

Increasing Rate of Change

Technology is driving permanent changes

Email

- 50 billion – email sent on the Internet in 2009
- 247 billion – Average number of email messages per day
- 1.4 billion – email users worldwide (~100 million – a decade ago)
- 200 billion – spam emails per day

Websites

- 234 million – The number of websites as of December 2009
- 47 million – Added websites in 2009. (20% increase)

Web servers

- 340% – Index by growth in 2009

Internet users

- 1.73 billion – Internet users worldwide (September 2009)
- 16% – Increase in Internet users since the previous year

Social media

- 126 million – blogs on the Internet
- 27.3 million – Number of tweets on Twitter per day (November, 2009)
- 350 million – People on Facebook; 60% – Facebook users log in every day
- 500,000 – The number of active Facebook applications

Video

- 1 billion – The total number of videos YouTube serves in one day
- 182 – The number of online videos the average Internet user watches in a month (USA)

Malicious software

- 2.6 million – Amount of malicious code attacks at the start of 2009 (viruses, trojans, etc.)
- 321,143 – The number of new malicious code signatures added by Symantec in Q4 2009

4.6B

Magnitude 7.0 - Haiti

January 12, 2010

Magnitude 7.0
Date-Time Tuesday, January 12, 2010
Region Port-au-Prince
Summary Death: 217,000 and 230,000 people (still on the rise)
 Injured: 300,000 estimated
 Homeless: 1,000,000 (1/3 the population)
 Building Damage: 300,000

Response in Haiti
UN OCHA

Magnitude 7.0 - Haiti

January 12, 2010

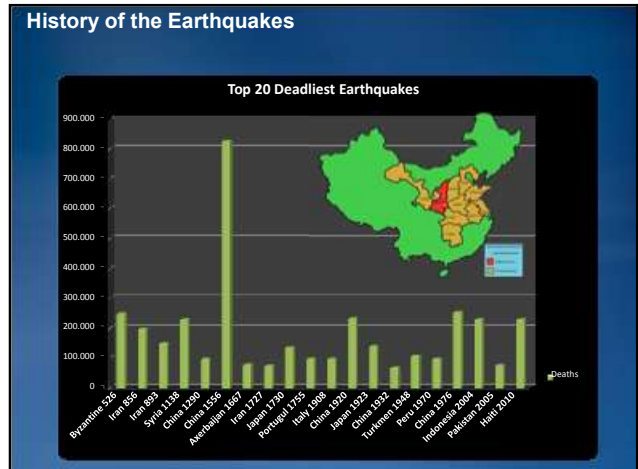
What is International Humanitarian Action Co-ordinator (IHA)?

What is IHA's Role?

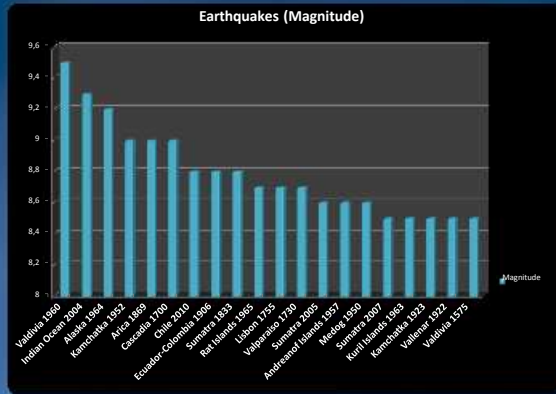
- To coordinate and support the humanitarian response to the earthquake in Haiti.
- To ensure that the humanitarian response is effective, efficient and coordinated.
- To provide a platform for the humanitarian community to share information and resources.
- To act as a central point of contact for the media and the public.

What is IHA's Structure?

- IHA is a multi-agency coordination mechanism.
- It is led by the United Nations Office for the Coordination of Humanitarian Affairs (OCHA).
- It includes representatives from the United Nations, the International Red Cross and Red Crescent Movement, and other humanitarian organizations.



History of the Earthquakes



Chile vs. Haiti

In numbers...

	Haiti	Chile
Magnitude of earthquake	7,0	8,8 (500x's)
Number of deaths	+250,000	795
Buildings destroyed	280,000	500,000
Days to build a basic warehouse	1,179 days	155 days
Rank worldwide corruption index	168	25
Hours before post-quake address	168	2
Hours before accepted assistance	0	48
News articles within first 48 hours	2,596	400
Population of US diasporas	531,000	70,000
Citizen's average annual income	\$1,300	\$14,700
Population	9 million	16 million
Percentage below poverty line	80 %	18.2 %
Life expectancy	61	77

Land Administration Challenges

What's Different with Haiti?

