quickly communicate past, current and future weather conditions. What happens over the next couple of hours to a week dictates the agenda of everything from strategic resource placement to what to wear to work. More often than not, the weather forecast is not binary - there is always some probabilistic component that results from the inherent chaos of a 4-D fluid wrapped around a spinning sphere.

Luckily, the EDD makes use of a variety of techniques that leverage Open Source technologies to present forecasts in both deterministic and probabilistic forms. The EDD contains many visual displays that refine bulky meteorological datasets into palatable forms. Whether you are looking to see what hazards you may face along a travel route or trying to find a heat map of how many people will be impacted by a tornado warning, the EDD can display this quickly. Finally, the ability to combine EDD layers with your own data makes this an extremely powerful application. EDD is a good example of how leveraging Open Source resources can result in an exquisite product.

13:30 - 13:55 • Room D135

Leaflet + UtfGrids + d3.js = Liquid Fast, Massively Scalable Interactive Web Pp & Data Visualization

Benjamin Wyss, GEM Foundation

I will discuss and demo how I use Leaflet, UtfGrids, and D3.js in concert to view and interact with large geographic data on the web. This presentation will not be on d3.js, but rather how to get geographic data from a map to a d3.js chart. I will illustrate why this stack is liquid fast and massively scalable and discuss in some detail what a UtfGrid is, how it works and how to create and server them to the web.

The context of my work: I am currently working on an open source project called OpenQuake. As a part of this project we are developing a platform which serves as a hub for integrated risk assessment. It allows users to combine seismic hazard, risk and social vulnerability in many different ways in order to obtain output for science, risk assessment, risk awareness and risk management.

All my work is available on Github and links will be provided to all demonstrated material.

13:30 - 13:55 • Room D136

Managing Public Data on GitHub: Pay No Attention to That Git Behid the Curtain

Landon Reed, Atlanta Regional Commission

The Atlanta Regional Commission (ARC) continuously solicits feedback on transportation data from local government partners. Historically, this process has taken the form of lots of markings on plotted maps with immeasurable amounts of manual work on the tail end to organize and interpret this feedback. Many tools developed specifically for this process today often fall short of the needs of agencies (such as geospatial presentation and tracking comments), yet the cost to develop or implement custom software is generally out of reach for government agencies.

This presentation introduces a case study of the process to develop geospatial collaboration tools for managing transportation data directly hosted on GitHub pages (currently in development at <http://atlregional.github.io/plan-it/> and <http://atlregional.github.io/fc-review/>). This approach was



partially inspired by GitHub's recent features additions that make collaborating on geospatial data simple and elegant.

Because these data span both functional and jurisdictional divisions, many of the greatest challenges have been project management related — coordinating stakeholder feedback and project requirements. However, by utilizing the existing git/GitHub infrastructure, many of these requirements can be managed cost effectively. Moreover, the framework allows for direct integration with other application environments via the GitHub API and GDAL Tools, ensuring that local modifications to project data are committed back to the data repository.

13:30 - 13:55 • Room E141-142

Spatial Temporal Network Web Visualization Techniques

Lynnae Sutton

Maps are traditional means of presentation and tools for analysis of spatial information. The power of maps can be also put into service in analysis of spatio-temporal data, i.e. data about phenomena that change with time. Exploration of such data requires highly interactive and dynamic maps. Using geospatial open source software, various techniques for visualizing spatial temporal network change data and combinations of spatial temporal network, point and area data are evaluated. Linear referencing represents locations along routes, linear features with an established measurement system, using relative positions. It allows locating events along routes without segmenting it, and has been applied to manage linear features in transportation, utilities, along trail networks and stream networks. Linear referencing for events occurring along a network through time are visualized using both animations and interactive time line visualizations. Sliders are used to give the user manual control to step through the data, allowing them to explore the data presented in each time step. Categorized point events (i.e. traffic accident types, flood locations, etc.) appear at multiple locations along the network. Color and size of symbols are used to denote these dynamic point event attribute changes and location changes. In addition, line segments are mapped using size and color to identify the changes occurring over time. Some of the combinations of changes evaluated include: attribute change (i.e. traffic accident type), spatial attribute change (i.e. flood boundaries), moving objects (i.e. traffic accidents), rate of change (i.e. fish survival by stream segment) and spatio-temporal aggregation (i.e. multiple fish releases by watershed). Some linear visualization techniques evaluated include: run maps and map and line chart visualization techniques similar to the famous Napoleon's retreat Minard visualization.

13:30 - 13:55 • Room E143-144

OSGeo Incubation

Jody Garnett, Boundless

The Open Source Geospatial Foundation does much more than hold FOSS4G each year.

This talk will look into what makes OSGeo a software foundation. What software foundations have to offer members, software projects and developers.

This talk is structured around the "incubation" process by which new software projects join the OSGeo.

If you are new to open source take this is a great chance to see how OSGeo evaluates software projects and how these checks protect you!

For managers it is especially important to understand the risks associated with the use of open source. Understand what assurances OSGeo incubation offers, how to double check the results, and what factors are left for your own risk assessment.

If you are a developer considering getting involved in OSGeo this is great talk to learn what is involved, how much work it will be, and how you can start!

Come see what makes OSGeo more than a user group!



13:30 – 13:55 • Room E145

Fast Travel Sheds Using GTFS Data in GeoTrellis Transit

John Branigan

General Transit Feed Specification (GTFS) data is the open standard for representing transit systems in space and time. While developing an open source planning application for public transit agencies, it became clear that processing speed was the primary impediment to calculating transit coverage indicators within a reasonable time. At a glance, GTFS is just a set of simple CSV files organized relationally with key fields. But transit systems are far more complex than just spatial data for routes and stops. They need to be able to model spatial-temporal relationships embodied in transit schedules as well as semi-cyclical and shifting schedule patterns. Additionally, the specification is flexible enough to represent many different approaches to operating transit systems and the same system attributes can often be represented in multiple ways.

While some transit system metrics are fairly straightforward to compute, certain public transit system metrics are best modeled as “travel shed” represented by raster coverages or isolines derived from them. The GeoTrellis Transit project is an extension of the open source GeoTrellis framework and was created to calculate travel shed rasters using GTFS and OpenStreetMap data. GeoTrellis Transit accomplishes this by creating a time-dependant graph structure that can rapidly perform shortest path queries at a given time of day, based on the public transit schedule.

The challenge in developing GeoTrellis Transit involved designing a time-dependent graph structure that contains information about how the nodes connect at any particular moment in time during traversal. Shortest path algorithms on time-dependant graphs need to take into account arrival times at any given node, as well as wait times until an edge becomes available. This makes fast calculation of shortest path trees on time-dependant graphs difficult, which GeoTrellis Transit optimizes using a novel data structure to represent the graph.

This presentation will introduce the GTFS standard and identify where difficulties may arise, especially for large systems. It will also describe how GTFS, OpenStreetMap and GeoTrellis Transit can be combined to build a fast time-dependant graph structure that can then be used to create time-based shortest path trees and travel shed rasters.

14:00 – 14:25 • Room D137-138

Assessing the Distribution of Disease Vectors and Fruit crop Pests from Satellite in GRASS GIS 7

Markus Neteler, Fondazione Edmund Mach

Over the past decades, disease vectors like the Asian tiger mosquito (*Aedes albopictus*) transmitting Dengue Fever and other infections and the Spotted Wing Drosophila (*Drosophila suzukii*), an economically important fruit crop pest, have continued to globally expand. In Europe, the already invaded areas comprise the Mediterranean basin while the spread to the north of the Alps is ongoing. Likewise many regions in the world face an increasing risk for new or re-emerging vector-borne diseases transmitted by mosquitoes. Given this spread, there is an urgent need to gain better understanding of spatio-temporal patterns in disease transmission and agro-pest diffusion. The life cycles of mosquitoes and fruit flies depend on climatic and environmental conditions which can be observed using satellite sensors. We identified the potential distribution areas linked to the current climatic suitability through the evaluation of remotely sensed land surface temperature (LST) data for Northern Italy and Switzerland. For this we processed with GRASS GIS 7 more than a decade of daily MODIS (Moderate Resolution Imaging Spectroradiometer) satellite sensor data at continental scale (250 m resolution, four maps per day) as an alternative to meteorological data. Since LST data often contain gaps due to cloud cover, these gaps were filled by reconstructing any missing LST values before environmental indicators have been derived from these data. From the gap-filled LST data (in the multi terabyte range) we derived threshold maps like January mean temperatures as a threshold to estimate the survival chances of overwintering diapausing eggs, whereas the annual mean temperature can be used as a threshold to estimate population stability. We derived growing degree days (GDD) as well by temporal aggregation. The approach can be applied to continents other than Europe, too. The resulting potential distribution



maps can be leveraged to assess the spread of disease vectors and agro-pests in order to assist decision makers and public health authorities to develop surveillance plans and vector control.

14:00 - 14:25 • Room D139-140

A Jumpstart for Your Mobile Map App

Greg Allensworth, GreenInfo Network

Would you like to get started programming mobile mapping applications? There's a lot to keep in mind: a responsive layout, a mapping framework, positioning of controls and buttons, offline caching of tiles, and finally compiling it all into a mobile app.

This presentation walks you through some problems and solutions, culminating in MobileMapStarter. Techniques discussed include jQuery Mobile, Leaflet, and PhoneGap/Cordova.

14:00 - 14:25 • Room D133-134

Geospatial-Semantic Knowledge Management and Linked Data for Humanitarian Assistance

Tim Clark

The challenges to sharing knowledge during humanitarian events are well documented. Of these, the lack of effective and meaningful communication between all actors in an event is the root cause of many of the inefficiencies that hinder the ultimate goal of relieving suffering and rebuilding societies. This presentation outlines an approach for applying semantic knowledge management, ontological rules, and Linked Data approaches to address these issues. We introduce semLayer, a geospatially-enabled Semantic MediaWiki prototype application with mobile and wiki-based collection components, built using open source constituent technologies. We will discuss specifically the integration of PostGIS as a data store, and how this approach compares to open source triples stores/frameworks (e.g. Apache Jena) that perform geospatial operations using the GeoSPARQL specification. We will then move into considerations of integrating micro-, domain-, and upper-ontologies and vocabularies, and defining rules that govern relationships between data and entities, including geospatial attributes. We will close with a discussion of contributing to a disaster response use case with a Linked Data approach.

14:00 - 14:25 • Room D135

GIS in the Browser – The Good Parts

Matt Priour, Esri, Inc.

Long gone (hopefully) are the days of replicating the "professionals only" desktop GIS interface in a browser. However, with modern browsers, HTML5 APIs, and increased efficiency of javascript engines it is possible to performantly replicate GIS functionality in a purely client-side browser application. Moderately complex geoprocessing, persistent client-side storage and simple to complex data visualization are all possible now. We walk through the underlying technology and demonstrate the practical use of it in an open-source sample application. Technologies covered include IndexedDB, WebStorage, Workers, Strongly Typed Arrays and Canvas. Some attention will also be paid to performance limitations, browser support and polyfills for older browsers.

14:00 - 14:25 • Room D136

Building Open Source Projects in Government Esri Ecosystems

Lyzi Diamond, Code for America

The challenges that are most commonly discussed by proponents of open source in government technology relate to changing the culture among technical staff and explaining the value of open tools and systems. But beyond the political concerns and misperceptions, there are practical com-



plications in implementing these tools inside proprietary tech ecosystems like Esri. Although it's becoming easier, injecting open source into the Esri stack can be convoluted, to say the least.

For all of its challenges, however, there have been many successful open source implementations in all levels of government, from open data portals to full-scale applications. Using case studies from recent Code for America projects, this talk will identify some of the more difficult challenges and highlight a few techniques for integrating open source geo tools into the Esri stack with a focus on minimizing difficulty for the developer and maximizing benefit for the end user. The talk will focus on web applications and tools while touching on data interoperability, spatial analysis, and trainings/documentation.

14:00 - 14:25 • Room E141-142

Anchoring and PostGIS Cure Post-Polygon Stress Disorder

Yao Cui, British Columbia Geological Survey

Polygons are great to have in digital maps, much like a canvas that we can render with beautiful colours. It is common that polygon boundaries are shared by linear features (e.g., municipalities divided by a river or a road). If polygons are used as part of the base to edit, update, and integrate digital maps, we have to reconcile the geometric differences among the shared boundaries and fix topological problems in edge matching. For many years we felt blessed that commercial software tools are available to reconcile shared boundaries, and to detect and fix topological problems. However, if wrestling with polygons leaves you feeling buried in slivers, discontinuities, gaps, and overlaps, you've got Post-Polygon Stress Disorder (PPSD).

PostgreSQL/PostGIS presented British Columbia Geological Survey an opportunity to identify the causes of PPSD. As a result, we have developed a geologic framework data model and implemented an anchoring mechanism in PostGIS to simplify the process of editing, updating, and integrating digital geological maps. We have dispensed with polygons and eliminated the problems from shared boundaries and edge matching.

Healing to PPSD is available in this poster:

<http://www.empr.gov.bc.ca/Mining/Geoscience/PublicationsCatalogue/GeoFiles/Pages/2014-9.aspx>.

14:00 - 14:25 • Room E143-144

Serving High-Resolution Spatiotemporal Climate Data is Hard, Let's Go Shopping

James Hiebert

The world is a big place and time is infinite. Scientists who study any aspect of the Earth's climate are immediately faced with the exponentially growing amount of data that are required to represent properties of the climate in both time and space. The bulk of these data is a substantial barrier to extracting meaningful information from their contents. This barrier can be prohibitive to smaller-scale researchers and communities that want to study and understand the impact of the climate on their localities. Fortunately, a substantial amount of free and open source software (FOSS) exists upon which one can build a great geospatial data application.

The Pacific Climate Impacts Consortium (PCIC), a regional climate services provider in British Columbia, Canada, has been making a concerted effort to use geospatial FOSS in order to expand the availability, comprehensibility and transparency of big climate data sets from the Coupled Model Intercomparison Project (CMIP5) experiment. With a full stack of geospatial FOSS and open protocols we have built and deployed a web platform capable of visualizing and distributing high-resolution spatiotemporal raster climate data.

Our web application consists of:

- back-end storage with raw NetCDF4/HDF5 files



- a PostgreSQL/PostGIS database for indexed metadata
- ncWMS for maps and visualization
- the PyDAP OPeNDAP server for data requests+ a web user interface to tie it all together

This presentation will provide a case study for enabling scientific collaboration using FOSS and open standards. We will describe our application architecture, present praise for and critique of the components we used, and provide a detailed discussion of the components that we had to improve or write ourselves. Finally, though our use case is specific to climate model output, we will provide some commentary as to how this use case relates to other applications of spatiotemporal data.

14:00 – 14:25 • *Room E145*

UrbanSim2: Simulating the Connected Metropolis

Fletcher Foti
Paul Waddell

UrbanSim is an open source software platform for agent-based geospatial simulation, focusing on the spatial dynamics of urban development. Since its creation UrbanSim has been used in the official planning processes for at least a dozen regional governments which were used to help allocate billions of dollars in regional investments in transportation infrastructure. UrbanSim was first conceptualized in the late 1990's and implemented using the Java programming language. The technology landscape for scientific computing changed dramatically after that, and by 2005 UrbanSim was converted to Python, making heavy use of Numpy to vectorize calculations. By 2014, it became clear that UrbanSim should be reimplemented again to take advantage of significant advances in the libraries available for scientific Python. The new version of UrbanSim, called UrbanSim2, makes extensive use of community-supported scientific Python libraries to reduce the amount of domain-specific customized code to a minimum. UrbanSim is an excellent case study for the power of leveraging the work of the scientific programming community as scaffolding for adomain-specific application, as opposed to building an extensive customized solution in each domain. Additionally, the open and participatory nature inherent in nearly all of the open source projects described here has been particularly embraced by governments, who are often reticent to support large commercial institutions and balkanized and private data formats and software tools.

15:00 – 16:00 • *Portland Ballroom*

Making Space for Diverse Mappers

Alyssa Wright, MapZen

Diverse communities provide the space for different points of view to find voice. Historically open source communities have balanced the contribution of various perspectives and expertises. We are often industry examples of remote cultural collaboration. But the nature of collaboration is changing, where diversity must stretch further across geographies to foster a wider scope of difference. One that includes the other sides of privileged space. In this session, I will present on why ideological diversity can be at the forefront of community structures by introducing three personal cornerstones – Mapzen, Maptime, and GeoNYC. This interactive session highlights how embracing a range of cultural perspectives and technical expertise allows communities to create the unexpected. We'll review success and challenges while performing our own mini GeoNYC complete with 3-word introductions and mapping fun.

15:00 – 15:25 • *Room D137-138*

ScribeUI: MapServer Mapfile Management Made Easy

Julien-Samuel Lacroix

Anyone who has tried to create great looking maps for a large dataset such as OpenStreetMap knows how daunting of a task that can be. Scribe is the solution to this painstaking task. This pre-



sentation will introduce this new way to not only edit, but mostly to manage, mapfiles. No matter how much data you have, how many mapfiles or the complexity of your symbology, it will help you sort out the essential by removing the iterative part of the process. Getting rid of all of this error prone copy-paste as well! After nearly two years of development and another great Google Summer of Code, the tool is greater than ever and ready to be reviewed by the community.

15:00 - 15:25 • Room D139-140

GIS in Node.js

Calvin Metcalf

An overview of GIS tools in server side JavaScript covering turf, proj4js, topojson, mbtiles and integration with Node.js idea like streams.

15:00 - 15:25 • Room D133-134

The Development and Evolution of an Open Source Mapping Application Within the USG – Now With More Google Glass

Eric Finnen

Benjamin Tuttle, PhD

The United States Government has a history of developing applications using legacy systems and continuing to use brittle software. This approach has managed to minimize data collection, sharing and use of open standards. With this in mind NGA has several groups focused on a rapid, innovative, and open approaches to application development. One of the recent applications developed in this fashion is the Mobile Analytic GEOINT Environment (MAGE), which evolved from earlier applications that were used for Disaster Response as well as various special events. Each of these earlier applications had their own strengths and weaknesses that were factored in during the development of MAGE. MAGE is built on an open source stack with a mobile and html5 application designed for geospatial data collection, imagery sharing, tracking, and communication. It is designed to be a lightweight, fully portable software stack that can be placed in front or behind firewalls with ease. It is fully customizable to a wide variety of mission needs so administrators can easily change the data collection parameters. MAGE is fully service enabled allowing easy access to the data via REST requests and returns multiple formats including GeoJSON, KML, and Shapefile to ensure ease of access and sharing. The app has also been ported to Google Glass for field collection and enhanced visualization.

15:00 - 15:25 • Room D135

Getting Started with OpenLayers 3

Tim Schaub, Planet Labs

OpenLayers 3 is here! Now it's time to dive in and get mapping. Join us for an overview of OL3 from a user's perspective. We'll cover common use cases and cool features of the library you might not have heard about. Our goal in this presentation is to get you comfortable with the OpenLayers 3 style of mapping – providing an introduction to raster and vector basics, discussing tips for integration with other JavaScript libraries, and exposing you to the build tools so you can choose just the functionality you need for your mapping application.





15:00 – 15:25 • Room D136

Adding Value to Open Data Using Open Source GIS

Brent Wood, NIWA

New Zealand, like many other countries around the world, is developing Government policies requiring open access to public data. The National Institute for Water and Atmospheric Research (NIWA) has been directed to make substantial parts of its fisheries, climate, coastal, oceanic and freshwater data more publicly available for re-use. NIWA recognises that making such data available is of very limited value, if potential users do not have access to suitable tools to work with these data, ie: GIS applications. As part of its Open Data programme, NIWA's Fisheries and Environmental Centers have funded enhancements to an Open Source GIS application, QGIS, and made this application available as a free download, along with NIWA data. This approach enables the effective re-use of NIWA (and other agencies') environmental and spatial data by individuals and organisations who otherwise have little or no access to commercial GIS tools. This presentation discusses the value of Open Source (and Open Standards) to support Open Data initiatives, and NIWA's experiences along the way.

15:00 – 15:25 • Room E141-142

GeoMesa: Distributed Spatiotemporal Analytics

Anthony Fox, Commonwealth Computer Research, Inc

The rapid growth of traditional and social media, sensors, and other key web technologies has led to an equally rapid increase in the collection of spatio-temporal data. Horizontally scalable solutions provide a technically feasible and affordable solution to this problem, allowing organizations to incrementally scale their hardware in tandem with data increases.

GeoMesa is an open-source distributed, spatio-temporal database built on the Accumulo column-family store. Leveraging a novel spatio-temporal indexing scheme, GeoMesa enables efficient (E) CQL queries by parallelizing execution across a distributed cloud of compute and storage resources, while adhering to Accumulo's fine-grained security policies. GeoMesa integrates with Geotools to expose the distributed capabilities in a familiar API. Geoserver plugins also enable integration via OGC standard services to a much wider range of technologies and languages, such as Leaflet, Python, UDig, and QuantumGIS.

In this presentation, Anthony Fox will discuss the design of spatio-temporal indexes in distributed "NoSQL" databases, the performance characteristics and tradeoffs of the GeoMesa index, and how it can be leveraged to scale compute-intensive spatial operations across very large data sources. This discussion will detail how GeoMesa distributes data uniformly across the cloud nodes to ensure maximum parallelization of queries, and other computations. Specific computationally intensive analytics include distributed heat map generation over time, nearest neighbor queries, and spatio-temporal event prediction. He will present common analytic workflows against spatial data expressed as batch map-reduce jobs, dynamic ECQL queries, and real-time Storm topologies. Using the Global Database of Events, Language, and Tone (GDELT) dataset as a working example source, Mr. Fox will demonstrate how a completely open-source architecture stack, including GeoMesa, enables ad-hoc and real-time analytics.