- **Land Occupation**
 - Occupation is ownership
 - 62% Urban Informal
 - 98% Rural Informal
- **Land Records**
 - Nearly non-existent prior
 - Mapping systems destroyed
- **Non-functioning Government**
 - Contracted police
 - Very few formal government services
- **Hurricane Prone**
 - 1 million people at risk
- **Infrastructure**
 - Inadequate airports
 - Poor port facilities
 - Archaic road system
- **Mapping Center**

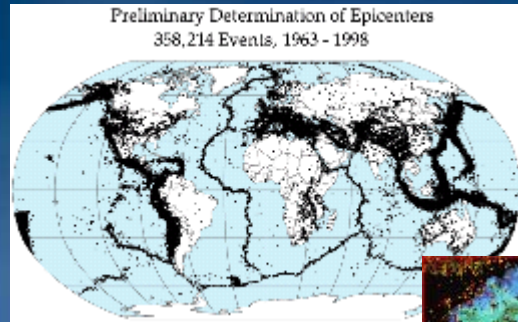


Disaster Events

ESRI Disaster Response Events

- Northridge Earthquake – Jan 17, 1994
- Oklahoma City Bombing – Apr 19, 1995
- WTC and Pentagon Attacks – Sep 11, 2001
- Space Shuttle Columbia Disaster – Feb 1, 2003
- Southern California Fire Storms of 2003
- La Conchita & Laguna Beach Landslides – 2004
- Indian Ocean Tsunami – Dec 26, 2004
- Pakistan Earthquake – Oct 8, 2005
- Indonesian Earthquake – May 27, 2006
- Peru Earthquake – August 15, 2007
- China Earthquake – May 12, 2008
- US Flooding and Tornado Support – 2007, 2008, 2009
- Hurricane/Cyclone Seasons – 2004, 2005, 2006, 2007, 2008, 2009
- Wildland Fire Seasons – 2004, 2005, 2006, 2007, 2008, 2009
- Australia Bush Fires - 2009
- Influenza A – H1N1 Outbreak (Swine Flu) - 2009
- Haiti Earthquake – January 12, 2010
- Chile Earthquake – February 27, 2010

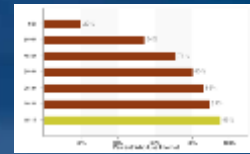
Recent Earthquakes



History of Modern Communication

Dispersing information...

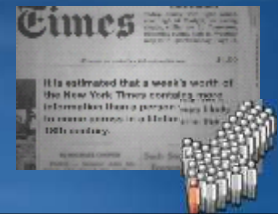
- 1877 – Telephone
- 1969 – Internet
- 1991 – First website
- 1973 – Cell Phone
- 2006 – Twitter launches



Years it took to reach an audience of 50 million

- Radio 38 years
- TV 13 years
- Internet 4 years
- iPod 3 years
- Facebook 2 years

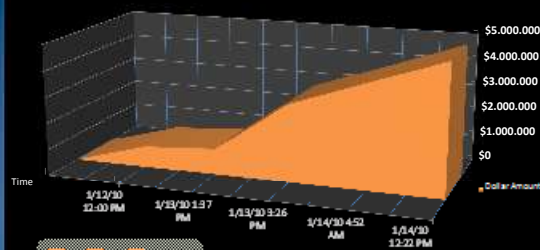
Twitter 50 Million daily



Social Media

More than an AP...

Text "Haiti" Campaign



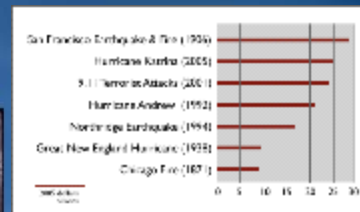
396M

Social Media

More than an AP...

Recent Comparisons

- 8 days after the flooding in New Orleans, Americans gave +\$580-million for relief efforts.
- 9 days after the Asian tsunamis, major U.S. relief groups raised \$163-million
- 10 days after September 11, Americans donated \$239-million



Social Media

More than expected....