This presentation will be of interest to data scientists, geospatial systems developers, DevOps engineers, and users of massive Spatio-Temporal datasets.

15:00 – 15:25 • Room E143-144

Update on new OGC Standards: GeoPackage, OWS Context and Geosync

Raj Singh, Open Geospatial Consortium

This presentation presents an overview on new OGC standards and developer tips on how to build your own implementations from scratch or on top of existing open source libraries that implement



them. We cover GeoPackage, the new SQLite-based geospatial data format; OWS Context for describing a group of related spatial data resources (e.g. for map composition); and the emerging Geosync architecture based on lessons from CouchDB.

15:00 - 15:25 • Room E145

CS-Map – Coordinate System Libraries

Norman Barker

CS-Map is often used as a reference but has not been as widely adopted as proj4. This presentation describes how CS-Map has been used in a distributed geospatial database for big data.

The presentation describes the benefits of CS-Map, in particular its whole earth support and also its disadvantages, primarily it is process locked.

The aim of the presentation is to demonstrate that having more than one coordinate system library is a good thing and to encourage development of coordinate system libraries.

15:30 - 15:55 • Room D137-138

Running Your Own Rendering Infrastructure

Alan McConchie, Stamen Design
Seth Fitzsimmons, Stamen Design

In addition to hosting the popular OSM-base Toner, Watercolor, and Terrain tile sets, Stamen incorporates custom cartography into much of our client work. This is a behind-the-scenes walk-through covering the evolution of our rendering infrastructure and the peripheral services that help to make our work unique. Topics covered include the image processing used for Watercolor and Map Stack, raster manipulation for Terrain, Surging Seas, and the Chesapeake Bay Program, as well as the use of vector tiles (for both OSM and other data) to support Pinterest and future work.

15:30 - 15:55 • Room D139-140

Tileserver on a Diet Using Node.js

Igor Tihonov, Hemnet

Imagine you were to present large amounts of constantly changing, live data to the users on a web map. Imagine it was on a website with high traffic volume (83 million page views per month) and high requirement on quick response time. What software would you use to solve this challenge? This presentation will cover the journey that Hemnet, a leading real estate property portal in Sweden, took while remaking a vital part of the website. A journey, during which a number of existing map servers, such as Geoserver, were put on test, but were not fast and flexible enough. A journey, that ended with creating a custom tileserver with technologies like Mapnik to make it as fast and efficient as possible. During the presentation we will cover the challenges we had and how we faced them with different technologies available. We'll take a look at how we did performance tests and how we rolled everything out to the masses.

15:30 - 15:55 • Room D133-134

Scaling for NYC While Tracking Plows

Colin Reilly, NYC DoITT

In the winter of 2012, NYC's Department of Information Technology and Telecommunications (DoITT) was tasked with developing an application to track snow vehicle operations. The DoITT GIS team was given a mandate to have the application in production before the end of the winter. Due to the aggressive schedule, our approach was to get something up as quickly as possible while enhancing and improving over time. Beyond the schedule constraint, additional challenges were minimal requirements and decision-making by committee with no clear business owner.



Three major tasks were required to complete the project: scale the existing infrastructure to better handle the expected demand, determine an approach for communicating the information to the public in a legible and understandable way, and develop and test the application. The team quickly undertook a multi-pronged approach to complete these tasks within a roughly two-month timeframe.

Of all the impossible tasks, scaling the infrastructure was the most challenging and difficult. High-profile application launches in NYC that come with press announcements tend to garner traditional and social media coverage and with that national exposure and demand. And although the application would have been a perfect candidate to deploy in the cloud, that was not an option. Additional servers were added and the application was optimized and tuned for performance. To do so, multiple-layers of caching were employed including GeoWebCache and a Content Delivery Network.

In terms of visualizing the data, we conducted a quick review of existing public-facing applications. There were not many examples at the time with most cities choosing to show 'breadcrumbs' of a plow's path. We felt this method was not an effective way of conveying plow coverage; our objective being, to show which streets had been plowed and not to show where a plow had been at specific time. As such, we decided on visualizing the data by the time a street was last plowed. Five time-buckets were established and the street segments were color-coded based on the last GPS ping received on the segment. Every 15 minutes an ETL pulls the GPS data and renders tiles using GeoServer and GeoWebCache.

The application, PlowNYC, was developed using open source and commercial software and custom code. These include OpenLayers, Geoserver, GeoWebCache, GeoTools and Oracle. Since its release, the application has been enhanced to handle greater traffic, support mobile clients and to simplify the interface. The presentation will cover these aspects of the project.

15:30 - 15:55 • Room D135

Vector Tiles for Fast Custom Maps

Dane Springmeyer

Vector tiles are becoming a common solution for fast clientside rendering of spatial data in both browsers and mobile devices. With the recent release of TileMill 2 Mapbox has made it easier to design and render vector tiles. This talk will cover the open source technology under the hood in TileMill 2 as well as other available tools. Also discussed will be the status of an emerging specification for vector tiles and recent advances in the format.

15:30 - 15:55 • Room D136

Empowering People, Popularizing Open Source, and Building a Business

Javier de la Torre, CartoDB

Andrew Hill, CartoDB

Vizzuality went from a data communications consulting company to the creator of one of today's most popular online mapping frameworks, CartoDB. Four years ago, we recognized a major problem in open source geospatial tools, they were still prohibitively difficult to use to creating dynamic, interactive, and beautiful online maps. That was when we decided to build CartoDB, a mix of existing open source software such as PostGIS and our own new code. Each account on CartoDB represents a new PostGIS enabled database, a new user of libraries such as Leaflet, and we hope, a long-time supporter of open source. In this talk, I'll present on how we are building a new and quickly growing community around open source geospatial. I'll talk about our plans for the future and how we plan to support open source for many years to come.



15:30 – 15:55 • Room E141-142

Real-time Scenario Planning with OpenLayers

Scott Fletcher, Point 97

Area-based planning processes are rapidly moving from paper and desktop GIS based processes to online applications offering real-time analysis and feedback. Users want an interactive and informative experience allowing them to generate reports and analysis without needing to understand the subtleties of GIS or spatial analysis. They expect a compelling user experience that works on a variety of platforms – ranging from old or outdated browsers to tablets and smart phones.

Building from years of experience (and standing on many shoulders), this talk demonstrates some of the strategies and techniques achieved for the Marine Planner platform, an online open-source map viewer and decision support tool. These strategies include UTFGrids, tile caching, pre-processing, and standard and forked OpenLayer libraries, among others. The result is large-scale scenario planning tools with a responsive and compelling user-experience that anyone who has used online maps can figure out.

15:30 – 15:55 • Room E143-144

Open Source Geo Certification

Arnulf Christl

The growing open source geospatial software market needs qualified professionals. In general IT qualification proof is often provided through a certification program, for example as offered by the Linux Professional Institute Certification (LPIC). The open source geospatial domain has no comparable programs.

This lack has been discussed for years in and around OSGeo which would be on of the more obvious contenders to provide such an independent certification. But certification is a decidedly difficult topic to tackle with many slippery slopes. Creating and then executing a certification program needs continuous engagement by paid staff which requires a regular stream of income. As it turns out OSGeo has (for now) decided to not employ staff but instead continues to rely on volunteer work, foster communities and stay independent of investors.

Some businesses offer training for Open Source geospatial software. This provides for a source of revenue and helps to professionalize the market. Some of the curricula are jointly developed and maintained by the software projects and the training providers. This is a good thing but as yet there is no independent third party committed to quality assurance.

The same situation can be found in the standards domain: The Open Geospatial Consortium has celebrated its 20th anniversary this year. It has implemented test suites for automated certification for software but as yet there is no certification program for individuals.

The metaspacial Institute was launched with the mission to close these gaps by offering a certification program. It is geared towards individuals who want to acquire an independently recognized confirmation of their skills and businesses who want to certify their staff for a growing number of software packages.

The metaspacial certification program is developed and maintained in close cooperation with Open Source software projects, academia, businesses and user communities. This presentation will discuss how the body of knowledge of participating software projects is developing and gives an overview of the current state of affairs.

15:30 – 15:55 • Room E145

Spatio-Temporal Data Visualization in GRASS GIS: Desktop and Web Solutions

Vaclav Petras, NC State Univ.
Anna Petrasova, NC State Univ.

GRASS GIS, a free and open source geographic information system, provides the functionality to



manage, analyze and visualize geospatial data. Recently, support for managing the temporal dimension has been integrated into GRASS GIS as a response to an increasing accessibility and importance of spatio-temporal data. However, to fully benefit from such data new capabilities for exploratory visualizations are needed. We present a set of tools for spatio-temporal data visualization which reflects data complexity and also supports online sharing. The GRASS GIS Animation Tool is a desktop application working directly with different types of spatio-temporal data stored in GRASS GIS. We can display synchronized animations of raster, vector and 3D raster data in two- and three-dimensional views. To share spatio-temporal visualizations online, we have developed web map applications which enable users to explore the data as animations or derive supporting information such as histograms. Our solution does not require any server-site application and enables a file-based offline sharing and an easy online publication without any special requirements on users' software or servers. We demonstrate the desktop and online tools on several use cases, namely solar radiation and fire spread modeling, volumetric soil moisture analysis, and cumulative cost surface visualization.

16:00 - 16:25 • Room D137-138

"Fast Big Data?" A High-Performance System for Creating Global Satellite Image Time Series

Derick Swanepoel, CSIR

Description:

We describe a system that transforms sequences of MODIS images covering the entire Earth into time-optimized data cubes to provide rapid access to time series data for various applications.

Abstract:

Satellite time series data are key to global change monitoring related to climate and land cover change. Various research and operational applications such as crop monitoring and fire history analysis rely on rapid access to extended, hyper-temporal time series data. However, converting large volumes of spatial data into time series and storing it efficiently is a challenging task. In order to solve this Big Data problem, CSIR has developed a system which is capable of automated downloading and processing of several terabytes of MODIS data into time-optimized "data cubes." This time series data is instantly accessible via a variety of applications, including a mobile app that analyzes and displays 14 years of vegetation activity and fire time series data for any location in the world. In this presentation we will describe the implementation of this system on a high-performance Storage Area Network (SAN) using open source software including GDAL and HDF5. We discuss how to optimally store time series data within HDF cubes, the hardware requirements of working with data at this scale as well as several challenges encountered. These include writing high-performance processing code, updating data cubes efficiently and working with HDF data in a multi-threaded environment. We conclude by showing visualizations of our vegetation and burned area time series data in QGIS, web apps, and mobile apps.

16:00 - 16:25 • Room D139-140

Client-side Versus Server-Side Geoprocessing: Benchmarking the Performance of Web Browsers Processing Geospatial Data Using cCommon GIS operations

Erin Hamilton, University of Wisconsin-Madison

Are web browsers ready to handle a larger portion of the processing load in our GIS applications? Web-based GIS and mapping applications are traditionally based on a client-server model, where most of the data processing work is placed on the server. This study examines what happens when that processing load is shifted to the client, using JavaScript to process geospatial data with GIS operations directly in the browser.

The time needed to complete common GIS tasks using the JavaScript library JSTS Topology Suite were benchmarked in popular web browsers including Chrome, Firefox, Internet Explorer, Opera, and Safari. The GIS operations buffer, union, and Voronoi diagram were tested with a suite of points,



lines, and polygons ranging in size from 10 up to 100,000 vertices. The testing platforms included Windows, Mac, and Linux desktops and laptops.

The same geoprocessing tests were conducted on a cloud-based Linux server using the Java library JTS Topology Suite as a performance comparison of server-side processing applications. The various testing configurations were then analyzed to see how browsers stack up to the performance of traditional client-server applications.

16:00 – 16:25 • Room D133-134

GeoNode for Humanitarian Crisis and Risk Reduction

Simone Dalmasso, European Commission – JRC
Paolo Corti, World Food Programme
Ariel Núñez, World Bank

GeoNode is a web-based application and platform for developing geospatial information systems (GIS) and for deploying spatial data infrastructures (SDI). The World Bank, the European Commission and the UN World Food Programme are among the major contributors and sustainers of the GeoNode project and they are using it for spatial data sharing and management projects. Being extremely active in the field of Humanitarian Crisis and Risk Reduction they have deployed custom GeoNode instances to support risk reduction and post crisis need assessment. During this talk three customized GeoNode instances will be presented, focusing the attention on their technology, usage for emergency preparedness and response, their federation and the added value provided by Open Source technologies for geospatial data sharing.

16:00 – 16:25 • Room D135

Tilez: Serving Seamless Polygons in the Browser with TopoJSON and Node.js

Luca Morandini, University of Melbourne

This talk will introduce the Tilez project, which provides a Node.js-based realisation of a Tile Map Service tiles in both GeoJSON and TopoJSON formats. These formats provide a seamless and highly performant usermapping experience in both OpenLayers and Leaflet. The key to fast display of vector geometries in Tilez lies in the use of tiles, which leverage both local and server-side caching. Whilst linear features lend themselves easily to tiling, polygons have traditionally represented more of a challenge. Tilez provides further efficiencies by using TopoJSON as a transport format between the server and the client. Tilez implements all these improvements to support web-based vector tiling, delivering good performance under heavy load through Node.js and CouchDB-based caching, and efficient transport through TopoJSON. This talk will cover Tilez and the practical aspects of its implementation together with use cases from the Australian Urban Research Infrastructure Network (AURIN – www.aurin.org.au).

16:00 – 16:25 • Room D136

Supporting Open Data with Open Source

Micah Wengren, NOAA
Jeff de la Beaujardiere, NOAA

Within the US Federal Government, there is a trend towards embracing the benefits of open data to increase transparency and maximize potential innovation and resulting economic benefit from taxpayer investment. Recently, an Executive Order was signed specifically requiring federal agencies to provide a public inventory of their non-restricted data and to use standard web-friendly formats and services for public data access.

For geospatial data, popular free and open source software packages are ideal options to implement an open data infrastructure. NOAA, an agency whose mission has long embraced and indeed centered on open data, has recently deployed or tested several FOSS products to meet the open



data executive order. Among these are GeoServer, GeoNode, and CKAN, or Comprehensive Knowledge Archive Network, a data management and publishing system.

This talk will focus on how these three FOSS products can be deployed together to provide an open data architecture exclusively built on open source. Data sets hosted in GeoServer can be cataloged and visualized in GeoNode, and fed to CKAN for search and discovery as well as translation to open data policy-compliant JSON format. Upcoming enhancements to GeoNode, the middle tier of the stack, will allow integration with data hosting backends other than GeoServer, such as Esri's ArcGIS REST services or external WMS services.

We'll highlight NOAA's existing implementation of the above, including the recently-deployed public data catalog, <https://data.noaa.gov/>, and GeoServer data hosting platform, as well as potential build out of the full stack including the GeoNode integration layer.

16:00 - 16:25 • Room E141-142

Trusting the Crowd in a Geospatial Crowdsourcing Application

Shravan Shah, CEPT University, India

Dr. Femke Reitsma, University of Canterbury, New Zealand

Crowdsourcing is known as a way to gather information and data from the general public. In last few years crowdsourcing has become the cheapest and one of the most efficient ways to gather data. With the increased availability of smartphones and smart devices, the general public carries a communication device with increasing computational resources, which can also carry a lot of information. With Web 2.0 the access to internet has become simpler and easier.

The crowdsourcing application, we have developed is a rating system that incorporates trust into the application. It works by gathering data of the busyness of hangout places from the crowd, specified in terms of a rating of the busyness of the establishment. The data gathered is shown back to the public using modified ratings and the trustworthiness of those ratings. Ratings are shown in real-time and on a map.

The end-user platform for which the application is built includes Android and the web.

HTML5 and PHP have been used for designing the main web page which works on any end user platform. JavaScript is used to display base maps from OpenStreetMap and Google servers.

PHPMYAdmin is used to manage the MySQL Database. Java was used to program the front end of the application.

The dots on the map range from small to large, with a small icon indicating a quiet place and the largest icon indicating a busy place. The trust rating shows our confidence in the rating of busyness, using an algorithm that produces a result ranging from 0% to 100%.

16:00 - 16:25 • Room E143-144

Avoiding Burnout, and Other Essentials of Open Source Self-Care

Kathleen Danielson, OpenStreetMap US

As technical community managers we are faced with a unique set of challenges. Like most FOSS community members, we're often volunteers, but the work we do in moderating mailing lists, planning events, fielding project feedback and contributions, and being the public face of our communities can take an additional emotional toll. We do it because we love our communities, but we also are often guilty of neglecting our own very real needs in order to serve those communities. We end up feeling guilty, run down, inadequate, and ultimately burnt out.

Does this sound like you? Even if you don't do community management work, you might have run into some of the same frustrations. In this talk I'll share with you my own experiences in building and



managing different geo communities. Through my own lessons learned, I'll strive to help you think about ways to:

- Ensure you have adequate support in your work
- Build a vocabulary to talk and think about the challenges you face
- Feel empowered to say no and to allow yourself time away from the project
- Recognizing and handling burnout
- Avoiding burnout next time around

16:00 - 16:25 • Room E145

Geodesign: An Introduction to Design with Geography

Matthew Baker, GeoChasm
Brad Barnett, Placematters

Geodesign, at its most basic, is design with geography. It is the combination of the tools and techniques geographers and other geoscientists use to understand our world with the methods and workflows designers use to propose solutions and interventions. For instance, the typical master planning process in which GIS-based knowledge is separated from the design process can be turned into a geodesign task by sketching buildings and other land uses directly within a GIS, and seeing indicators update on the fly as various data graphics. This can then allow the designer(s) to pinpoint specific design interventions based on live feedback from geospatial information.

Over the last 10 years, technology has facilitated an explosive growth in geodesign as both a framework for solving problems and a toolkit of geospatial analyses that feed into that framework. The growth of the Geodesign Summit in Redlands, CA from 2010 to 2014 is an example of the demand for this sort of framework.

Parallel to the rise of geodesign, the tools represented by FOSS4G have also been evolving into sophisticated tools capable of taking on the needs of geodesign. However, to date there's been too little discussion of how to take the framework and working methods of geodesign and accomplish them with open source tools. This session will connect those dots by taking the typical parts of a geodesign framework (suitability analysis, sketching/designing, evaluating/comparing, iterating) and outlining our own experience making use of open source tools for geodesign. In particular, we will focus on how the interoperability of open source tools and the growth of web-based geospatial tools can support (and evolve!) the ways that geodesign is done.

This presentation will address:

- What is geodesign: the conceptual framework and typical use cases for geodesign
- Where are we: workflows and tool stacks we've used and seen others use to date
- Where could we go: identifying current gaps and pain points in existing stacks and possible solutions from emerging technologies



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PORTLAND BALLROOM

Don't Copy Data! Instead, Share it at Web-Scale
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Tuning Open Source GIS Tools to Support Weather Data/Rapidly Changing Rasters
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Big (Enough) Data and Strategies for Distributed Geoprocessing
Robin Kraft, World Resources Institute

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Creating Charts and Legends for 3D Atlas Maps – A Mashup of D3.js, osgEarth, and the Chromium Embedded Framework
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Steven Pousty, Redhat

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Open Source Social Media Aggregation and Geolocating for Emergency Management
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Open for Business Down Under
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Geolode: The Motherlode of Geospatial Data Sources
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Open Source Work-Flow for Surface Interpolation with Curvilinear Anisotropy
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Jeffery Caver, Biodiversity Institute Univ. of Kansas

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Mapping Words and Phrases from Geographic Knowledge on the Web
B. Adams, Centre for eResearch, The Univ. of Auckland

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Jakob Lanstorp, DGE Group Environmental Engineers

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Automated Classification and Change Detection for Rapid Update of Land-Cover Maps of S. Africa using Landsat Data
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Oregon Metro's Combination of FOSS4G with Enterprise in Web App Development
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(State of QGIS Server)
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OSGeoLive: An Overview of the Best Geospatial Open Source Software
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Building Development Environments Using Vagrant
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M.S. Souza, Hex - Tecnologias Geospaciais Inovadoras

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Exposing NASA's Earth Observations
Ryan Boller, NASA
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Disparate Data, Technology Fiefdoms and 65 Pictures of Your Cat
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A GeoNode Primer
Tyler Garner

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10:00 - 11:00 • *Portland Ballroom*

Don't Copy Data! Instead, Share it at Web-Scale

Mark Korver, Amazon

Since its start in 2006, Amazon Web Services has grown to over 40 different services. S3, our object store, one of our first services, is now home to trillions of objects and regularly peaks at 1.5 million requests/second. S3 is used to store many data types, including map tiles, genome data, video, and database backups. This presentation's primary goal is to illustrate best practice around open data sets on AWS. To do so, it showcases a simple map tiling architecture, built using just a few of those services, CloudFront (CDN), S3 (object Store), and Elastic Beanstalk (Application Management) in combination with FOSS tools, Leaflet, Mapserver/GDAL and Yas3fs. My demo will use USDA's NAIP dataset (48TB), plus other higher resolution data at the city level, and show how you can deliver images derived from over 219,000 GeoTIFFs to both TMS and OGC WMS clients for the 48 States, without pre-caching tiles while keeping your server environment appropriately sized via auto-scaling. Because the NAIP data sits in a requester-pays bucket that allows authenticated read access, anyone with an AWS account has immediate access to the source GeoTIFFs, and can copy the data in bulk to anywhere they desire. However, I will show that the pay-for-use model of the cloud, allows for open-data architectures that are not possible with on-prem environments, and that for certain kinds of data, especially BIG data, rather than move the data, it makes more sense to use it in-situ in an environment that can support demanding SLAs.

10:00 - 10:25 • *Room D137-138*

pyModis: From Satellite to GIS Maps

Luca Delucchi, Fondazione Edmund Mach

One year after the first public presentation of pyModis at FOSS4G 2013 a lot of improvements have been implemented in the pyModis library. The most important news are that each command line tool now offers a graphical user interface to assist inexperienced users. Furthermore, the MODIS Reprojection Tool (MRT) is not longer mandatory in order to mosaic and reproject the original MODIS data as GDAL is now supported. Hence the most important improvement was the reimplementation of existing MRT component to use the Python binding of GDAL. This was basically driven by the fact that MRT does not properly perform geodetic datum transforms as discovered in the daily work with MODIS data within the PGIS-FEM group leading to shifted reprojection output. With the new GDAL support not only this problem has been solved but also the installation greatly simplified. pyModis is used all over the world in academic, governmental and private companies due to its powerful capabilities while keeping MODIS processing workflows as simple as possible. The presentation will start with a small introduction about pyModis and its components, the library and the tools. This part is followed by news about the latest pyModis release and indications about future developments.

10:00 - 10:25 • *Room D139-140*

Tracking Slippery Map Analytics

Dustin Sampson

Google Analytics is a great tool for monitoring and reporting on website traffic and user interac-



tions but what it doesn't tell you is that 75% of the time your user's zoom in two levels every time they start to use your map or that external soils layer you added is taking an average three seconds to load. Client side map monitoring adds the missing chapters needed to complete your geo-analytics storybook. We'll briefly walk-through how to setup your slippy map to start tracking analytics, what can be tracked, and what can be discovered.

10:00 - 10:25 • Room D133-134

Inteligeo – Geographic Intelligence System in the Brazilian Federal Police

Daniel Miranda

This is a case study about using WebGIS for fighting crime from a forensics standpoint. When one thinks about GIS for law enforcement, vehicle tracking and messaging immediately comes to mind. Inteligeo provides support for law enforcement in a different manner: it provides information for the forensics examiner.

The system became operational in November 2010 and it now has more than 850 themes and 950 data visualization layers, and is available only inside of the Brazilian Federal Police internal network. It started as tool for fighting environmental crime, now it covers a wide variety of subjects such as environmental data, chemical analysis of pesticides, mining operations, public works fraud and legal status of rural properties. We also have a raster data repository and integration with databases from several institutions.

The system uses a fully open source database. After a difficult migration from a proprietary database, the data can now be handled not only by the proprietary GIS framework, but also by tools from the open source ecosystem and by our own maintenance tools.

During almost four years of operations, some lessons have been learned and the initial strategic plans have changed. We will discuss issues such as what can be outsourced and what has to be made in house, decisions regarding the database, experimenting versus focusing, key features (our users use most, demonstrating value to internal management.

10:00 - 10:25 • Room D135

Mapping with AngularJS

Matt Priour, Esri, Inc.

AngularJS is rapidly gaining popularity and favor in the front-end web development community. Several open-source AngularJS wrappers exist for open and closed source web mapping libraries. This session will survey the landscape of existing mapping library wrappers. Wrappers for OpenLayers, Leaflet, d3, Google Maps, and Esri WebMaps will be examined. Comparisons of the different abilities of these wrappers and the techniques required when using them will be examined. Advantages, strengths, weaknesses, limitations, and "gotchas" will all be examined for the AngularJS interfaces of the different mapping libraries. Attendees should leave the session with an understanding how to best integrate their mapping library of choice within an AngularJS application and how they could help improve these various wrappers.

10:00 - 10:25 • Room D136

The Role of Geospatial Open Source (FOSS4G) as a Component of Hybrid Systems

Michael Turner, AppGeo

Currently, it is rare that an organization faces a choice between "just commercial" or "just open source" geospatial software. Increasingly, the answer isn't about "or", it is now about solutions that may involve both. Indeed, Commercial systems – both installed software and cloud-based platforms – may have both functional and cost effectiveness gaps. Free and open source software for geospatial (FOSS4G) can be a critical component that helps to bridge these gaps. And, given



that organizations may have large existing investments and sunk costs in commercial software it can make sense to leverage those investments by building hybrid systems that incorporate open source components. This presentation will describe several specific examples of hybrid systems that incorporate geospatial open source (e.g., OpenGeo Suite) alongside both Esri and Google components. The presentation will focus on both the business reasoning for choosing hybrid as well as the technical approaches taken. Ultimately, hybrid projects or systems can be very important as they provide a key entry-point for geospatial open source into organizations that might not otherwise consider it.

10:00 – 10:25 • Room E141-142

Open Source Work-Flow for Surface Interpolation with Curvilinear Anisotropy

Michele Tobias, University of California Davis

Traditional approaches to interpolating a surface from point samples often assume that if anisotropy is present in the data, it is along a straight line. However, this assumption breaks down for many data-sets, such as river bathymetry, elevations near coastlines, or levels of pollutants along roads. I will present a work-flow using open source tools to make use of the curvilinear anisotropy present in many data-sets by transforming the curved data-set into a straight line (QGIS and PostGIS), applying an interpolation to the transformed data (SAGA, GRASS, or other program with interpolation tools), and finally re-bending the interpolated surface back to the data's original shape (PostGIS).

10:00 – 10:25 • Room E143-144

GRASS GIS 7: Your Reliable Geospatial Number Cruncher

Markus Neteler, Fondazione Edmund Mach

GRASS GIS (Geographic Resources Analysis Support System) looks back to the longest development history in the FOSS4G community. Having been available for 30 years, a lot of innovation has been put into the new GRASS GIS 7 release. After six years of development it offers a lot of new functionality, e.g. enhanced vector network analysis, voxel processing, a completely new engine for massive time series management, an animation tool for raster and vector map time series, a new graphic image classification tool, a “map swiper” for interactive maps comparison, and major improvements for massive data analysis (see also <http://grass.osgeo.org/grass7/>). The development was driven by the rapidly increasing demand for robust and modern free analysis tools, especially in terms of massive spatial data processing and processing on high-performance computing systems. With respect to GRASS GIS 6.4 more than 10,000 source code changes have since been made. GRASS GIS 7 provides a new powerful Python interface that allows users to easily create new applications that are powerful and efficient. The topological vector library has been improved in terms of accuracy, processing speed, and support for large files. Furthermore, projections of planets other than Earth are now supported as well. Many modules have been significantly optimized in terms of speed even by orders of magnitude. The presentation will showcase the new features along with real-world examples and the integration with QGIS, gvSIG CE, R statistics, and the ZOO WPS engine.

10:00 – 10:25 • Room E145

A Mobile Situated Learning Module using Open Source Geoweb Technology

Carl Sack, Univ. of Wisconsin – Madison
Julia Janicki, Univ. of Wisconsin – Madison

Mobile device technology is being introduced into educational settings and is likely to become widespread as an instructional medium in the coming years. As of 2013, nearly three-fourths of American college students own a smartphone, while four in ten own a tablet, and a majority of



students believe that mobile devices can make their education more effective. There is tremendous opportunity to harness these devices for situated learning, or lessons that take place in a real-world context, through the use of mobile-ready geoweb technologies. Adaptive web maps can be developed to guide students to important places—either virtually or physically—and facilitate landmark interpretation. This presentation will demonstrate a situated learning module developed using open source geoweb technologies for an international Studies course at the University of Wisconsin-Madison. The purpose of the module is to “make the familiar strange” to students in the Madison landscape, guiding them to historic landmarks and pairing those places with maps, images, and narration to explore the course of economic development in the U.S. The web application makes use of the principles of responsive web design to adapt to mobile or desktop devices, altering the map interface and modes of content delivery to fit the user’s context. The mobile and desktop versions will each be evaluated to determine what adaptations effectively increased usability and whether situated viewing of the map on a mobile device influenced learning outcomes. A review of the application development and evaluation processes and results will be accompanied by a summary of lessons learned about how mobile mapping applications can adapt to their users and surroundings.

10:30 – 10:55 • Room D137-138

Tuning Open Source GIS Tools to Support Weather Data/Rapidly Changing Rasters

Timothy Kempisty

The National Weather Service is developing several geospatial forecast visualization and analysis tools. The back end data store and WMS server is built on Open Source GIS tools: GDAL, PostGIS/Raster, Mapserver, and Mapcache.

Weather forecasts are in a constant state of flux. In the case of the National Digital Forecast Database, forecasts expire or are superseded every hour. This presents several challenges when it comes to managing forecast rasters with GIS tools, and delivering the most up-to-date, real-time forecasts with an acceptable level of performance. This presentation will examine the methods and practices we’ve used to optimize our data store performance, from data ingest to forecast analysis to image delivery.

- Using PostgreSQL Inheritance/Parent and Child tables to manage raster updates inside the database
- Managing an up-to-date image cache in Mapcache and Memcached, with rapidly changing source data.
- Optimizing PostGIS raster tiles and Mapserver DATA queries for faster image generation and display over Google Maps
- Future work: Expanding PostgreSQL Inheritance to work with raster overviews

10:30 – 10:55 • Room D139-140

Creating Charts and Legends for 3D Atlas Maps – A Mashup of D3.js, osgEarth, and the Chromium Embedded Framework

Raimund Schnürer, ETH Zurich

This presentation introduces a mashup of the JavaScript library D3.js, the virtual globe toolkit osgEarth, and the web browser engine Chromium Embedded Framework. Using the example of a national atlas, it is demonstrated how these OpenSource frameworks facilitate the creation of charts and legends for a series of three-dimensional maps.

The first part of the presentation explains how to derive a 3D chart map from multivariate point data: Charts are defined in osgEarth configuration files, generated in the DOM of the Chromium Embedded Framework, transferred back as SVG documents, and displayed as billboards in the virtual globe. So far, six widely used chart types (i.e. pie, ring, wing, divided area, bar, and divergent bar charts) with individual properties could be implemented.

In the second part, legends for choropleth, line, symbol, and raster maps are presented. They allow



to depict unique values, value ranges, and combinations of those having two dependent variables. Also legend templates for color gradients and hierarchical categories have been developed. All legends are made with D3.js and superimposed the virtual globe, thus helping the atlas user to resolve the meaning of map features.

Finally, current limitations of the chosen approach are discussed and future work of the atlas project is outlined.

10:30 - 10:55 • *Room D133-134*

Open Source Social Media Aggregation and Geolocating for Emergency Management

Dan King, Viewpoint Computer Services

This paper is a case study of FirstToSee, the social media situational awareness project organized by agencies in the Puget Sound region of the Pacific Northwest.

The purpose of FirstToSee is to capture, analyze and map social media using open source tools. The desired result is improved situation awareness through a clearer operational picture which in turn assists in providing a more targeted response. The Puget Sound is an actively seismic region and is prone to massive earthquakes, such as the 1700 magnitude 9 Cascadia earthquake. The next such earthquake in the region will cause widespread casualties and damage.

Inevitably, when the 'Big One' hits the public will turn to social media to report what is happening in their area. The collective information has the capacity to assist in assessment of problems and direct resources where needed most.

The project stack includes SwiftRiver, PHP, D3JS, GeoJSON, OpenLayers and GeoServer as well as complementary iOS and Android mobile applications that allow trusted sources to report additional critical information during an incident.

The open nature of social media provided numerous opportunities to test the platform. Since deploying in May of 2013 we tracked Twitter activity at major Puget Sound festivals and gatherings and real-world incidents around the globe.

The first regional disaster since launching came in late March of 2014 during the Washington State Oso landslide. The paper continues with analysis of the keywords searched, content gathered and methods for geolocating, aggregating and disseminating the information to emergency responders at the scene.

10:30 - 10:55 • *Room D135*

Next Generation of Printed Maps

Jesse Eichar, Campotocamp SA

Mapfish-print is a library and web-application for printing maps and reports using data from multiple online web mapping solutions like WMS, WMTS, OSM, WFS, GeoJson, etc.

The project is now nearly a decade old and is being used by a large number of websites. However, there are limitations to the original design, including the inability to have more than one map in a page, limited formatting and output restricted to PDF (in practical terms).

Mapfish-print V3 is the result of a major change in the underlying implementation. Thanks to integration with Jasper Reports and the new pluggable architecture the new version of Mapfish print is more powerful, flexible and scalable than ever before.

This talk will be targeted at the primarily website developers and managers will look at:

- The new features present in the new version
- How to use the new features
- How to use the report designer
- Examples of advanced formatting



- How to upgrade from previous versions
- The design decisions that allow mapfish-print to be a more scalable solution
- A very high level look at the ways the application can be extended by a developer for a specific vertical

10:30 – 10:55 • Room D136

Open for Business Down Under

Andrew Dennison, Gaia Resources

The open source geospatial community tends to focus heavily on technical solutions, but how do we ensure that we are engaging customers on the benefits of open source solutions or that our customers even properly understand what open source means to their business?

Can we engage our customers to encourage their projects to be contributed back to the open source core, can we get them interested in supporting core projects, do they even care that they are using an open source solution at all?

Customers are used to proprietary licensing models and have an inherent understanding of them, but many don't understand open source models beyond the superficial 'it's free'. Convincing clients to build on open source is relatively easy, convincing them to support open source projects that they have leveraged is often more difficult.

This talk discusses our experiences and challenges in Australia with collaborating with our clients on open source projects, particularly for customers with a limited technical background.

10:30 – 10:55 • Room E141-142

Adding Phylogenies to QGIS and Lifemapper for Evolutionary Studies of Species Diversity

Jeffery Cavnar, Biodiversity Institute University of Kansas

Phylogenetic data from the "Tree of Life" have explicit spatial and temporal components when paired with species distribution and ecological data for testing contributions to biological community assembly at different geographic scales of species interaction. Important questions in biology about the degree of niche suitability and whether the history of a community's assembly for an area can affect whether the species in a community are more or less phylogenetically related can be answered using several different spatially-filtered measures of phylogenetic diversity. Phylogenetic analyses which support the description of ecological processes are usually achieved in a handful of software libraries that are narrowly focused on a single set of tasks. Very few applications scale to large datasets and most do not have an explicit spatial component without relying on external visualization packages. This prompted us to explore bringing phylogenetic data into an open-source GIS environment. The Lifemapper Macroecology/Range & Diversity QGIS plug-in is a custom plug-in which we use to calculate and map biodiversity indices that describe range-diversity relationships derived from large multi-species datasets. We describe extensions to that plug-in which expand the Lifemapper set of ecological tools to link phylogenies to spatially-derived 'diversity field' statistics that describe the phylogenetic composition of natural communities.

10:30 – 10:55 • Room E143-144

ILWIS, The Next Generation Tool Framework for GIS and Remote Sensing

Rob Lemmens, ITC, University of Twente

The Integrated Land and Water Information System (ILWIS, <http://52north.org/communities/ilwis/>) is a GIS and remote sensing software integrating raster, vector and thematic data set processing into



a desktop application. ILWIS is hosted under the umbrella of the 52North project and managed and maintained by ITC, University of Twente, The Netherlands. ILWIS is currently subject to a significant refactoring and modularization process referred to as ILWIS Next Generation (ILWIS NG). This will increase attractiveness for developers and lowers their entry requirements. It will provide a sustainable code base for the next decade and allows for integration with other open source software. Beneficiaries are researchers, educators and project executers. It will allow them to use GIS and remote sensing functionality in an easy and interoperable manner on a single desktop and in a web and/or mobile environment in order to integrate their work with others in a standardized way. Based on requirements analysis meetings with a small team at ITC, an architecture was created to host the modular components of ILWIS NG. The implementation of this architecture was started in 2013 and comprised the creation of the QT-based core software centered around a plug-in concept which supports connectors. This supports different data formats and interfaces to other software packages. As first extensions, a Python API and WFS have been developed and data connectors to PostgreSQL and OGC's SWE are underway, as well as a flexible mobile app environment, making it possible to configure lightweight GIS apps within a very short time. The presentation will embark upon the justification of starting the software refactoring and will provide an overview of the new modular architecture, giving insight into the design choices which were made. The presentation will also expose the GIS and image processing functionalities within ILWIS and how they are made available in the new interoperable setup indicating the libraries and standards on which they are based. Examples will be given on the many projects in which ITC has used ILWIS already and the potential use of ILWIS Next Generation in combination with OSGEO projects in the future.

10:30 - 10:55 • Room E145

TeachOSM

Nuala Cowan, George Washington University, Geography
Richard A. Hinton, George Washington University, Geography

For the past three years Nuala Cowan & Richard Hinton of the Geography department at the George Washington University have integrated the open source mapping platform, OpenStreetMap into the curriculum for their introductory undergraduate Geographical Information Systems (GIS) & Cartography classes; traditionally the domain of desktop, proprietary software. Professors Cowan and Hinton have sought to expand the traditional curriculum, and expose students to various different open source software's, web based platforms, and data collection initiatives, specifically in a service-learning environment.

In collaboration with both local & international partners (American Red Cross 2012, USAID 2014), GW Geography students have used high-resolution satellite imagery to trace road and building infrastructure (Columbia & Indonesia 2012, Kathmandu 2013, Philippines & Zimbabwe 2014), data that is subsequently used to support disaster preparedness efforts.

Initiated by a small innovative teaching grant we have started work with OpenStreetMap foundation to develop a web site that would allow other instructors to replicate our mapping assignment specific to their particular discipline and curricular needs. This site is called TeachOSM.org. Our funding has since been matched by the World Bank, USAID (OTI and The Geocenter), the State Department and The American Red Cross. With this funding the scope of the project has been expanded to include the redevelopment of the OSM Tasking manager. The OSM Tasking Manager is a custom-mapping tool that facilitates collaborative mapping projects with a humanitarian focus. The purpose of the tool is to divide a mapping job into individual smaller tasks for group work, while guaranteeing coverage and minimizing overlap. New additions to the Tasking Manager will allow instructors to assign cells to individual students for both data creation, and data validation roles. Mapping has applicability across many fields and communities of interest, and can be used to document, archive, plan and contribute to both local and international initiatives.

Open source mapping modules and assignments are also a unique way to integrate service-learning strategies in course curriculum, while exposing students to new and exciting technological platforms. The experience teaches civic responsibility and the value of collaborative efforts in the global community.



The collaborative mapping initiatives at GWU Geography have been exclusively disaster related to date, as this coincides with the research interests of the faculty involved. We believe this instructional module/assignment is applicable to many disciplines and teaching scenarios, and the objective of the TeachOSM platform is to open that possibility to these other fields, in a comprehensive user friendly way.

11:00 - 11:25 • Room D137-138

Big (Enough) Data and Strategies for Distributed Geoprocessing

Robin Kraft, World Resources Institute

Big data gets a lot of press these days, but even if you're not geocoding the Twitter firehose, "big enough" data can be a pain - whether you're crashing your database server or simply running out of RAM. Distributed geoprocessing can be even more painful, but for the right job it's a revelation!

This session will explore strategies you can use to unlock the power of distributed geo-processing for the "big enough" datasets that make your life difficult. Granted, geospatial data doesn't always fit cleanly into Hadoop's MapReduce framework. But with a bit of creativity - think in-memory joins, hyper-optimized data schemas, and offloading work to API services or PostGIS - you too can get Hadoop MapReduce working on your geospatial data!

Real-world examples will be taken from work on GlobalForestWatch.org, a new platform for exploring and analyzing global data on deforestation. I'll be demoing key concepts using Cascalog, a Clojure wrapper for the Cascading Java library that makes Hadoop and Map/Reduce a lot more palatable. If you prefer Python or Scala, there are wrappers for you too.

Hadoop is no silver bullet, but for the right geoprocessing job it's a powerful tool.

11:00 - 11:25 • Room D139-140

Vert.x - Web Sockets and Async Programming for Everyone

Steven Pousty, Redhat

You have started to hear about micro-services, evented asynch servers, and WebSockets but then you hear the only platform that really has those now is Node.JS. While you like JavaScript you would like to use other languages. Well Vert.x has all these features AND runs JavaScript, Java, Scala, Python, Ruby, CoffeeScript, and Groovy. You don't have to be a Node.JS hipster to have all the fun - though JavaScript is fine if you roll that way. This talk will cover a basic introduction to Vert.x and it's architecture. Then I will show how I built a WebSocket asset tracking application with Leaflet and a Vert.x backend application. The goal is at the end you can go home and start writing your own, scalable, (a)synchronous, WebSocket applications.



CARTO^{DB}



11:00 – 11:25 • Room D133-134

Spatial-Temporal Prediction of Climate Change Impacts Using pyimpute, scikit-learn and GDAL

Matthew Perry

As the field of climate modeling continues to mature, we must anticipate the practical implications of the climatic shifts predicted by these models. In this talk, I'll show how we apply the results of climate change models to predict shifts in agricultural zones across the western US. I will outline the use of the Geospatial Data Abstraction Library (GDAL) and Scikit-Learn (sklearn) to perform supervised classification, training the model using current climatic conditions and predicting the zones as spatially-explicit raster surfaces across a range of future climate scenarios. Finally, I'll present a python module (pyimpute) which provides an API to optimize and streamline the process of spatial classification and regression problems.

11:00 – 11:25 • Room D135

Responsive Interactivity: Toward User-centered Adaptive Map Experiences

John Czaplewski, Univ. of Wisconsin – Madison Geoscience Department

Richard Donohue, University of Kentucky

Rashauna Mead, Applied Population Laboratory Univ. of Wisconsin – Madison

In recent years, the web design community has moved quickly to accommodate the various devices and methods for accessing web content. The FOSS4G and wider development community have responded to this paradigm of adapting the layout of content to scale to the device of the user by creating and leveraging tools such as Leaflet and D3. However, there remains a lack of knowledge, understanding, and conversation about what it truly means to create a map experience that meets the present needs and expectations of the user. Designing an adaptive map should go beyond simply fitting it into a responsive layout. User variables, such as the mode of interaction and location-based needs, raise map-specific UI design questions that this community is uniquely positioned to answer.

This talk will explore what it could mean cartographically and experientially to adapt all aspects of the map experience to the needs of the user using principles already embraced in other communities. Our goal is to provoke a wider discussion of how we, as a community, can work toward these objectives. Regardless of expertise level, anyone who is involved with the creation of interactive web maps has inevitably come across the problems associated with, and will benefit from involvement in this conversation.

11:00 – 11:25 • Room D136

Geolode: The Motherlode of Geospatial Data Sources

Keith Jenkins, Cornell University

You can't make a map without data. A wealth of free and publicly-accessible geospatial data exists on thousands of websites scattered around the world, just waiting to be found and used. But finding the right data for a specific map or analysis requires the knowledge of what geodata websites are out there, and what types of data they each contain. Searching the web can turn up webpages that contain sprawling lists of geodata websites, but such lists are not easily browseable, and are often out of date.

Geolode.org is a newly-launched lightweight catalog of geodata websites around the world, searchable and browseable by location, topic, and other tags, so that searchers can quickly focus on the most relevant websites for their geodata needs. An API also provides open access to the catalog's records in JSON format.

Geolode's inventory is the collaborative product of a group of librarians and other researchers with many years of experience searching for a wide range of data. We'll talk about how Geolode works,



as well as strategies for keeping Geolode up to date, such as harvesting links from all those sprawling lists, and monitoring Twitter for reports of new geodata resources.

11:00 - 11:25 • Room E141-142

Mapping Words and Phrases from Geographic Knowledge on the Web

Benjamin Adams, Centre for eResearch, The University of Auckland

Extremely rich and diverse knowledge about places across the world is available online in a variety of forms, including structured data, image, and natural language description. Map-based exploration of this knowledge has potential to aid a number of applications from education to marketing. In this presentation we describe a system to map geographic regions associated with arbitrary keywords, phrases, and texts by computing topic surfaces over the Earth from unstructured natural language text. Our methodology combines natural language processing and geostatistics and is built using freely available open source tools. We train our system on Wikipedia and travel blog entries and demonstrate it with a general-purpose geographic knowledge exploration tool.

11:00 - 11:25 • Room E143-144

Seven Ways of Injecting Python to QGIS

Jakob Lanstorp, DGE Group Environmental Engineers

This presentation will enlighten the novice Python QGIS user with different ways of running Python code in QGIS without the need of building a QGIS Python plugin. Any QGIS user could start writing small Python scripts for automating, customizing and extending QGIS, making their daily workflow an easier and more fun task to complete.

- Python through the QGIS Python Console and Script editor: This would be the most obvious place for PyQGIS newcomers. The console and editor comes with syntax highlighting, autocomplete and easy integration to QGIS.
- Scriptrunner: A handy plugin for running Python scripts when objects needs to be instantiated.
- Extending the Expression engine: Using a startup.py in your .qgis2 Python folder with a @qgsfunction(0, "Python") attribute. An example is shown adding the name of the current user, to a label on a Print Composer composition.
- Run script on project event open, close and save: You may want to validate if a certain table is open, and notify the user if it is not, when opening or saving a QGIS project.
- Python in QGIS Actions: Extend your QGIS actions with Python code.
- Python Init function: A powerful feature in QGIS when creating new features. You can validate and programmatically edit your attribute input. One can also process the newly digitalized geometry. An example is shown creating rectangular oil tanks with predefined dimension.
- Processing Framework: Scripting methods from the Processing Framework. Useful when you need to loop or run a batch of commands from the Processing Framework.

11:00 - 11:25 • Room E145

Educating 21st Century Geospatial Technology Industry Workers with Open Source Software

Phillip Davis, FOSS4GEO Academy

Kurt Menke, Birds Eye View GIS

John Van Hoesen, Green Mountain College

Where are GIS educators to go when they need educational material to teach FOSS4G in their academic programs? While commercial vendors, like Esri through their Virtual Campus, have a wealth of training material available, there are very limited resources for educators seeking to teach

FOSS4G. The new QGIS Academy program is the first national effort to provide this much need academic infrastructure. The Academy has produced a set of five full GIS courses, based on the latest version of QGIS, to offer educators and others for free under the Creative Commons CC BY license. These courses have been under development since 2010 and use the US Department of Labor Geospatial Technology Competency Model (GTCM) as the basis for their scope and sequence. This presentation will demonstrate the courses and discuss their development and future plans.

13:00 - 13:25 • Room D137-138

Data.gov/Geoplatform.gov CSW Implementation Through pycsw and CKAN Integration

Angelos Tzotsos, NTUA

This presentation will discuss the implementation of the CSW endpoint using pycsw within the Data.gov infrastructure (architecture/enhancements/testing/deployment) and CKAN, which powers Data.gov.

CSW (Catalogue Service for the Web) is an OGC (Open Geospatial Consortium) specification that defines common interfaces to discover, browse, and query metadata about data, services, and other potential resources.

Data.gov provides access to its catalog via the CSW standard for both first-order and all metadata for harvested data, services and applications. Data may be referenced from federal, state, local, tribal, academic, commercial, or non-profit organizations. The first-order CSW endpoint provides collection level filtering of all metadata records. The all metadata CSW endpoint provides all levels of metadata at varying levels of granularity.

Any client supporting CSW (desktop, GIS, web application, client library, etc.) can integrate the Data.gov CSW endpoints.

13:00 - 13:25 • Room D139-140

Case Study: Developing OpenLayers-based Mobile Applications

Syrus Mesdaghi, LMN Solutions/Noblis-NSP
Kevin Zusy, Noblis-NSP
Tyler Garner, Noblis-NSP

Developing an application with the capability to view, collect, and edit geospatial data in connected, limited connectivity, and disconnected environments was a necessity for the ROGUE project. The first version of the application was developed using Cordova/PhoneGap, with everything written in html, css, and javascript, using OpenLayers 2.13 as the mapping library, and jQuery Mobile for the UI. Due to various UI concerns, we decided to implement another version utilizing as much of the native Android API as possible. We also developed a third mobile application using OpenLayers 3 as the mapping library, and Bootstrap for the UI. This talk will cover our experience developing these three geospatial mobile applications, specifically the differences between the approaches we took and any challenges that we overcame.

13:00 - 13:25 • Room D133-134

Compositing a Global Mosaic

Frank Warmerdam

Planet Labs is collecting images from dozens of satellites in order to build timely global cloud free mosaics at around 5 meter resolution. I will review the software components we use to accomplish this, as well as discussing challenges and solutions in this process. With luck I will be in a position to show off our global mosaics, and offer Planet Labs open source compositor software.



13:00 – 13:25 • Room D135

GeoExt2 – Past, Present and Future

Marc Jansen, terrestris GmbH & Co. KG
Julien-Samuel Lacroix, Mapgears Inc.

GeoExt is Open Source and enables building desktop-like GIS applications through the web. It is a JavaScript framework that combines the GIS functionality of OpenLayers with the user interface savvy of the ExtJS library provided by Sencha.

Version 2 of GeoExt (<http://geoext.github.io/geoext2/>, released in October 2013) is the successor to the GeoExt 1.x-series and is built atop the newest official installments of its base libraries; OpenLayers 2.13.1 and ExtJS 4.2.1.

The talk of two GeoExt core developers and members of the PSC (Project Steering Committee) will shortly present the history of the project with a focus on how an international code sprint back in May 2012 lay the foundations of the 2.x-series of GeoExt. The current version will be presented and we'll discuss new features and important changes for users of the framework. Especially the following aspects will be portrayed:

- Usage of the new classes
- Compatibility with the single-file build tool of Sencha
- Integration into the ExtJS MVC (Model-View-Controller) architecture
- Better API-documentation
- Easier theming of ExtJS/GeoExt applications

As both of the base libraries are about to release new major versions - OpenLayers 3 and ExtJS 5 are very near to be being released in stable versions - the last focus of the talk will be the future development of the GeoExt 2 framework.

The project has already pre-evaluated the possibility of supporting more than just one mapping library, so a future version of GeoExt might bring support for OpenLayers 3 and/or Leaflet and is likely being built on top of ExtJS 5.

13:00 – 13:25 • Room D136

A Glimpse of FOSS4G in the Environmental Consulting Arena

John McCrae, NewFields LLC

In the highly competitive world of environmental consulting, being able to manage large volumes of data and deliver timely, accurate information based on that data is critical to our ongoing success. As a relatively small company, we recognized that we needed something unique to survive and prosper in an industry dominated by huge corporations. Over the past 7 years we have made a considerable effort to shift over to a FOSS4G environment, with a belief that, not only would this decision enhance what we already do well, but give us the competitive edge we would need to ensure future prosperity.

A brief presentation of a snapshot of our current FOSS4G status, how we arrived here and a workflow tour beginning at the data acquisition stage looking at the feed through our patented EDMS QA/QC system into PostgreSQL followed by a demonstration of a just a few of our many custom web/mobile/desktop applications that rely on the PostgreSQL back end database and how these solutions are able to deliver accurate and timely information to employees and clients alike, and finally, where to next.

We take advantage of multiple FOSS4G including the likes of OpenLayers, MapServer, PostgreSQL/PostGIS, PHP, D3 and jQuery. This combination places us in an ideal position to respond to client needs with the ability to rapidly deliver almost any request.

13:00 - 13:25 • Room E141-142

Köppen-Geiger Classifications of Paleoclimate Model Simulations

Christian Willmes, University of Cologne

A pyGRASS implementation of the Köppen-Geiger climate classification applied to paleoclimate model simulations from the Paleoclimate Model Intercomparison Project III (PMIP III) will be presented. The talk will show the details of how Köppen-Geiger classifications are practically implemented and applied to climate model simulations using GRASS GIS, the python library pyGRASS and QGIS for the cartography.

13:00 - 13:25 • Room E143-144

(State of QGIS Server)

Pirmin Kalberer, Sourcepole AG

QGIS server continues to grow with an active community and expanding user base. Besides new styling features shared with QGIS desktop, new services have been added continuously. OGC WFS (Web Feature Service) and WFS-T were the first additions to WMS, recently followed by an OGC WCS (Web Coverage Service) implementation. The map service itself also got several additions besides the GetPrint request for delivering PDF outputs made with QGIS print composer. Performance and scalability has been steadily improved and brought to the same level as other established map servers. PDF outputs got recently support for dynamic texts and images (e.g. QR codes) and server-side GeoJSON rendering allowing redlining implementations.

13:00 - 13:25 • Room E145

Choose Your Own Adventure – Open Source Spatial on OpenShift

Ryan Jarvinen

Learn how to build quick and easy open source mapping solutions using several different languages and datastores. We'll start by selecting our source data, and a database to house it. Then, we'll pick language and a simple microframework to power a basic REST API. Finally, we add Leaflet Maps for user-facing data visualization and controls. Feel free to bring a laptop and follow along to launch your very own mapping application during this short talk.

13:30 - 14:30 • Portland Ballroom

LocationTech Projects

Jody Garnett, Boundless

Andrew Ross, Eclipse Foundation

Rob Emanuele, Azavea

LocationTech is an Eclipse Foundation industry working group for location aware technologies. This presentation introduces LocationTech, looks at what it means for our industry and the participating projects.

Libraries: JTS Topology Suite is the rocket science of GIS providing an implementation of Geometry. Mobile Map Tools provides a C++ foundation that is translated into Java and Javascript for maps on iOS, Android and WebGL. GeoMesa is a distributed key/value store based on Accumulo. Spatial4j integrates with JTS to provide Geometry on curved surface.

Process: GeoTrellis real-time distributed processing used scala, akka and spark. GeoJinni mixes spatial data/indexing with Hadoop.

Applications: GEOFF offers OpenLayers 3 as a SWT component. GeoGit distributed revision control for feature data. GeoScript brings spatial data to Groovy, JavaScript, Python and Scala. uDig offers an eclipse based desktop GIS solution.



Attend this presentation if want to know what LocationTech is about, are interested in these projects or curious about what projects will be next.

13:30 - 13:55 • Room D137-138

Open Source Geospatial Production of United States Forest Disturbance Maps from Landsat Time Series

Chris Toney

The North American Forest Dynamics (NAFD) project is completing nationwide processing of historic Landsat data to provide annual, wall-to-wall analysis of US disturbance history over nearly the last three decades. Because understanding the causes of disturbance (e.g., harvest, fire, stress) is important to quantifying carbon dynamics, work was conducted to attribute causal agents to the nationwide change maps. This case study describes the production of disturbance agent maps at 30-m resolution across 434 Landsat path/rows covering the conterminous US. Geoprocessing was based entirely on open source software implemented at the NASA Advanced Supercomputing facility. Several classes of predictor variables were developed and tested for their contribution to classification models. Predictors included the geometric attributes of disturbance patches, spectral indices, topographic metrics, and vegetation types. New techniques based on shape-restricted splines were developed to classify patterns of spectral signature across Landsat time series, comprising another class of predictor variables. Geospatial Data Abstraction Library (GDAL) and the R statistical software were used extensively in all phases of data preparation, model development, prediction, and post-processing. Parallel processing on the Pleiades supercomputer accommodated CPU-intensive tasks on large data volumes. Here we present our methods and resultant 30-m resolution maps of forest disturbance and causes for the conterminous US, 1985 - 2011. We also discuss the computing approach and performance, along with some enhancements and additions to open source geospatial packages that have resulted.

13:30 - 13:55 • Room D139-140

Glob3 Mobile (Mobile Map Tools)

Manuel de la Calle

Glob3 Mobile is an API for the development of native map applications on mobile devices. The main capability of this library is the Multiplatform approach, it have the very same API in all environments thanks to coding translation. Developing with Glob3 Mobile you can save time and resources when you face a mobile development having all advantages of native development (Performance, UI, Access to disk, sensors, etc) and the simplicity of an API thought for GIS developers. During 2013-2014 G3M has been growing in capabilities and is now a solution to face the development of any map application on any device.

In this presentation We will explain the architecture and the main capabilities of this library and we will show some examples and demos and use cases with the API working. Glob3 Mobile has been developed thinking in the usability and the UI of mobile devices. Currently Glob3 Mobile is working in the next platforms:

- iOS
- Android
- Google Glass
- html5-webgl

And it is planned to add others like Windows 8 or Java Desktop. Currently also g3m has been used as offline AR engine for wearable devices.

The capabilities list is huge but the main are:

- Raster data
- Vectorial data
- Point Clouds
- 3D models (Buildings, cities, vehicles...)
- 4D Data
- Real Time
- Simbology
- Offline - Online -> Cache Handling
- 3D -2D - 2,5D views
- Scenarios
- Animations
- Cameras
- Tasks



During 2014 Glob3 Mobile will become part of Location Tech (Eclipse Foundation) and will change the name and license: Glob3 Mobile -> Mobile Map toolsBSD -> EPL

Different use cases of Mobile Map Tools.

- Vazz: <http://www.vazz.tv/start>
- Galileo: <http://galileo.glob3mobile.com> and <http://galileo.mobilemaptools.com>
- Aero Glasses: <http://glass.aero/>

13:30 - 13:55 • Room D133-134

24-hr Latency End to End Data Processing Using Open Source Technologies for the Airborne Snow Observatory

Paul Ramirez

JPL's Airborne Snow Observatory is an integrated imaging spectrometer and scanning LIDAR for measuring mountain snow albedo, snow depth/snow water equivalent, and ice height (once exposed), led by PI Dr. Tom Painter. The team recently wrapped our second "Snow On" campaign where over a course of 3 months, we flew the Tuolumne River Basin, Sierra Nevada, California above the O'Shaughnessy Dam of the Hetch Hetchy reservoir; focusing initial on the Tuolumne, and then moving to weekly flights over the Uncompahgre Basin, Colorado.

To meet the needs of its customers including Water Resource managers who are keenly interested in Snow melt, the ASO team had to develop and end to end 24 hour latency capability for processing spectrometer and LIDAR data from Level 0 to Level 4 products. Fondly referring to these processing campaigns as "rodeos" the team rapidly constructed a Big Data open source data processing system at minimal cost and risk that not only met our processing demands, but taught the entire team many lessons about remote sensing of snow and dust properties, algorithm integration, the relationship between computer scientists, and snow hydrologist; flight and engineering teams, geographers, and most importantly lessons about camaraderie that will engender highly innovative and rapid data systems development, and quality science products for years to come.

Chris Mattmann, Paul Ramirez, and Cameron Goodale for the ASO project will present this talk and will detail the story of the Compute processing capability on behalf of the larger team, highlighting contributions of its key members along the way. We will cover the blending of open source technologies and proprietary software packages that have helped us attain our goals and discuss areas that we are actively investigating to expand our use of open source.

13:30 - 13:55 • Room D135

TileMill and the Tower of Prince Henry, Reversed

Eric Theise

Programs that generate map tiles default to generating tiles for abounding box whose dimensions are fixed up and down the zoom stack. But the overarchingly common use case calls this default behavior into question. If the ultimate goal of a map is to lock down the display of a feature at a high zoom level, then any tile outside of the inverted pyramid whose truncated top bounds the feature at the desired zoom level is extraneous, unnecessary.

Inspired by a game of marbles that uses a similar shape in its playing, I call this truncated, inverted pyramid the "Tower of Prince Henry, Reversed"^[1], and abbreviate it TOPHR.

This presentation describes modifications to TileMill, the same strategy implemented directly through Mapnik XML, the use of the flexible mbtile format to store the generated tiles, and presents several measures of the resulting savings (tile generation time, number of tiles, disk space). I'll also describe a plug in for Leaflet and an approach for OpenLayers that ensures that map users cannot stray outside the bounds of TOPHR.

[1] It's also reminiscent of the name of a real album by The Fall or an unreal tarot card.



13:30 – 13:55 • Room D136

A FOSS4G-based Geo Connection System for Education and Research

David Strohschein, Salem State University, Department of Geography

55

The presentation will examine the selection, installation, and the current and planned use of a CentOS-based system running FOSS4G to support student education, research, and projects with state and local organizations. A system was designed to foster collaborative work between an educational institution and the community.

Specifically, it is being used to better understand and enhance distribution systems associated with local agriculture producers and consumers. Part of this work is the development of a web-based system to process and serve geospatial information in an effort to improve communication between food producers and consumers, i.e. restaurants, farmers markets, and Community Supported Agriculture (CSA). This presentation will demonstrate how the system was built to:

- Continue investigation of the general principles and approaches for designing food distribution systems to enhance local food networks
- Provide access to a web-based system for geospatial computations and data management
- Serve as a resource for the community to access information in support of the broader goals of the CEDS research center
- Act as a map server
- Act as the server supporting deployment of geo-aware mobile phone applications implemented by the department to enhance the learning process on field trips and other field work
- Collect, process, store, and serve data from environmental sensors to support education in weather, climate, and the environment

13:30 – 13:55 • Room E141-142

Evaluation of Web Processing Service Frameworks

Ebrahim Poorazizi, University of Calgary
Andrew J.S. Hunter, University of Calgary

In this presentation, I illustrate, and discuss initial results from a quantitative analysis of the performance of WPS servers. To do so, two test scenarios were used to measure response time, response size, throughput, and failure rate of five WPS servers including 52°North, Deegree, GeoServer, PyWPS, and Zoo. I also assess each WPS server in terms of qualitative metrics such as software architecture, perceived ease of use, flexibility of deployment, and quality of documentation. A case study addressing accessibility assessment is used to evaluate the relative advantages and disadvantages of each implementation, and point to challenges experienced while working with these WPS servers.

13:30 – 13:55 • Room E143-144

From Nottingham to PDX: QGIS and QGIS Server 2014 Roundup

Pirmin Kalberer, Sourcepole AG

Following the long awaited QGIS 2 release, announced at FOSS4G 2013 in Nottingham, the project decided to switch to a regular release cycle with three versions per year. QGIS 2.2 was the first release in this cycle and already packed with many new features like 1:n relations, gradient fills, native DXF export and NTV2 datum transformations to name a few. QGIS 2.4, released in June, has one major extension in its core: multithreaded rendering. Originally developed as a Google Summer of Code project, it makes a big difference in the responsiveness of QGIS desktop.

QGIS server, delivering QGIS desktop projects as OGC web services, continues to grow with an active community and expanding user base. Besides new styling features shared with QGIS desktop, new services have been added continuously. OGC WFS (Web Feature Service) and WFS-T were the first additions to WMS, recently followed by an OGC WCS (Web Coverage Service) implementation.

THURSDAY



The map service itself also got several additions besides the GetPrint request for delivering PDF outputs made with QGIS print composer. Performance and scalability has been steadily improved and brought to the same level as other established map servers. PDF outputs got recently support for dynamic texts and images (e.g. QR codes) and server-side GeoJSON rendering allowing redlining implementations.

This talk shows a selection of the latest features and gives an outlook what's in the works for QGIS 2.6. Some interesting plugins and other news from the community will keep you up to date with the high pace of this OSGeo project.

14:00 - 14:25 • *Room D137-138*

An Automated Classification and Change Detection System for Rapid Update of Land-Cover Maps of South Africa Using Landsat Data

Bryan McAlister, CSIR South Africa

Recent land cover maps are essential to spatial planning and assessment by non-/governmental agencies. The current land cover mapping methods employed in South Africa are slow and expensive and the most recent national land cover map dates back to 2000. The CSIR is developing an auto-mated land-cover mapping system for the South African region. This system uses widely available Landsat satellite image time series data, together with supervised machine learning, change detection, and image preprocessing techniques. In this presentation the implementation of this end-to-end system will be addressed. Specifically, we will discuss the use of an open source random forest implementation (Weka), a change detection algorithm (IRMAD), as well as tools used for satellite image preprocessing (Web enabled Landsat data, fmask cloud masking) and on-line validation tools. Furthermore the approach used in optimising automatic land-cover production accuracy for operational use will be discussed.

14:00 - 14:25 • *Room D139-140*

Web and Mobile Enterprise Applications

Peter Batty, Ubisense

This presentation will discuss enterprise web mapping and mobile applications that we've been developing for large utilities and communications companies, based on a number of open source geospatial components, including PostGIS, MapFish, GeoServer and Leaflet. It will discuss development of offline mobile applications using both PhoneGap to compile to native applications on Android, iOS and Windows, using a SpatialLite database, and also use of HTML5 offline storage. We will discuss ideas on how to create extremely easy to use but still powerful applications, using approaches inspired by consumer web mapping sites rather than traditional GIS. The presentation will not be deeply technical but will include material of interest to developers as well as end users and managers.

14:00 - 14:25 • *Room D133-134*

OnEarth: NASA's Boundless Solution to Rapidly Serving Geographic Imagery

Joe Roberts

OnEarth is an open source software package that efficiently serves georeferenced raster imagery with virtually zero latency, independent of image size or spatial resolution. The key to OnEarth's speed lies in the use of a unique, multi-resolution file format (Meta Raster Format, or MRF) combined with supporting open source software packages such as the Geospatial Data Abstraction Library (GDAL) and Apache to serve out images via web service protocols such as Web Map Tile Service (WMTS) and Tiled Web Map Service (TWMS), or visualization formats such as Keyhole Markup Language (KML). The emphasis on performance and scalability were strong drivers for developing this specialized package versus using existing software.



While OnEarth is currently deployed operationally at several institutions, powering applications across the Earth Science and planetary spectrum, its active development is managed by NASA's Global Imagery Browse Services (GIBS) project. The purpose of GIBS is to provide a complementary historical and near real time (NRT) image archive to NASA's Earth Science data products for a multitude of uses: GIS ingestion, first responder and NRT applications, data search and discovery, decision support, education and outreach.

Released as open source to GitHub in October 2013, NASA is encouraging members of the open source community to participate in the evolution of OnEarth—in the roles of developers, evaluators, and users—as a means to vet and enhance its capabilities. This leveraging of efforts not only benefits those who intend to use the software for their own endeavors, it effectively contributes back to NASA by strengthening GIBS and promoting the use and understanding of NASA's vast archive of science imagery and data. Several tools, including the GIBS reference client, Worldview, will be demonstrated as part of this presentation to illustrate the breadth of application and consistent image access speed across installations. <https://github.com/nasa-gibs/onearth>

14:00 - 14:25 • Room D135

Creating Custom HTML Elements for Maps

Daniel Luxemburg, Bandwagon

Maps appear all over the web but the core structural language of the web — HTML — does not natively support them. Adding dynamic or interactive maps to a web page or web application can involve complex JavaScript code that is difficult to reuse between contexts.

Web developers are starting to have opportunities to change this. Some newer web development frameworks are designed to support HTML page elements with custom attributes as a way of defining behaviors. These frameworks anticipate web components, an emerging standard for creating fully custom HTML tags. Custom attributes and elements make it possible to effectively expand HTML to include `{my-map}...{/my-map}`.`

This talk will demonstrate how to use existing JavaScript map libraries to create flexible, reusable maps that take the form of HTML elements with custom attributes. Looking forward, we'll explore how web components let us take this technique even further and create true custom HTML elements for maps and the display of other geo data.

Crafting custom HTML map elements doesn't just mean making maps a first-class citizen of web page markup, it offers a whole new way to create and share web-based mapping tools between applications and organizations.

14:00 - 14:25 • Room E141-142

WPS Benchmarking Session

Gérald FENOY, GeoLabs SARL

With the interest for OGC Web Processing Service growing, we need to know details about the Open Source Solutions available. Various projects implementing WPS designed individuals from their community to participate in this talk to introduce their project and summarize their key features, they are the following: 52°North WPS, Constellation SDI, GeoServer, PyWPS, ZOO-Project. For being able to provide good quality results, the tests should be run locally, so a server dedicated to this WPS Benchmarking Session, hosting OSGeoLive environments, is accessible to each team for running test procedures defined through discussions. The results of the given test procedures will be presented during this session and will compare implementations from different aspects: capabilities, compliancy, ressources usage and performance.





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14:00 - 14:25 • *Room E143-144*

Extracting Geographic Data from Wikipedia

Hal Mueller, Mobile Geographics

A large fraction of Wikipedia's millions of articles include geographic references. This makes Wikipedia a potentially rich source for themed, curated geographic datasets. But the free form nature of Wikipedia's markup language presents some technical challenges. I'll walk through the Wikipedia API, show how to get to the various places where spatial info might be found, and show some blind alleys I've followed. I'll close with a case study of using Wikipedia to drive a map-based iOS app.

15:00 - 16:00 • *Portland Ballroom*

OSGeoLive: An Overview of the Best Geospatial Open Source Software

Angelos Tzotsos, NTUA

This presentation provides an overview of the breadth of quality geospatial open source applications, which are available for the full range of geospatial use cases, including storage, publishing, viewing, analysis and manipulation of data.

The presentation is based upon documentation from OSGeoLive, which is a self-contained DVD, USB thumb drive and Virtual Machine, based on Ubuntu GNU/Linux. It includes over 50 of the best geospatial, open source applications, pre-configured with data, project overviews and quick-starts, translated into multiple languages. It is an excellent tool for demonstrating Geospatial Open Source, using in tutorials and workshops, or providing to potential new users.

This presentation is very useful for anyone wishing to gain a high level understanding of the breadth of Geospatial Open Source available, and is often presented at the start of spatial conferences to help attendees select targeted presentations later in the conference.

15:00 - 15:25 • *Room D137-138*

"Sliding" Datasets Together for More Automated Map Tracing

Paul Mach, Strava Inc

Importing new/updated geometry into large dataset like Open Street Map is tricky business. Features represented in both need to be detected and merged. Often times editors are asked to completely "retrace" over updated maps as automated methods are unreliable.

While a 100% accurate merge is impossible, it is possible to auto create a best guess and let the user refine from there, eliminating as many manual, tedious steps as possible.

Slide is a tool designed to solve this problem and works by iteratively refining roads, trails and other complex geometries to match another dataset, where the features are correctly mapped. In a single click one geometry is "slided" to the other, eliminating hundreds of tedious clicks.



The form of the new dataset is flexible. It could be an updated representation of roads such as the new TIGER database, a scanned historical paper map, or a large collection of GPS data points like the 250+ billion made available by Strava, a fitness tracking website.

Overall, Slide is designed to leverage what we already know, collected in various datasets, to speed map tracing. Map editors should be focusing on higher level challenges and not just retracing over another dataset.

15:00 – 15:25 • Room D139-140

MapServer Project Update – Introducing Version 7.0

Steve Lime

This session will begin with a status update for the MapServer project – current and future directions. Focus will then shift to the main features and enhancements coming in MapServer 7.0 including dynamic heatmaps, WFS 2.0 support, UTFGrid generation and more. Finally we'll finish with a discussion of contribution opportunities for interested developers and users.

This a great opportunity to chat with the members of the MapServer project team!

15:00 – 15:25 • Room D133-134

An Automated, Open Source Pipeline for Mass Production of 2 m/px DEMs from Commercial Stereo Imagery

David Shean

We have adapted the NASA Ames Stereo Pipeline (ASP) – a suite of automated, open source, command-line photogrammetry tools originally developed for NASA planetary missions – to process high-resolution stereo satellite imagery of the Earth. These tools are multithreaded, memory efficient and scalable, which enables processing of “big image data” (e.g., 16-bit panchromatic WorldView images with dimensions ~36000 x 460000 px).

We have deployed this pipeline on the NASA Pleiades supercomputer to generate ~2 m/px digital elevation models (DEMs) and ~0.5 m/px orthoimages for thousands of WorldView-1/2 along-track stereopairs. New ASP tools mitigate systematic DEM artifacts and allow for automated, a posteriori DEM coregistration using iterative closest point algorithms. When existing control data are available (e.g. LiDAR, GPS), automated alignment routines offer sub-meter horizontal and vertical DEM accuracy.

Our research applications focus on ice sheet dynamics in Greenland/Antarctica and ice/snow evolution in the Pacific Northwest. We have developed an additional collection of tools for DEM analysis, including utilities to produce maps of 3D surface displacement (velocity) vectors and eulerian/lagrangian elevation change. We present the following case studies to highlight the capabilities of these data and our open source workflow:

- -A 57+ DEM timeseries from 2008-2013 for Greenland’s most dynamic outlet glacier, revealing >40 m/yr interannual thinning and large seasonal variability
- Annual DEM mosaics that reveal the ongoing evolution of West Antarctica’s “weak underbelly”, an area roughly the size of New Mexico
- Repeat DEM timeseries for Mt. St. Helen’s showing volcanic dome growth, glacier advance, canopy height, fluvial erosion/deposition, and landslides.

For many applications, DEMs derived from high-resolution satellite imagery are comparable to those derived from airborne LiDAR data, with the advantage of global, on-demand tasking capabilities and reduced costs. Archived commercial stereo imagery is available at no cost to federal employees or federally-funded researchers, and the tools/methods highlighted here offer an automated, open source alternative to traditional, GUI-based, commercial photogrammetry software packages.

<https://github.com/NeoGeographyToolkit/StereoPipeline>



15:00 - 15:25 • Room D135

Open Web Mapping: An Educational Resource for Creating Online Maps Using Free and Open Source Software

Sterling Quinn, The Pennsylvania State University

Free and open source software (FOSS) for GIS continues to increase in functionality and usability, and offers a flexible and economic option for organization that want to create online maps; however, beginners face a broad array of software choices and may not know which FOSS products and packages to deploy in each tier of the web map architecture. Compounding the problem is the fact that much documentation for FOSS GIS is fragmented among these tier-specific products and does not provide end-to-end workflows for designing and publishing cartographic web services and assembling them into an online map product. In response to these needs, The Pennsylvania State University has introduced an open online course entitled Open Web Mapping. The course lessons explain the theory and architecture of web mapping, while walking beginners through the process of deploying online maps with FOSS. Software such as QGIS, GDAL, GeoServer, TileMill, and OpenLayers is introduced as students start from the data processing stage and work their way to the final display of interactive web service layers in a browser-based map. The course is intended as an open resource for the entire FOSS community; therefore, the lesson materials are freely accessible through a Creative Commons license.

15:00 - 15:25 • Room D136

GeoMOOSE at 10 Years

Dan Little

GeoMOOSE released its very first version in 2005. At nearly 10 years old the project has continued to hold on to its original developers and many of its foundation users. Over that lifespan the project has allowed the development team to observe struggles in changing technology, attitudes, and the dedication required to keep such an open source project relevant as it ages.

Nearly 10 years worth of dirty laundry will be aired! And a preview of GeoMOOSE 3.0 ideas! And slides with exclamation points!

15:00 - 15:25 • Room E141-142

PyWPS – 4 Project Report

Jachym Cepicky

PyWPS is one of the first implementations of OGC Web Processing Service (OGC WPS 1.0.0) on the server-side, using Python programming language. Since it's beginning in 2006 it was offering support for running scripts of GRASS GIS and other popular libraries, such as R, GDAL, Proj4 and other. Users of PyWPS can write their server-side geo-scripts and interface them on the internet using standard WPS interface.

During last two years, PyWPS development team was discussing new features, users would like to see in this popular OGC WPS Server implementation. Users were missing for example proper support for multiple in- and outputs, advanced logging, more natural serializing, possibility to store big data to external services. PyWPS was never validating properly input data, as long as underlying libraries were able to read them.

Also new versions of nearly everything are at hand – Python 3, GRASS GIS 7 with proper Python support, Fiona, Shapely, no need to write custom code, when OWSLib is around. New formats are now used for sharing of raster and vector data, for example Geo- and TopoJSON. They can be even validated, using json-schema. Python became The geo-scripting language since 2006 (now being slowly replaced by JavaScript).

Current work on PyWPS 4 is split into several fields: New WSGI interface was written, using Werkzeug. PyWPS has now new core for in- and output data structures (LiteralData and ComplexData). New IOHandler base object can seamlessly switch between file-, stream-like- and in-memory objects.



PyWPS - 4 contains validators of input complex data, which uses four-level of validation (None, mime-type based, "can read GDAL", schema validation) for XML-based format (like GML) but also for JSON-based formats (like GeoJSON). Literal data are validated on similar way.

We are going to support MapServer, Geoserver and QGIS MapServer in the future for output complex data management and serving. Data are going to be stored in storages (new abstract class defined), which currently is file system based by now, but can be extend to remote storage (such as FTP or e.g. Dropbox), or to database servers. Possibilities of WPS-T are discussed as well.

PyWPS - 4 will remain the old PyWPS, how our users do like it: small, fast to install and configure, fast to run. But with new features at hand, we will provide you with modern, safe, scalable tool, which you can use to interface the work of yours on the internet.

15:00 - 15:25 • Room E143-144

The Mapossum: A System for Creating, Collecting and Displaying Spatially-Referenced Answers to User-Contributed Questions

George Raber, The University of Southern Mississippi
James Dickens, The University of Southern Mississippi

This project, originally inspired by the pop vs soda maps (www.popvssoda.com) seeks to create a web application where any question can be asked and answered by anyone with internet access. The Mapossum allows users to visualize spatial patterns in the questions they wish to pose without the need to possess the knowledge necessary to create maps of their own. The application creates a spatial web-survey system that harnesses the visualization power of a web map to explore the spatial components of question. As a tool it has the ability to help users reveal a different dimension of spatial interactions, and provides more insight into cultural and regional interactions. To accomplish this we have created a framework that abstracts the creation of questions and the logging of spatially referenced responses so that the answers can be mapped as points, or aggregated at various levels of administrative or political units (counties, states, countries). The application utilizes PostGIS/PostgreSQL to store and manipulate the data for the questions, responses, and other spatial data needed to support the application. The information is served as Web Mercator tiles using Python and Mapnik. On the front end these tiles and other data are consumed using the Leaflet JavaScript library. Users have the ability to create questions and the possible responses to these questions, as well as query the responses. The presentation will discuss the framework in detail, and we will demonstrate the use of the application for various types of question - response collection scenarios. The application has potential to be used as a general data collection tool for those collecting data in the field. We are also seeking to include the ability to couple the process of both answering and visualizing responses with social networking sites. The Mapossum couples a web-survey system with the visualization power of a web map to explore questions that have a spatial component to them as so many questions do.

15:00 - 15:25 • Room E145

A GeoNode Primer

Tyler Garner

GeoNode is a web-based extendable platform for the management and publication of geospatial data. It brings together mature and stable open-source software projects under a consistent and easy-to-use interface allowing users, with little training, to quickly and easily share data and create interactive maps. This talk will be a high-level overview, suitable for new users, of the application's functionality including examples of the creative ways organizations are using GeoNode. This talk will also cover new functionality being added in the 2.1 release and the status of that release.



15:30 - 15:55 • Room D137-138

Fixing GIS Data Discovery

Jack Reed

Discovery of GIS data is broken. It is overly complicated and incomplete. Organizations spend time and money on creation and acquisition of data, yet it sits on hard drives, dvd's, and shelves without a straightforward way for others to discover it. Discovery tools that do exist have usability issues which alienate users and prevent wide adoption. Too often, data discovery is an afterthought, grafted onto tools that have been designed for analysis, or treated as one feature among many in a map portal. Thus these tools attempt to serve every possible user need and in the process become unusable. Simply put, we need an application which enables discovery of GIS data with an emphasis on user experience, integrates seamlessly with other tools, and streamlines the use and organization of geospatial data.

We present GeoBlacklight, a collaboratively designed and developed open source software focused on discovery use cases. The project builds on existing, widely adopted open source projects. GeoBlacklight fills the gap in discovery tools for geospatial data by providing a simple, yet powerful intuitive interface. To reach this goal, Stanford University embarked upon a comprehensive design process. Our process includes an environmental scan, stakeholder interviews, user interviews, inter-institutional collaboration, and rapid prototyping. We will present the user personas that have been distilled from our interviews, the user stories and feature prioritization process these inform, and prototypes of the software we have developed so far, as well as plans for future development.

15:30 - 15:55 • Room D139-140

MapServer #ProTips

Michael Smith

MapServer is a fast, flexible and extremely powerful tool for creating dynamic maps for the Web. Underneath the hood, MapServer offers many powerful and advanced features that many users never dig into, and new features are being added constantly. Come learn about some of the more advanced features of MapServer, from heat maps to 3D WFS services to exporting data to GDAL file formats to very complex symbology and labeling. Learn simple and advanced use cases and debugging techniques for some of these advanced features from two presenters with over 20 years combined experience of using MapServer. A live MapServer instance will be used during this presentation (yes we are crazy!).

15:30 - 15:55 • Room D133-134

Case Study of Brazilian Institute of Environment and Renewable Natural Resources with FOSS GIS

Marcelo Soares Souza, Hex - Tecnologias Geospaciais Inovadoras

This proposition is a case study who aims to demonstrate and discuss the adoption and development of FOSS GIS tools and open standards at Brazilian Institute of Environment and Renewable Natural Resources (IBAMA) in the Remote Sensing Center (RSC) who is responsible for collecting, analysis and distributing of GIS data of brazilian biomes (Amazônia, Cerrado, Mata Atlntica, Caatinga, Pampa, Pantanal and Manguetal), using FOSS tools like Quantum GIS, PostgreSQL/PostGIS, GeoServer, pgRouting, OGR/GDAL, Leaflet.JS, OSM and others.

In recent years FOSS GIS has become an important part of brazilian enviromental conservancy system.

Working with FOSS and open standards, the Remote Sensing Center at IBAMA is developing tools to help conservation of the environment and brazilian forests. Systems like the Emergency Environmental System (EES), which helps to identify and warn about environmental disasters.

Other systems, in development at Remote Sensing Center at IBAMA, using a large open database of geospatial data, shows data on deforestation in the major biomes in Brazil in real time.



In 2014, the Remote Sensing Center team began collaborating with others projects, giving back contributions to the FOSS community. With source code, bug reports, translations, and mostly with free and open data about brazilian enviroment and Natural Resources.

15:30 - 15:55 • Room D135

An Easy Web Mapping Framework

Martin Davis

Browser technologies such as HTML, JavaScript and CSS have matured to a point where they can be used to develop sophisticated applications. Spatial JavaScript libraries such as OpenLayers, JSTS and D3 supply great capability for implementing mapping and graphing applications. Complex geo-processing functions such as geocoding, routing and surface analysis can now be accessed easily via REST API's. These technologies provide a powerful set of tools for building the next generation of client-side web mapping applications. But this tool set is complex, and requires significant effort in UI design to make it accessible to users. The BC Government Natural Resource Sector (NRS) deploys over a hundred web mapping applications. Implementing these applications using one-off designs would be prohibitively costly in development, support and training. This talk discusses the development of a Common Web Mapping framework based on OpenLayers 2, which uses the power of modern browser technology to provide a fast and easy way to build web mapping applications.

15:30 - 15:55 • Room D136

Disparate Data, Technology Fiefdoms and 65 Pictures of Your Cat

Will cadell, sparkgeo.com

Up in the frozen wastes of the Northern British Columbia, we organized a hackathon. We based it on the ideas of open data and civic applications.

Our hardy hackathoners pulled together a number of excellent ideas but met with a constant and obtrusive barrier: that open data maybe open but with out some level of standardization its not actually very useful.

Now, no one said that data had to be 'useful', and perhaps if we want the technology utopia of real open data interoperability we will need to "build it" ourselves, but it is worth noting that talking the same language as our neighbours is generally awesome. Indeed, perhaps rather than swearing fealty to our technology overlords and just pressing the "publish document to open data platform" button, we could think about the commonwealth of data. The value of any data increases wildly with density and open data should be more valuable!

The cats? Well you'll have to tune in for that bit.

15:30 - 15:55 • Room E141-142

ZOO-Project 1.4.0: News About the Open WPS Platform

Gérald Fenoy, GeoLabs SARL

ZOO-Project is an Open Source Implementation of the OGC Web Processing Service (WPS), it was released under a MIT/X-11 style license and is currently in incubation at OSGeo. It provides a WPS compliant developer-friendly framework to easilly create and chain WPS Web services. This talk give a brief overview of the platform and summarize new capabilities and enhancement available in the 1.4.0 release.

A brief introduction to WPS and a summary of the Open Source project history with its direct link with FOSS4G will be presented. Then an overview of the ZOO-Project will serve to introduce new functionalities and concepts available in the 1.4.0 release and highlight their interrests for applications developers and users. Then, examples of concrete services chain use will illustrate the way



ZOO-Project can be used to build complete applications in a flexible way by using the service chain concept, creating new service by implementing intelligent chain of service through ZOO-API but also by taking advantage of the publication using OGC standards. Various use of OSGeo softwares, such as GDAL, GEOS, PostGIS, pgRouting, as WPS services through the ZOO-Project will be illustrated by applications presentation.

15:30 - 15:55 • Room E143-144

The DiscoverTotems Project: Social Curation with Mapping

Diane Mueller

I will discuss what we learned when we built an online mapping community for Native & non-Native youth, educators and community leaders. Our Pacific Northwest First Nations Totem Poles program teaches community members to collect, create, map, and curate content using mobile devices and an easily configurable content management system.

Social curation helps our First Nation participants preserve their culture, language, arts, and writing by engaging participants across generations. Because how content is collected is just as important as the content itself, the program leverages social curation to build communities to harness social media and create “digital repositories” of cultural knowledge.

Geographic data is a key social and technical component of the project — participants use GPS-enabled devices to ‘tag’ the locations of totem poles and to associate photographs and histories collected and written by the participants. The data is then assembled into both event-specific private websites accessible only to participants with the ability to push content to a public website - DiscoverTotems.com. The project is designed to be easily is designed to be re-deployed for different semesters in educational settings by non-technical event facilitators. Think “hack-a-thons for totem pole trackers!”

In addition to describing the lessons learned, I will also cover issues in Privacy, Copyright, Security of Online Content, and how we leveraged Open Source Geospatial & Cloud technologies to scale and manage our new “digital repositories.”

16:00 - 16:25 • Room D137-138

Building Development Environments Using Vagrant

Mikael Blomberg, SC5 Online Ltd

During Oskari.org development we noticed releases usually where delayed due to environment differences. Our desktop and server environments are quite different. We believe there should be no differences between the production and development environments. In our research we discovered Vagrant, which utilizes Virtualbox for creating virtual environments. It was a perfect solution and we wondered into the world of DevOps. We noticed our lack of automation and began our search for a good Configuration Management tool. Our research showed many promising alternatives and we ended up choosing Ansible. Armed with Vagrant and Ansible we began to automate our development environment in a reproducible way. This talk is about our journey into DevOps and why you should join us!

16:00 - 16:25 • Room D139-140

MapCache: Overview of MapServer’s Tile Caching Server

Thomas Bonfort

MapCache is the MapServer project’s implementation of a tile caching server. It aims to be simple to install and configure, to be (very) fast (written in C and running as a native module under apache or nginx, or as a standalone fastcgi instance), and to be capable (services WMTS, googlemaps, virtualearth, KML, TMS, WMS). When acting as a WMS server, it will also respond to untiled GetMap requests, by dynamically merging multiple layers into a single image, and multiple tiles into an



arbitrary image size. Multiple cache backends are included, allowing tiles to be stored and retrieved from file based databases (sqlite, mbtiles, berkeley-db), memcached instances, cloud REST containers (S3, Azure, Google Cloud Storage), or even directly from tiled TIFF files. Support of dimensions allows storing multiple versions of a tileset (e.g. one per customer), and time based requests can be dynamically served by interpreting and reassembling entries matching the requested time interval. MapCache can also be used to transparently speedup existing WMS instances, by intercepting get-map requests that can be served by tiles, and proxying all other requests to the original WMS server. Along with an overview of MapCache's functionalities, this presentation will also address real-world usecases and recommended configurations.

16:00 - 16:25 • Room D133-134

Exposing NASA's Earth Observations

Ryan Boller, NASA
Mike McGann, Columbus Technologies and Services

The satellites which comprise NASA's Earth Observing System (EOS) have a long history of capturing rich datasets with global coverage over extended periods of time. While the data itself is rich (and open!), it can be a daunting task for uninitiated users to find suitable datasets, learn the data format, and subsequently find interesting phenomena. Even for those who are familiar with the data, it can be a time consuming process. But thanks to the proliferation and maturity of open source geospatial software, NASA has been able to build an imagery ingest pipeline, open source tiled imagery server, and open source, web-based mapping client to encourage exploration and discovery of NASA datasets. This talk will describe how NASA is building these capabilities through the Global Imagery Browse Services (GIBS) and Worldview client, demonstrate how others are building upon them, and show what it takes to integrate NASA imagery into clients using the GIBS API.

16:00 - 16:25 • Room D135

A User-centered Design for Interactive Masking Capability within Web GIS

John Morgan, UNC Asheville's NEMAC

This presentation will discuss the design of interactive raster masking capability for a web-based geographic information system (Web GIS) from the perspective of user-centered design. A case study will be presented by analyzing and discussing specific aspects of the user-developer dialog within the context of the software development life cycle.

The presented case study will take the audience through the development of an open-source Web GIS software architecture (MapServer, PostGIS and OpenLayers) with particular focus on how the masking functionality was designed and implemented. Software engineering techniques informed by iterative cognitive walkthrough allowed for a dialog between Web GIS production and consumption that led to a more usable and useful cartographic interface. Key findings from this case study will be presented.

16:00 - 16:25 • Room D136

Quadcopter GIS For Less Than \$700 – Hardware and Software to Map Your Local Community

Aaron Racicot

Quadcopter - Phantom FC40 (\$500). Camera - Canon PowerShot ELPH 130 IS 16.0 MP (\$110). Opportunity to engage your local community to produce open data - priceless.

Let's get to the point. Let's talk about hardware and software to get out there and actually map some stuff with a quadcopter. This is the story of my adventures hacking with a Phantom quadcopter over the last 10 months to make local maps... and of course have fun. The only rules... it has to be cheap and the software has to be open source.



We will go through the hardware, including purchasing, setting up, and flying the quadcopter. The camera is hacked with CHDK and strapped on the quadcopter with some velcro to a vibration dampener cut up with a dremel tool. The processing software is a pain to install, but we will talk through it including software options, how to get your processing off loaded to your video card GPU, and how we as a community can make all this easier in the future. Finally, we will look at what you can actually make... including mosaics, 3d models, and DEM's of your local community.

Quadcopters are cheap, fun, and amazing for engaging your local community to produce open data. Let's do it!

16:00 - 16:25 • Room E141-142

Easy ETL with OGR

Pirmin Kalberer, Sourcepole AG

The ogrtools Python library lets you run complex ogr2ogr operations defined in a configuration file supporting transformations of all OGR vector formats. It uses the OGR Virtual Format (VRT) internally for transformations like renaming tables or columns, calculating values and converting data types. Since version 1.11 of GDAL/OGR, multiple geometry columns per table are fully supported for major data formats. As a pure Python library using OGR Python bindings, it has no additional dependencies and is therefore easy to integrate in other applications like QGIS.

<https://github.com/sourcepole/ogrtools>

16:00 - 16:25 • Room E143-144

MapStory: The Next Plateau

Ian Schneider

MapStory.org is a community-driven open educational resource that lets people share and peer review observations about how the world evolves over time and space. It's built on an open source geospatial stack (PostGIS, GeoServer, OpenLayers, GeoNode) and aims to empower both authoritative and public participation in data collection, peer review, and storytelling. We want to use this session to debut a "new plateau" for MapStory that includes an updated user interface with new features, namely integration of GeoGit 'crowdediting' of data and XYT frames for MapStories (what we call StoryBoxes).



FRIDAY – SESSION 1

10:00 – 10:25

10:30 – 10:55

11:00 – 11:25

INVITED TALK

PORTLAND BALLROOM

State of GeoServer and GeoTools 2014

Jody Garnett, Boundless
 Andrea Aime, GeoSolutions
 Justin Deolivera, Boundless

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TRACK 1

ROOM D137-138

Connected Cars with PouchDB
 Norman Barker

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GeoCouch: A Distributed
 Multidimensional Index
 Volker Mische, Couchbase

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Faster and More Accurate
 Polygon Queries in Lucene
 Spatial
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10:00 - 11:00 • *Portland Ballroom*

State of GeoServer and GeoTools 2014

Jody Garnett, Boundless
Andrea Aime, GeoSolutions
Justin Deolivera, Boundless

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GeoServer and the Java toolkit GeoTools comprise one of OSGeo's fastest moving mapping ecosystems. In addition to this core we will cover java-stack developments in JTS, GeoWebCache and ImageIO-Ext.

First up is "State of GeoServer" reviewing the new and noteworthy features introduced in the past year. Our six month release cycle sees GeoServer 2.5 and 2.6 being released this year. These releases bring together exciting new features: WCS 2.0 and WCS 2.0 Earth Observation profile, batch importer, and a fresh implementation of GetFeatureInfo.

Switching to technical for a GeoTools update. A passion for performance sees improvements in PNG and JPEG encoding, rendering from PostGIS and experimental JDK work. This presentation provides a review of new features, api changes and community modules. We have simplified the core FeatureCollection interface, introduced partial 3D support, structured grid coverages, multiple grid coverages and extended JTS Geometry with Curves.

Data formats support continues to grow with the latest GeoPackage, native NetCDF support and a new shapefile and wfs client implementation. Database users have table and index management methods to look forward to. Extensions have seen a lot of activity with WMS client improvements, vector grids, and a transform extension for dynamic feature collection processing.

Attend this talk for a cheerful update on what is happening with these great OSGeo projects! Whether you are an expert user, a developer, or simply curious what these projects can do for you, this talk is for you.

10:00 - 10:25 • *Room D137-138*

Connected Cars with PouchDB

Norman Barker

Connected cars are everywhere and writing apps for connected cars is an emerging space. OpenXC is an open JSON data API for Ford cars that enables developers to write custom apps for telemetry data in real time, this includes geographic location.

Bandwidth and connectivity in a car is limited however and as such an app needs to be written to be offline first.

This talk discusses the difficulties of connected cars and how to overcome this big data problem with PouchDB, CouchDB, Leaflet and Google Chrome Applications.

10:00 - 10:25 • *Room D139-140*

Server-Side Marker Clustering For Rapid Display of Large Datasets

Eric Ingbar

What happens when you try to give map users a rich display with thousands of points in a web browser? Generally, one of two things occurs. One, the map looks like a carpet of marker symbols. Two, depending on device and bandwidth, a browser-side clustering algorithm can delay the display for an agonizingly long time.

The problem is acute in dynamic map systems where automated processes or users generate content because the system architects cannot know in advance how many map entities will be created. Think of mapping tweets, potholes in a major city, or locations of coffee places in Portland - map displays have to show dense data effectively.

FRIDAY



Our presentation shows how a Leaflet plug-in is used on a node.js server to solve this problem. We will demonstrate how the Leaflet.markercluster plug-in is used to generate clusters. Once generated, the clusters are stored in MongoDB and retrieved using a MongoDB geospatial index.

10:00 – 10:25 • Room D133-134

GeoTools, GeoServer, GeoGit: A Case Study of Use in Utility Field Work

Peter Hansen

After creating a custom application featuring ArcSDE and the ESRI Mobile SDK for use by the field crew from a local Mosquito and Vector Abatement District, we sought an alternative to the high overhead from the proprietary software. By utilizing GeoTools, GeoServer, and GeoGit, we were able to develop a full-fledged application maintaining the same functionality and usability of the original application, without the high cost of entry.

The GeoTools application, “Mosquito,” and GeoServer, were placed on each of the field laptops of the twenty-member crew, serving both the application and cached base layers to allow for offline data connection. A USB Bluetooth GPS dongle was used to allow workers to locate themselves within the application. GeoGit was utilized to allow the disparate field workers to merge and synchronize data to the master database at the end of their shift.

10:00 – 10:25 • Room D135

Automated Vehicle Location (AVL)

Bob Basques

Using OpenLayers and GeoMoose web clients, MapServer and the PostgreSQL/PostGIS database packages, we’ve built a live view for our Automated Vehicle Locating (AVL) system, as well as custom geographic reporting tools. This talk will cover why we chose to build our own web viewer instead of using a commercial package, and reasons to use the existing Open Source web viewers. We’ll also show how the feed from the commercial AVL vendor was translated into the Postgres database in order to build out a smooth end user experience. There will also be discussion on standards for the database tables and records in order to make the system plug and play for others interested in customizing a live AVL web viewer on their own. Some production services will be demonstrated in a live view mode.

10:00 – 10:25 • Room D136

3D-Printing with GRASS GIS – A Work in Progress in Report

Peter Loewe, German National Library for Science and Technology

As the amount of scientific data continues to grow, researchers need new tools to help them visualize complex data. Immersive data-visualisations are helpful, yet fail to provide tactile feedback and sensory feedback on spatial orientation, as provided from tangible objects.

The production of a tangible representation of a scientific data set is one step in a line of scientific thinking, leading from the physical world into scientific reasoning and back: The process starts with a physical observation, or from a data stream generated by an environmental sensor. This data stream is turned into a geo-referenced data set. This data is turned into a volume representation which is converted into command sequences for the printing device, leading to the creation of a 3D printout via additive manufacturing (“3D-printing”). As a last, but crucial step, this new object has to be documented and linked to the associated metadata, and curated in long term repositories to preserve its scientific meaning and context.

This presentation showcases a reference workflow to produce tangible 3D data-prints based on Free and Open Source Software (FOSS), using both GRASS GIS and Paraview. The workflow was successfully validated in various application scenarios using a RapMan printer to create 3D



specimens of elevation models, geological underground models, ice penetrating radar soundings for planetology, and space time stacks for Tsunami model quality assessment.

10:00 - 10:25 • Room E141-142

Cartography From Code...?

Barend Köbben, ITC-University Twente

Nowadays we see, specifically on the Web, maps that are interactive, creative, as well as beautiful and effective. And more and more these maps are no longer “drawn”, by hand or computer, but “coded”. Programmed.

In this talk we show that with modern programming tools, such as the popular D3 API, the results can be as good or better, even to the most discerning cartographer. And we discuss the question “can programmers be cartographers, or should cartographers become programmers...?”

10:00 - 10:25 • Room E143-144

Regional Conservation Strategy Viewer

Greg Allensworth, GreenInfo Network

Tommy Albo, Portland Metro

The Intertwine Alliance has formed a Regional Conservation Strategy (RCS) for the area surrounding Portland, Oregon. The goal of the RCS is to guide the development by providing a high-resolution model of habitat valuation and land cover.

The RCS Viewer allows website visitors to access and visualize high-value habitat and land cover, without specialized GIS knowledge or tools. By selecting, uploading, or drawing an area of interest, the user can bring up a feature-rich summary of habitat valuation and land cover.

This presentation covers some uses of the RCS Viewer of interest to conservation-concerned planners in the area, as well as some technical details of interest to developers.

10:00 - 10:25 • Room E145

MapMint: The 100% Service-Oriented GIS Platform

Nicolas Bozon

MapMint is an comprehensive task manager for publishing webmapping applications. It is a robust open source geospatial platform allowing the user to organize, edit, process and publish spatial data to the Internet. MapMint includes a complete administration tool for MapServer and a simple user interfaces to create mapfiles visually. Its use does not require any coding and most of the mapfile parameters are supported, so the user can fully focus on the map features and not on its source code. The latter is generated using various WPS requests which are using the user’s data and settings as input.

MapMint is based on the extensive use of OGC standards and automates WMS, WFS, WMT-S and WPS. Most of the MapMint core functions are run through WPS requests which are calling general or geospatial web services (vector and raster operations, mapfiles creation, spatial analysis and queries and much more). MapMint server-side is built on top of ZOO-Project, MapServer and GDAL and its numerous WPS services are written in Python and JavaScript. MapMint client-side is based on OpenLayers and JQuery and provides user-friendly to create, publish and view maps.

MapMint architecture and main features will be introduced in this presentation, and its modules (dashboard, data, maps and apps) will be described with an emphasis on the OGC standards and OSGeo software they are using. Some short case studies and examples will finally illustrate some of the key functionalities.



10:30 - 10:55 • Room D137-138

GeoCouch: A Distributed Multidimensional Index

Volker Mische, Couchbase

This talk is about GeoCouch, a spatial extension for Couchbase and Apache CouchDB. I will give a quick introduction into Couchbase and Apache CouchDB and why they might be the ideal databases for solving your problem.

With GeoCouch it is not only possible to query your spatial data, but also your spatio-temporal, or even higher dimensions. For example you might want to find all parking lots within a certain area that offer free parking from 3-4 pm and have at least space for 100 cars.

GeoCouch, Apache CouchDB and Couchbase are licensed under the Apache 2.0 License.

10:30 - 10:55 • Room D139-140

Js.Geo Part Deux Recap

Steven Pousty, Redhat

For those of you sad pandas who couldn't make JS.geo on Tuesday, we will give a quick intro as to why scheduling was so hard this year, a quick tour of some of the amazing demos, highlights of the discussion from the day, and wrap up with what we would like to do to see it go smoother next year. Be there or be square (actually all that would happen is you would miss out on the coolest tech demo'ed at FOSS4G)!

10:30 - 10:55 • Room D133-134

Distributed Versioned Editing in Action

Scott Clark

The concept of distributed versioned editing has been instantiated as GeoGit (<http://geogit.org>). This talk is about the practical application of both the concept and the software to empower people to collaboratively develop geospatial information in distributed and sometimes disconnected environments.

The ROGUE team used GeoNode, GeoGit, and the OpenGeo Suite to provide a collaborative editing environment that maintains provenance of the data. The discussion will include an overview of how the technology is being used operationally in Honduras and for risk assessment and response. What worked, what didn't, and where can we take this next. I'll give you my opinion and I'd love to hear yours.

10:30 - 10:55 • Room D135

Writing Better PostGIS Queries

Regina Obe, Paragon Corporation

This presentation will demonstrate ways to take most advantage of spatial indexes, SQL constructs, and PostGIS specific functions. For these exercises we'll be using PostGIS 2.1+ and PostgreSQL 9.3+ . We'll demonstrate common cases people often do inefficiently.

This presentation demonstrates the following:

- Various SQL constructs including ANTI join, LEFT, RIGHT, EXISTS, LATERAL, CASE clauses, aggregates
- What common table expressions (CTEs) are and when to and when not to use them
- We'll demonstrate these concepts in use in a couple of common spatial query problems - e.g. proximity analysis (both geometry and geography), raster analysis and generation, aggregation of data based on various attributes, other correlation queries.



10:30 – 10:55 • Room D136

OpenDroneMap

Stephen Mather, Cleveland Metroparks

Aimed at developers and end-users, this presentation will cover the current state-of-the-art of OpenDroneMap, toolkit of FOSS computer vision tools aiming to be easy to use for referencing unstructured photos into geography data (colorized point clouds, referenced photos, orthophotos, surface models and more), whether the images be sourced from street level photos, building interiors, or from sUASs (drones).

Currently no such comprehensive FOSS toolkit exists and is easy to use and install. ODM aims to fill this gap.

10:30 – 10:55 • Room E141-142

Advanced CartoCSS Techniques

Kate Watkins, Stamen Design

Alan McConchie

Seth Fitzsimmons

CartoCSS is becoming an ever more popular — and ever more powerful — tool for cartographic and data styling. In this talk, Stamen designers and technologists will present some tips and tricks to make your next design sing. Tips and tricks covered include, but will not be limited to: pixelation, use of dingbat fonts for texture and markers, post-facto label adjustment, alternate uses for text symbolization, where to find and use entropy, blending, and geometry manipulation.

10:30 – 10:55 • Room E143-144

EarthExplorer – On-line Search Tool for USGS Remote Sensing Data

Tim Mentele, SGT Inc.

The EarthExplorer (EarthExplorer.usgs.gov) system provides on-line search, order, browse and download of Landsat, aerial, LiDAR, and a multitude of other earth science data in support of the United States Geological Survey (USGS), Earth Resources Observation and Science (EROS) Center. Last year, the launch of the Landsat 8 satellite has provided over 200,000 additional scenes to the historical Landsat archive. EarthExplorer was developed to provide a fast, easy to use search engine to allow scientist and general users the ability to search and download data over their area of interest.

The EarthExplorer user interface uses open source JavaScript libraries, PHP: Hypertext Preprocessor (PHP), Cascading Style Sheets, and the Google Map API.

Some of the key features of EarthExplorer include:

- Fast, geospatial search engine
- Map viewer for viewing overlay footprints and browse overlays
- Simple, fast Graphical User Interface (GUI)
- Data access tool to search and discover data
- Textual query capability
- Keyhole Markup Language (KML) export capability to interface with Google Earth
- Save or export queries, results, and map overlay for reuse
- Request on-demand products
- Access to browse images from standard products
- User authentication service for access to specialized datasets and tools
- Access to Landsat Data Continuity Mission (LDCM) quality band data
- Standard product downloads
- On-Demand Web Mapping Services
- User notifications of new acquisitions and available products through subscription services



In addition the Bulk Download Application provides a simple tool for users to obtain large quantities of data without user interaction. Together with the EarthExplorer interface, user are able to obtain large amounts of data from the EROS archives.

11:00 – 11:25 • Room D137-138

Faster and More Accurate Polygon Queries in Lucene Spatial

Jeffrey Gerard, The Climate Corporation
David Smiley

Lucene, and the NoSQL stores that leverage it, support storage and searching of polygonal records. However the spatial index implementation traditionally has returned false matches to spatial queries.

We have contributed a new spatial indexing strategy to Lucene Spatial that returns fully accurate results (i.e. exact matches only).

Better still, this new spatial search strategy often enables keeping a smaller index and and faster retrieval of results.

I will illustrate why false matches happen -- this requires a high-level walkthrough of spatial index trees -- and real world cases where it makes a difference.

Our initial workaround was to query Elasticsearch through a separate server layer that post-filters Elasticsearch results against the query shape, removing the false matches.

We've now built a similar approach into Lucene Spatial itself. By virtue of living inside, this new solution can take advantage of numerous efficiencies:

- it filters away false matches before fetching their document contents;
- it uses a binary serialization that is far faster than the GeoJSON we used before; and
- it optimizes the tradeoff between work done in the index tree vs. post-filtering, often resulting in a smaller index and faster querying. I will provide benchmark numbers.

I'll illustrate how developers and database administrators can use this improvement in their own databases (it's easy!).

11:00 – 11:25 • Room D139-140

Terraformer – Open Source Geometry in Your Browser and Node.js

Jerry Sievert, Esri

Terraformer is an Open Source geometry engine built to run in the browser and on the server. It is built with open standards first (GeoJSON), and includes the ability to work with ArcGIS JSON and Well Known Text.

Terraformer includes the ability to work with geometry, as well as build Geo-Enabled databases with its GeoStore. <http://terraformer.io/>

11:00 – 11:25 • Room D133-134

Open Source, Open Standards and 50 Lines of Code: A Look Behind GitHub's GeoJSON Rendering and Diffing

Ben Balter, GitHub

Last June, GitHub announced support for GeoJSON rendering — just commit and you have a versioned, open-source map. Six months later, visual GeoJSON diffing followed suit. Since then, GitHub hosts hundreds of thousands of GeoJSON files, has served millions of maps, and has diffed tens of thousands of changes, both proposed and realized. Why GeoJSON? Why Leaflet? Why open-



streetmap? We'll take a look at both the technical how, and the philosophical why, and pull back the curtain on GitHub's recent venture into the world of GIS.

11:00 - 11:25 • Room D135

GIS Goes 3D: An OpenSource Stack

Olivier Courtin

3D in GIS is already here, with more and more data available, and new hardware and sensors for 3D data capture and interaction. The third dimension becomes useful for several use cases and applications, since the technology is now available to achieve full 3D spatial analysis, like 3D intersections, 3D buffers, triangulation and a lot of other data processing capabilities we already use with 2D data. 3D Point clouds from Lidar data, 3D Meshes or TIN, this can now be stored and processed.

With 3D data, an absolute must-have is a nice, fast and smooth rendering of features. Visualization is a key element of a complete vertical software stack of 3D data management.

This presentation will demonstrate the ability to setup and take advantage of a full FOSS4G 3D stack. Taking data from 3D sensors, or real use-case GIS Open Data, we present the components which can be used together to build the core infrastructure of 3D data management. From data storage to data visualization, through processing and webservice.

- Learn how you can use PostgreSQL and PostGIS latest enhancement to store and process 3D data.
- Discover how you can setup 3D Web Services for data dissemination
- Visualize 3D data with QGIS thanks to the Horao Plugin
- Find out the visualization tools available for your favorite browser (Three.js powered)

Here we are, a full 3D stack, with OpenSource tools. Software components, data formats, protocols and standards, you will get a global picture of the infrastructure available to extract the value out of your 3D data.

11:00 - 11:25 • Room D136

Hardware Hacking: Make Your Own GPS/Sensor Logging Devices

Michael Juvrud

An introductory look at how to build and program your own custom GPS receiver or other field sensor logging devices using open source hardware and software.

As a practical example, we will walk through an Arduino-based, GPS data logger that has been assembled from open hardware components and uses a variety of sensors. In addition to hardware/sensor discussion, the presentation will cover the programming concepts involved in capturing, displaying, and logging data from multiple sensors.

No electronics knowledge is required, as we will focus on Arduino compatible components that most makers with a little programming knowledge can begin hacking together.

11:00 - 11:25 • Room E141-142

The Unrelenting Progress of Design in Open Source

Sergio Leiva, CartoDB

Open source geospatial is in an Enlightenment era regarding design; many teams are breaking away from tradition and embracing simple, clean, and usable interfaces. For a long time though, open source geospatial software, and geospatial software in general, seemed to pay little attention to the knowledge of the design community. Here, I will discuss why design has taken a backseat for such a long history and what is suddenly changing that brings it to the forefront. I will also talk some about



the design decisions that have gone into the CartoDB user interface and many of the mapping options we help our users find. This talk will focus both on the history of design in open source geospatial software and where it is heading in the future. We will also talk about how design itself is inherently open and how we are working to improve open source software design through our own contributions and through this discussion of our process.

11:00 - 11:25 • Room E143-144

Local Ecological Footprinting Tool (LEFT)

Peter Long, University of Oxford

LEFT is a free to use, web-based decision support tool originally developed to aid industry in evaluating the pattern of relative ecological value across a landscape to inform their planning of land use in order to minimize the environmental impact of their operations. A user defines an area of interest anywhere globally using a web-based map and the tool then automatically processes a series of high-quality datasets using standard published algorithms to produce maps at 300m resolution of landcover class, numbers of globally threatened terrestrial vertebrate and plant species, beta-diversity of terrestrial vertebrates and plants, habitat fragmentation, wetland habitat connectivity, numbers of migratory species and vegetation resilience. These results are aggregated to produce a single map of relative ecological value. The tool then generates a customised pdf report and a zip file of GIS data for the area requested. Results are delivered to users by email within a few minutes of job submission. This tool has been designed to be highly intuitive to use, and requires no specialized software or user expertise: novice users can submit an analysis within a few minutes and get results which can inform business decisions. www.biodiversity.ox.ac.uk/left

13:00 - 14:00 • Portland Ballroom

PostGIS Feature Frenzy

Paul Ramsey

PostGIS has over 300 functions, which in turn can be used with the many features of the underlying PostgreSQL database. This talk covers some basic and not-so-basic ways to use PostGIS/PostgreSQL to process spatial data, to build infrastructures, and to do crazy things with data. Consider the possibilities: raster, topology, linear referencing, history tracking, web services, overlays, unions, joins, constraints, replication, json, xml, and more!

13:00 - 13:25 • Room D137-138

Introduction to the Geospatial Goodies in Elasticsearch

Simon Hope, Geoplex
Jerome Anthony, Geoplex

In this session we'll introduce how you can work with spatial data in Elasticsearch — The Open Source, distributed, RESTful Search Engine. We'll provide a general introduction on how to index spatial data into Elasticsearch, then cover off on using spatial query and filters, before finishing up showing you how you can visualise and interact with spatial data stored in Elasticsearch using Kibana.

13:00 - 13:25 • Room D139-140

Dynamic Mapping on the Web: Building a Scalable Service for Thousands of Companies

Javier Santana, CartoDB
Alejandro Martinez, CartoDB

At CartoDB is an open source stack that includes PostgreSQL, PostGIS, Mapnik and Leaflet. The hosted version enables thousands of users to make new and interesting maps everyday. With



some of those users including Al Jazeera America, Twitter, and even online gaming platforms, we aren't scaling for one popular webpage but for thousands of different ones each day. On top of that, maps aren't constrained to a single filter, single style, or to a predefined zoom, CartoDB allows users to access the full power of a dynamic database from the front end. In this talk, I'll present the architecture decisions we have implemented that make it possible to turn PostgreSQL and PostGIS into components of a powerful real-time data visualization tool. These decisions cut straight through the CartoDB software stack, from PostgreSQL and PostGIS through our caching and tile services, and up through to our CartoDB.js library. We'll talk about our on-demand tiling service, our caching strategy, and our implementation of the novel data format for Torque. Each of these areas has enabled our users to make use of entirely open source tools to create maps and services that scale, remain fast, and are beautiful.

13:00 - 13:25 • Room D133-134

MapLoom: A New Web-client With Versioned Editing (GeoGit) Integration

Syrus Mesdaghi, LMN Solutions/NSP-Noblis
Tyler Garner, LMN Solutions/NSP-Noblis

The need for a user-friendly web-client that enabled effective geospatial data collection, sharing, and collaboration for the ROGUE project motivated us to move away from our GeoExplorer based web-client. Our new web-client, MapLoom, is based on OpenLayers3, AngularJS, and Bootstrap which addresses key shortcomings of GeoExplorer and provides an intuitive and simple interface for performing complex GeoGit operations. The capabilities include per feature and layer history, viewing difference between revisions, merging, conflict resolution, and synchronizing with multiple remotes through the UI. The ability to synchronize a repository with multiple remotes is just one of the reasons why development of GeoGit was the solution to our needs. GeoGit allows distributed versioned editing of geospatial data at a feature level and allows the repositories to be synchronized even in disconnected or reduced connectivity environments. This talk will cover our experience developing the web-client as well as highlight the use of GeoGit.

13:00 - 13:25 • Room D135

The State of Geospatial WebGL in the Browser

Brian Jacobs

With browser adoption of WebGL on the rise, developers can start to reap the benefits of GPU-assisted rendering and 3D graphics. The WebGL API has a notoriously steep learning curve, but there are a number of open-source projects to accelerate getting geospatial data visualized.

I'll compare the pros and cons of developing geospatial applications using native WebGL verses general-use and geospatial-specific WebGL javascript libraries. Some libraries include three.js, lightgl, PhiloGL, CesiumJS, OpenWebGlobe, and OpenLayers 3. The use of WebGL also has benefits beyond 3D visualization. I'll also talk about how we can leverage better performance out of 2D or 2.5D maps by using a WebGL renderer through my experience developing a web-based urban data processing and visualization framework.

I'll go over the types of 3D data visualization, from globes, to abstract 3D representations, to 3D modeling, and whether any of this works within mobile devices.

The use of 3D maps will also be considered from a data-driven and user-centered design and cartography perspective--their inclusion should consider whether the user and data actually benefit from expressing geospatial dimensions. I'll address some common geospatial pitfalls, from 3D to 2D, and when maps can hurt more than help, through real-world examples.



13:00 - 13:25 • Room D136

GIS-based Modeling with Tangible Interaction

Anna Petrasova, Department of Marine, Earth and Atmospheric Sciences, NC State Univ.
 Brendan Harmon, College of Design, NC State University
 Helena Mitsova, Department of Marine, Earth and Atmospheric Sciences, NC State Univ.

We present advances in the development of TanGeoMS, tangible geospatial modeling and visualization system. By coupling a physical three-dimensional landscape model, Kinect scanner, projector, and open source GIS software suite GRASS GIS, we created an intuitive tangible interface for dynamic modeling of real-world processes in response to different terrain data inputs. How does it work? You modify the flexible physical model by hands while it is being scanned, imported and processed in GRASS GIS. After computing a desired geospatial analysis or dynamic simulation, the results are projected back on the physical model providing you with instant feedback.

With TanGeoMS we can explore how dune breaches affect coastal flooding, how the spread of fire is influenced by location of firebreaks or what is the effectiveness of various landscape designs for controlling runoff and erosion. We can add buildings and assess the distribution of solar radiation for different building sizes and locations or explore impacts of built structures and trees on line of sight and viewsheds. We will cover new 3D manufacturing technologies and materials we use to create precise physical models and discuss various options for single user and collaborative system designs. Whether you are involved in environmental modeling, decision-making, education or you are just curious, you will find this talk inspiring for your own projects.

13:00 - 13:25 • Room E141-142

Cartography in Mapserver From a User's Perspective

Lars Schylberg, Saab AB

Setting up a multi-scale styling Web Map Service (WMS) with heterogeneous data from several sources can be a challenge. Various official databases from the Nordic countries have been used. The goal is to produce good looking, readable and efficient cartographic output.

Topics that will be covered are as follows: How to choose appropriate content and style for various zoom levels. The Mapserver options to author a WMS service will be discussed. In this case the Scribe tool was chosen and used to carry out the work. The built in capabilities of Mapserver to do cartographic styling of point, line and polygons are exemplified. Heterogeneous data from several countries is discussed and how that affects the abilities to carry labeling for instance. Some shortcomings in the data sources are discussed. Some of these problems are solved by preprocessing data with the GDAL/OGR package. The intended use of the map is also discussed and how that influences feature selection for different zoom levels. Finally the performance tuning options for Mapserver are reviewed.

The presentation aims to provide the attendees with enough information so that they can produce their own Mapserver WMS services with beautiful and useful maps.

13:00 - 13:25 • Room E143-144

UrbanFootprint: Next-Gen Scenario Planning Tool

Garlynn Woodsong, Calthorpe Associates

UrbanFootprint is a new open source scenario planning tool that seeks to revolutionize the practice of planning, with the potential to allow for a closer integration with research, public involvement, and education. Within version 1.1 alpha now complete and the next version currently under development, UrbanFootprint is a new state-of-the-art model that uses open source geographic information system (GIS) technology to create and evaluate physical land use/transportation investment scenarios. It is designed to be deployed by government agencies, private entities and NGOs. The model translates disparate data describing the existing environment and future urban development plans into a common data language, and defines future scenarios through the application of a new common set of 'Place Types'. The model's suite of Place Types represents



a complete range of development types and patterns, from higher density mixed-use centers, to separated-use residential and commercial areas, to institutional and industrial areas. The physical and demographic characteristics associated with the Place Types are used to calculate the impacts of each scenario. UrbanFootprint represents the new standard for scenario modeling tools intended for use by urban and regional planners at the local, county, regional, state or national level. Running on a backbone of PostGIS, PostgreSQL and Ubuntu Linux 64-bit, it takes full advantage of today's hardware processing capabilities to model the impacts of future urban growth scenarios on the base (existing) environment in future years to generate outcomes for a full list of metrics, including: Travel behavior (vehicle miles traveled, transit trips, walking trips, fuel consumed, fuel cost, criteria pollutant emissions, transportation electricity consumed and impacts); Energy & Water consumption (for transportation & buildings); Land Consumption by type; Infrastructure Cost (capital and operations & maintenance); City revenue from residential development; Public Health Impacts (Obesity, Asthma, Rhinitis, Pedestrian-Vehicle Collisions, Respiratory & Cardiovascular Health Incidences); and Greenhouse Gas (GHG) Emissions.

13:00 - 13:25 • Room E145

State of the (Geo) Gem

Scooter Wadsworth

According to its creator, Yukihiro "Matz" Matsumoto, "Ruby is designed to make programmers happy." While it may not achieve this goal for everyone, it works for at least one programmer (me). When developing spatial applications however, the seeming lack of support for Ruby can serve to diminish programmer happiness. The aim of this presentation is to show that Ruby, with the right gems, and an occasional bit of JRuby sprinkled on top, can make spatial programmers truly happy.

13:30 - 13:55 • Room D137-138

Mending Spatial Data with PostGIS

Leo Hsu, Paragon Corporation

This presentation demonstrates common techniques to clean-up spatial data from a real-world data source. I will start with raw OSM data. Topics I'll cover:

- Getting OSM data
- How to merge multilinestrings into single linestrings.
- Fill in gaps, snapping, reducing resolution
- Consolidating geometries with aggregate functions ST_Union, ST_MakeLine, ST_Collect based on both spatial and non-spatial attributes

13:30 - 13:55 • Room D139-140

Geo Trio: Putting MapServer, KML, and Google Earth to Work at the Province of British Columbia

Michael Ross, Province of British Columbia

Over the past four years, the Province of British Columbia has developed numerous web applications based on the powerful, template-driven output capabilities of UMN MapServer. By outputting custom KML that can be viewed in Google Earth, we have built an air-photo viewer that lets you display and print over 150 000 airphotos; a physical address viewer that lets you search for and display civic addresses in the context of road, property, and topography WMS layers; and a spatial reporting tool that dynamically generates a list of First Nations contacts that are appropriate for your current map view (pan and zoom and you automatically get a new report). We also built the FrontCounterBC Discovery Tool which combines all of the above viewers and adds tenure and interest layers for clients to determine potential conflicts with their proposed tenure and interest applications. All the above apps are simply KML NetworkLinks that make requests for KML against our UMN Mapserver Web Map Services.



Come see how we do it and learn why MapServer has the most powerful KML support of any web mapping server.

13:30 - 13:55 • Room D133-134

Our Cartesian World: Does Projection Still Matter

Shaun Walbridge

GIS was born in part by rejecting the strict requirements of surveying, instead blindly digitizing paper maps, which despite their imprecision gave us access to tremendous volumes of digital data. Similarly, great innovation is happening today by discarding precision and standardizing on geographic coordinates to a fixed datum, as commonly done in formats like GeoJSON, and its topological kissing cousin TopoJSON. This talk reviews some of history and trade-offs between these different worldviews, provides a flavor for the geodesic perspective of the world, and finally discusses how I learned to stop worrying and love crappy data.

A quick game of “projection engine telephone” will be played, examining how coordinates with different levels of precision fare after reprojection through projection engines, helping build up an intuition for when we should and shouldn’t care about projections. Finally, I’ll discuss possible futures of coordinate systems, and what we can do to escape the evil genius running our Cartesian world.

13:30 - 13:55 • Room D135

3D Slippy Map with three.js

Jarle Johan Pedersen

We will demonstrate the use of WMS and WCS as input to three.js for rendering an interactive 3D-model in the browser, based on actual data. Our extension of three.js, (WxS.threejs) takes several inputs, the boundingbox being the simplest. WMS-service, WCS-service, LAYERS and many, many other variables can be set either via the URL or predefined in a quick and easy setup. Further, we wish to introduce the idea of using cached WMS as an input. We’ve prepared a framework that is ready for consuming WMTS, rendering tiled 3D-models that are stitched together. The goal is to implement a slippy map in 3D. This is an open invitation to all hungry hackers who wish to join us in tapping the potential.

Original article: <http://labs.kartverket.no/wcs-i-threejs/>

Example: <http://labs.kartverket.no/threejs/wxs.three.html>

Github: <https://github.com/jarped/wxs.threejs>

13:30 - 13:55 • Room D136

Helping Farmers, Helping the Environment: An Affordable GPS Guidance System for Agricultural Sprayers

Scott Samson, Geosystems Research Institute, Mississippi State Univ.

Jane Moorhead, Department of Electrical and Computer Engineering, Mississippi State Univ.

Little open source software finds its way into commercial agriculture and, yet, has the potential to reduce production costs for small farm operations as well as diminish potential harmful impacts on the environment in and around crops. Improving the efficiency of applying herbicides and pesticides can be brought about with improved control of sprayer operation.

Row crop agriculture relies upon effective control of weeds and insects while minimizing impact on the environment and the farmer’s budget. Using GPS to guide agricultural sprayers through the field can reduce chemical treatments by controlling the position of the sprayer to eliminate overlapping applications or leaving gaps between passes through the field.

Commercial GPS guidance systems are economically out of reach for many small farm operations.



An open source option has been developed for under \$250 to reduce the investment to retrofit sprayers. The sprayer controller system takes advantage of over the counter electronic components and utilizes Python to encourage a larger audience of developers to participate in enhancing the current product.

Minimizing the use of agricultural chemicals, along with responsible land management practices, can cut costs to farmers in both time and purchase of herbicides and pesticides. Providing an open architecture for applications to aid small farms in crop management will also benefit responsible stewardship of the natural environment.

13:30 - 13:55 • Room E141-142

Creating Map Style & Visibility Rules from Statistics

Robert Hollingsworth, Kartanica GeoSystems

Map style, label, and visibility rules, especially those aimed at differentiating “important” classes of features from “minor” ones, can be derived from statistical functions performed on feature attributes. If the source data classification scheme is not already strong in prioritizing features how we want to view them, then style patterns may emerge from calculations over an assortment of counts, sums, averages, and other measurements.

We will begin with a quick examination of popular open source web and desktop mapping engines — do their configuration capabilities include formal constructs for deriving rules from statistics? Or must the developer arrive at “this looks right” through trial and error?

We’ll extend the discussion to specific data distribution patterns that can be exploited for styling. We’re accustomed to setting line styles, symbol and font sizes, colors, and visibility at different scales. The bell curve resulting from a query may point us to where we make the scale breaks, or toward how much color or size contrast to employ in order to make the best presentation from the particular data we are displaying. Perhaps we can arrange our queries, thereby grouping our features a certain way, to aim for an “ideal” curve that is already known to produce pleasing results.

A simple set of query tools for streamlining style assists from statistics will be used to create a few examples from troublesome data.

13:30 - 13:55 • Room E143-144

GRASS GIS, Star Trek and Old Video Tape – A Reference Case on Audiovisual Preservation for the OSGeo Communities

Peter Loewe, German National Library for Science and Technology

This presentation showcases new options for the preservation of audiovisual content in the OSGeo communities beyond the established software repositories or Youtube. Audiovisual content related to OSGeo projects such as training videos and screencasts can be preserved by advanced multimedia archiving and retrieval services which are currently developed by the library community. This is demonstrated by the reference case of a newly discovered high resolution version of the GRASS GIS 1987 promotional video which made available from into the AV-portal of the German National Library of Science and Technology (TIB). The portal allows for extended search capabilities based on enhanced metadata derived by automated video analysis. This is a reference case for future preservation activities regarding semantic-enhanced Web2.0 content from OSGeo projects.

14:00 - 14:25 • Room D137-138

Implementing Basic GeoCouch Support in Couchbase Lite

Chris Anderson

Couchbase Lite is an Apache-licensed native JSON database for iOS and Android with offline synchronization support.



At a hackathon last year it took a couple of hours to add GeoCouch-style bbox queries to Couchbase Lite. I'll walk through the implementation of the geo indexer and how it fits into the Couchbase Lite codebase.

Also expect to be wowed by examples of the power of sync + geo.

14:00 - 14:25 • *Room D139-140*

Introduction to MapGuide

Gordon Luckett, Arrow Geomatics Inc.

This class is for those who want to fast-track into installing and using MapGuide Open Source. MapGuide Server and Web Extensions are set up in the Workshop (Windows). MapGuide Maestro (Windows) is used to load and connect to GIS data, create layers, author maps and publish web sites.

14:00 - 14:25 • *Room D133-134*

Projections in Web Browsers Are Terrible and You Should Be Ashamed of Yourself

Calvin Metcalf

The JavaScript port of proj4 was (relatively) recently moved from subversion to github and updated to use modern build tools.

The talk will discuss some of the differences between desktop and web environments when it comes to projections and CRS, other new projects that take a different perspective on projections (like topojson), and why you can't just use an EPSG number in your browser (and should be ashamed of yourself wanting to).

14:00 - 14:25 • *Room D135*

What's New in Cesium: The Open Source Alternative for 3D maps

Patrick Cozzi, Analytical Graphics, Inc.

When building 3D mapping apps, we no longer have to deal with closed feature-sets, limited programming models, temporal data challenges and bulky deployments. This talk introduces Cesium, a WebGL-based JavaScript library designed for easy development of lightweight web mapping apps.

With live demos, we will show Cesium's major geospatial features including high-resolution global-scale terrain, map layers and vector data; support for open standards such as WMS, TMS and GeoJSON; smooth 3D camera control; and the use of time as a first-class citizen. We will show how Cesium easily deploys to a web browser without a plugin and on Android mobile devices.

Since last year's talk at FOSS4G NA, Cesium has added 3D models using the open-standard glTF, a large geometry library and higher-resolution terrain.

14:00 - 14:25 • *Room D136*

Using FOSS Tools, UAVs and Linear Referencing to Better Manage Federal Levee Data

Wilhelm Breitzkreutz, U.S. Army Corps of Engineers
Randy Goss, USACE Jacksonville District

The U.S. Army Corps of Engineers (USACE) is responsible for thousands of miles of levees in the United States. Over time the agency has developed a very specific way of evaluating levee systems



and relationships between their constituent parts. This approach has served USACE well, at least until having to coordinate our internal data structures with additional data managed by other agencies or programs who potentially treat levees in very different ways. Solving this requirement led to a new approach being developed inside the USACE National Levee Database program referred to as Reaches. Based on linear referencing, the Reaches approach combines interactive creation of linear event themes, a graphical linear reference data editor, and user driven symbolization of the data within a single comprehensive web interface. Using a combination of OpenLayers, GeoExt on the client side and Oracle SDO, MapServer and GeoTools on the server, it is optimized both for speed and flexibility, putting the power of the linear referencing approach into the hands of a range of technical and non-technical users. This presentation presents an architectural overview of the system and how FOSS applications were leveraged during development of Reaches.

The ability to manage data with a new level of flexibility and interactivity is supported in some cases by our new unmanned aerial vehicle (UAV) imagery pipeline. Flying imagery from altitudes only in the hundreds of feet give us images with resolution down to inches. By stitching these images into geotiff mosaic composites then processing into individual MBTiles databases using TileMill, we get a new level of perspective on construction projects and any other ground conditions, allowing for monitoring change over time at a convenience and price our agency has not previously had available. The full capability of this imagery is brought to light by our custom tile services that are generated down to zoom level 24. This presentation will show how by pairing the new imagery capabilities with the Reaches tools for collecting and storing data, our non-technical users now have access to tools and data normally reserved for the GIS/RS team.

14:00 - 14:25 • Room E141-142

Mapping in GeoServer with SLD and CSS

Andrea Aime

Various software can style maps and generate a proper SLD document for OGC compliant WMS like GeoServer to use. However, in most occasions, the styling allowed by the graphical tools is pretty limited and not good enough to achieve good looking, readable and efficient cartographic output. For those that like to write their own styles CSS also represents a nice alternatives thanks to its compact-ness and expressiveness.

Several topics will be covered, providing examples in both SLD and CSS for each, including: mastering multi-scale styling, using GeoServer extensions to build common hatch patterns, line styling beyond the basics, such as cased lines, controlling symbols along a line and the way they repeat, leveraging TTF symbol fonts and SVGs to generate good looking point thematic maps, using the full power of GeoServer label lay-outing tools to build pleasant, informative maps on both point, polygon and line layers, including adding road plates around labels, leverage the labelling subsystem conflict resolution engine to avoid overlaps in stand alone point symbology, blending charts into a map, dynamically transform data during rendering to get more explicative maps without the need to pre-process a large amount of views. The presentation aims to provide the attendees with enough information to master SLD/CSS documents and most of GeoServer extensions to generate fast, appealing, informative and readable maps.



GALA

Thursday, September 11th, 6:00 – 10:00 PM
World Forestry Center

4033 SW Canyon Rd

THE PARTY

Join us in the beautiful hills of NW Portland to celebrate a fantastic conference with delicious drinks, great local food, and excellent company. This year the Gala Night will be held at the spacious World Forestry Center — and may be your only chance to try your hand at smoke-jumping, operating a timberjack harvester, or rafting class IV rapids without getting wet.

Full conference registration includes a Gala Night ticket, and you will receive a MAX ticket when you register — so you have no excuse not to go.

Want to bring a guest? Fantastic. Snag an extra Gala ticket for them on the main FOSS4G registration page.

GETTING THERE

We recommend that you take public transportation to the gala. Please note that we will have limited alternative transportation available (but the train is faster). Gala night attendees will be given a paid ticket (for transportation to the Gala via MAX) at registration. Directions to the World Forestry Center via light rail (MAX) are below. More details on local transit can be found at <http://trimet.org>.

- Directly north of the Convention Center, board either the MAX Blue Line westbound towards Hillsboro or Elmonica/170th, or the MAX Red Line westbound towards Beaverton TC.
- Get off at the Washington Park stop, which is in a tunnel augmented with geologic info and other nerdery. (Stop and take a look!) It's the only stop underground, so you can't miss it.
- Take the western-most elevator to ground level (remember the train was going West!). When you exit the elevator, look across the street. That's the gala location.
- To return to the Convention Center, board either the MAX Blue Line eastbound toward Gresham or the MAX Red Line eastbound toward the Portland Airport; get off at the Convention Center MAX stop.

WHERECAMPDX

September 12th-14th, 2014
Eliot Center

1226 SW Salmon Street

WhereCampPDX is a free, volunteer-created unconference for anyone interested in geography and technology.

WhereCamps connect geo-enthusiasts, developers, social place hackers, artists, activists, grad students, geographers, earth scientists and anybody else who wants to "know their place".

Popular topics include social cartography, software and hardware, context awareness, mobile development, humanitarian mapping efforts, food webs and local food transparency, transit, psychogeography, geo games, paper maps, and place hacking.

More details at <http://wherecamppdx.org>



CODE SPRINT

Saturday, September 13th
Eliot Center

1226 SW Salmon Street

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The Code Sprint provides the opportunity for projects to get together to make plans, work on new features, write documentation and generally collaborate. We provide comfortable facilities with all the power and wifi you could need, it's up to the individual projects to decide what the time is used for.

While a code sprint is obviously a place for developers it's worth remembering that it's not just about writing code – as we all know a project has many needs including documentation, testing, and providing feedback. What better way to give feedback and give back to the project that you love than to spend a day with the project's developers. There are roles that need to be filled, no matter what your expertise.

All participants are welcome. You don't need to register or attend FOSS4G to attend the Code Sprint, although registering on the OSGeo wiki is appreciated for planning purposes like coffee and food.

WHEN & WHERE

We will have dedicated facilities the day after the main conference (Saturday, September 13th). The Code Sprint will run along side WhereCampPDX.

Show your interest and/or create a specific project on the OSGeo wiki: <http://wiki.osgeo.org>

MAP GALLERY

By the time you read this, we hope you have already heard all about the FOSS4G Map Gallery and have maybe even submitted an entry. Either way, take some time to browse all the awesome submissions at the OSGeo booth, in the session rooms, and online (where you can also cast your vote for the People's Choice award!) at:

<http://2014.foss4g.org/map-gallery>



Big thanks to James Meacham, David Imus, and Matthew Hampton, for lending their expertise in judging the winning entries; to Tim Welch and Justin Miller for building out the digital gallery and session displays; to Lynnae Sutton and Mark Scott for their contributions on booth decor; and a special thanks to our prizes donors and to the many gallery contributors.



FIELD TRIPS

You've traveled all the way across the country, or even the world to come to FOSS4G. You'd be crazy not to relax a bit. We hope you'll spend a few extra days to discover some of what makes our little corner of the world special.

To help you do that, we've planned a number of outings on various days before and after the conference.

Walking Tours of Portland Sunday, September 12th, 5:00PM

KNOWYOURCITY.ORG

Get out and explore Portland on a walking tour from Know Your City! There are two separate tours to choose from: DIY PDX Tour and Keep Portland Wired. The tours will meet up downtown and last approximately 2 hours.

For more information, please email ask@knowyourcity.org or call (971) 717-7307.

DIY PDX TOUR

Sick of big box stores and corporate chains? Welcome to Portland, OR, USA - home to all things independent! This walking tour is designed for those seeking to connect with the true, homespun culture of the city (which can sometimes be tough to find as a visitor).

Our two-hour walking tour includes:

- The history of Portland's unique food cart phenomena
- A look at Portland's burgeoning music and literary scenes and its independent businesses
- A visit to a craft brewery that has been in business for 20 years
- A local roaster that transports its coffee only by bicycle - of course!

Along the way, we'll meet with some of the personalities that contribute to Portland's artisan and DIY culture, and we'll also explore some of the key policies that help foster these independent business. DIY PDX introduces tour-goers to our grassroots culture that embraces local self-reliance and sustainable living - and that defines Portland's independent ethos.

When: Friday, September 12th, 5:00PM

Price: \$17

KEEP PORTLAND WIRED! TOUR

Join us for a walking tour of Portland's technology industry, including meeting some of the best minds that keep our city on the map for innovative and creative thinking as well as some of our emerging start ups. Get a behind-the-scenes view of leading tech innovators and meet some of the leaders who are shaping Portland's tech future.

When: Friday, September 12th, 5:00PM

Price: \$17

Mount Saint Helens Trip Sunday, September 13th, 9:00AM

[SOLD OUT]

This field trip will be led by a local geologist and is designed to give you a hands-on experience of the power and scale of the 1980 eruption and its impact on the region's industries, communities and ecosystem. Attendees will (weather permitting) view the 1980 crater and the new lava dome created during the 2004-2008 eruptive period, as well as the ecosystem's recovery since the 1980 eruption.



FIELD TRIPS

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The field trip will follow the Toutle River on the north side of the volcano's 1980 eruption zone. Stops include the Mount Saint Helens Visitor Center and the Johnston Ridge Observatory to take in the exhibits and a couple of short videos; viewpoints to discuss the ecosystem's recovery (we may see some beavers, raptors, and elk) and the local geology; and a 2.4-mile hike along the hummocks trail where you will walk on and touch giant pieces of the volcano that were transported 8 miles downstream during the 1980 eruption (and enjoy more ecosystem recovery and wildlife sightings).

The hummocks trail is rated as easy. The trip will be held rain or shine. Previous trip attendees have thoroughly enjoyed this trip in inclement conditions. In the event of soaking rains, the hummocks trail hike may be replaced with visits to additional interpretive centers.

What to Bring: A lunch, snacks, water, comfortable shoes to walk on the ash-covered, hilly hummocks trail, sunscreen, hat, sunglasses, and appropriate clothing for heat, cold, and rain.

The tour will depart around 9:00AM and will be back in Portland around 6:00PM.

For more information, please email hydrogeojill@gmail.com.

When: Saturday, September 13th, 9:00AM

Price: \$65

Willamette Valley Wine Country Sunday, September 13th, 10:30AM

Join Wine Dirt tours on a trip through the Willamette Valley wine country for a day of wine-tasting and taking in the lush scenery. The group will tour 3-4 of the Willamette Valley's most acclaimed wineries in an intimate and relaxed setting. Pinot Noir is the primary wine produced in the area (and what it's most famous for), along with Pinot Gris, Pinot Blanc, Chardonnay, and Riesling wines. You will also learn about the rich ecology of the region, the history of Oregon's diverse wine country, and the fine art of viticulture and sustainable farming.

The tour will depart around 10:30am and will be back in Portland around 6:00pm. Lunch and tasting fees are included. Space is very limited.

For more information, please email info@winedirt.com or call (503) 583-4391.

When: Saturday, September 13th, 10:30AM

Price: \$100

Portland Breweries Tour Sunday, September 14th, 11:00AM

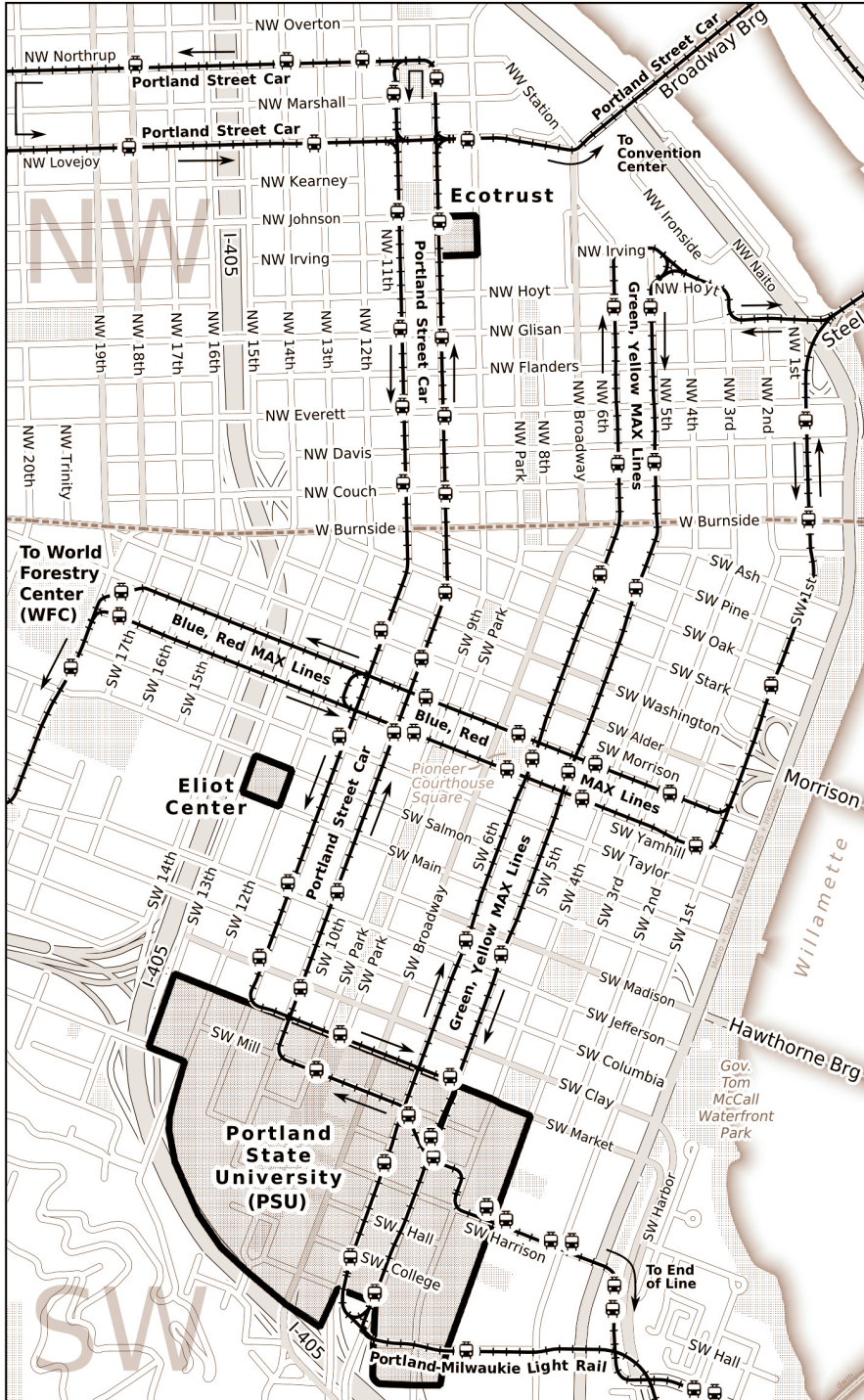
With more breweries than any other city on Earth, no trip to Portland is complete without experiencing our thriving brewing culture first hand. Shanghai Portland tours will transport you to three amazing breweries to sample multiple masterpiece craft beers at each location. By the end of your tour you'll see exactly why Portland, Oregon is a global leader in craft beer production. Transportation, plenty of beer sampling, and tours of the brewing facilities are included.

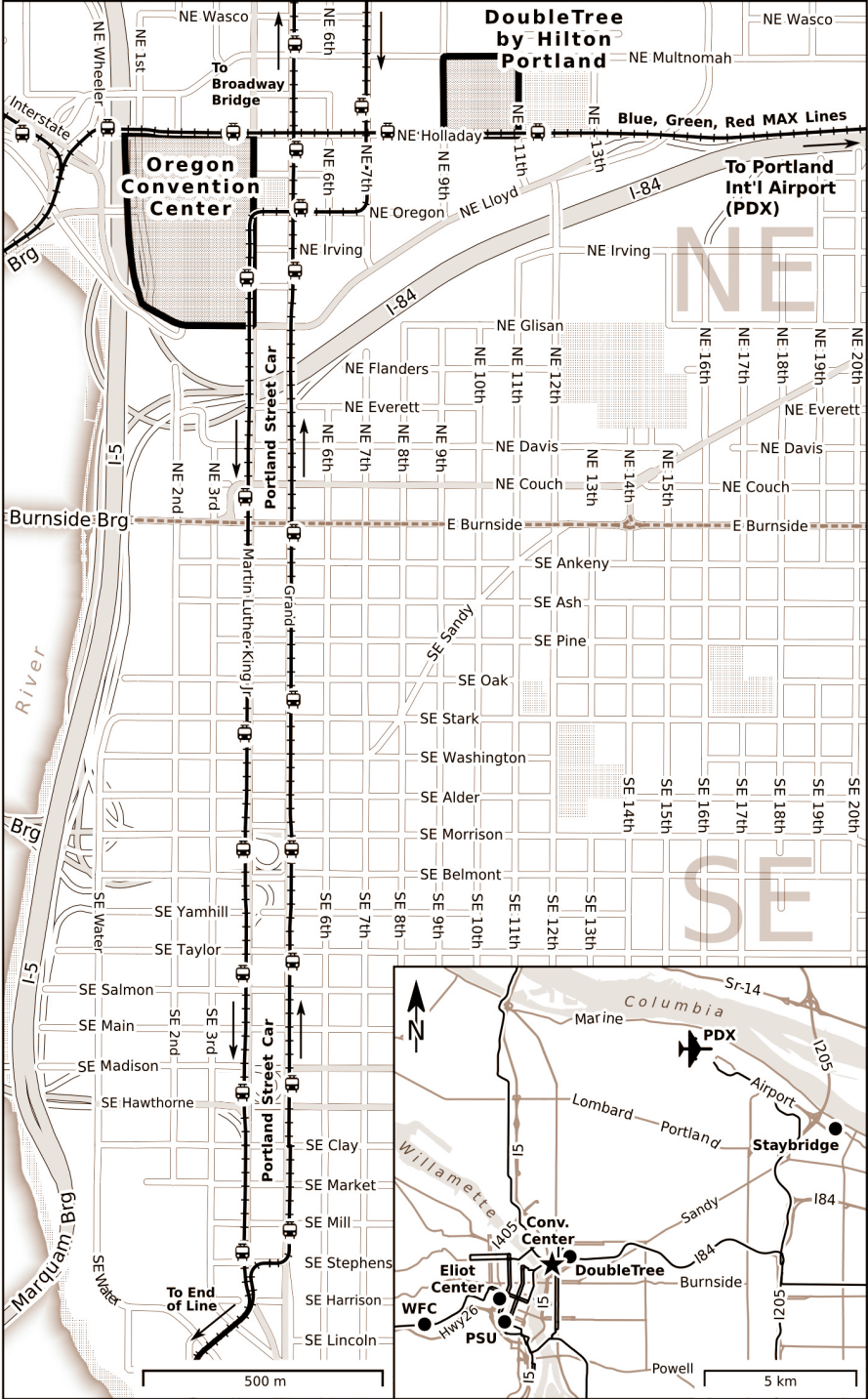
For more information, please email info@shanghaiportland.com or call (971) 533-7848.

When: Sunday, September 14th, 11:00AM

Price: \$50







Map by Dave Mangold



IN MEMORIAM: DOUG NEBERT



Doug Nebert of Newport, died in a private plane crash on May 31, 2014, in Toledo, Oregon.

Doug was born August 15, 1962, in Portland to Myrna and Daniel Nebert. He received a Bachelor of Science in Environmental Science from Evergreen State College and a Master of Science Degree in Geography from Portland State University.

While still a student, Doug's future career was influenced by his internship with the U.S. Geological Survey. His subsequent employment with USGS continued for the rest of his life. During his 30-year career, Doug grew into what has been described as the "Geospatial Pioneer" for his foundational work in modern geospatial information systems. In that capacity, he was involved with numerous international organizations, such as the Group on Earth Observations (GEO), dealing with spatial data interoperability and international cooperation in the Global Earth Observation System of Systems (GEOSS). Acknowledged not only as an expert in this area, but also as an excellent communicator of highly technical information, his vision and commitment to make this information available around the world has been highly praised. He was described by colleagues "a one-man interoperability show case," and "an incredible force behind many of the things we take for granted in modern geo-spatial information systems." He was a brilliant, versatile and dedicated public servant. Among many examples of the great esteem the scientific community had for his work, he received the highest Open Geospatial Consortium (OGC) honor, the Kenneth D. Gardels Award for his personal and professional contributions and leadership.

Doug's life was enriched by his knowledge and love of many things, including geology, the mysteries of weather, music (he played piano) and languages. He was fluent in Spanish and conversant in several other languages, including Japanese. A major hobby was the airplane he built himself and flew for many years before the tragic accident. Those who knew him prized the friendship of a generous, sensitive, witty man of many talents.

Doug married his high school sweetheart, Dee Kirkpatrick, in 1989 in Reston, Virginia. In 2011, they moved to Newport, to own and operate a bed and breakfast, the Tye Lodge. While maintaining his full-time job with USGS and his many activities with organizations around the world, Doug also assisted the B & B chef (Dee) and made beds when necessary. He was active in local organizations, secretary to the Newport Airport Committee, the Aircraft Owners and Pilots Assoc. (AAOP) and the local Experimental Aircraft Assoc. (EAA) chapter.

He will be missed.



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