- 500 Facebook groups
- Volunteered Translators
- Donation drives
- Public Awareness
- Facebook Mobile users (touch.facebook.com)

Consumer Mapping

Increasing Geographic Awareness

... and increasing the potential for GIS

Volunteered Geographic Information (VGI)

Citizens as Sensors: The World of Volunteered Geography

- User-generated content
- Collective intelligence
- Crowd sourcing
- Asserted information
- The empowerment of millions of private citizens

*Harnessing the Web ...
... And the Power of GIS*

Sharing Common Resources

*Creating New Ways to Share, Integrate & Collaborate ...
... Leveraging Web 2.0 Patterns*

What Makes VGI Possible

Web 2.0

- Free & Available Content
- User generated Content
- Search Engines, Blogs, and Wiki's
- Geospatial Data Centers (NOAA, NASA, GeoEye)
- Cloud computing (dynamic web feed from workstations, servers, mobile phones)
- Human beings – 4.6 billion intelligent sensors (mobile phones)
- informed observers
- rich local knowledge

**Largely untrained
No obvious reward
No guarantee of truth
No authority**

The Value of VGI

- Significant contribution to geography
- Enhancing our knowledge of the Earth
- Local focus
- Engaging citizens

Many unresolved questions

- Trust
- Preservation
- Social psychology



Integrating Social Media



Twitter



Facebook



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GIS and Social Media

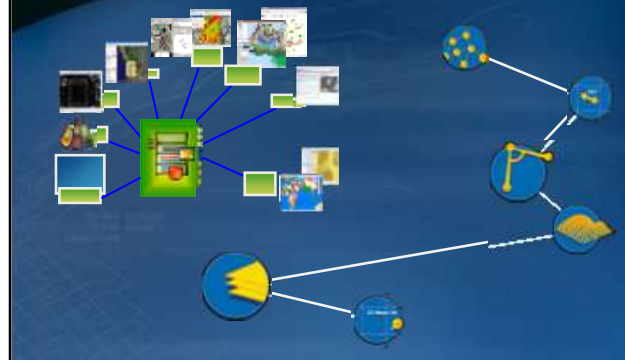
Who is Using Social Media?

- **Public Works**
 - Street closures
 - Construction projects
 - Special event announcements
- **Public Safety**
 - Accidents
 - Traffic
- **Emergency Notification**
 - Evacuation routing
 - Weather alerts
- **Parks and Recreation**
 - Registrations
 - Reservations
- **Dispatchers**
 - Date stamping pictures
 - Photographing incidents



Data integration

Data integration requires accurate data



Types of Data Accuracy

Measures of data correctness

- **Topological** – how features relate to each other
- **Attribute** – non-graphical information about features
- **Spatial** – nearness to the true position
- **Temporal** – how current is it
- **Relative** – how accurate are things relative to each other
- **Feature Identification** – is it what we say it is

... data maintained in a structured environment

Base Maps Support Data Integration

Authorities data served over the web

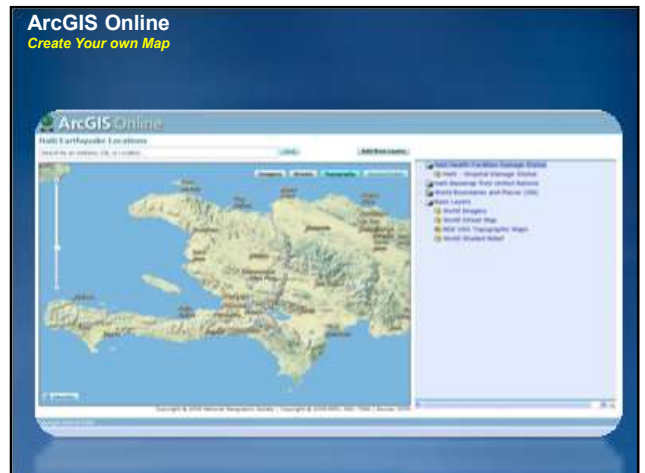
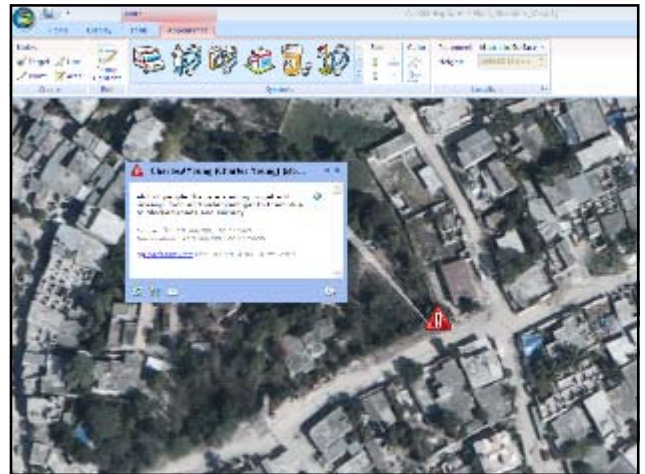
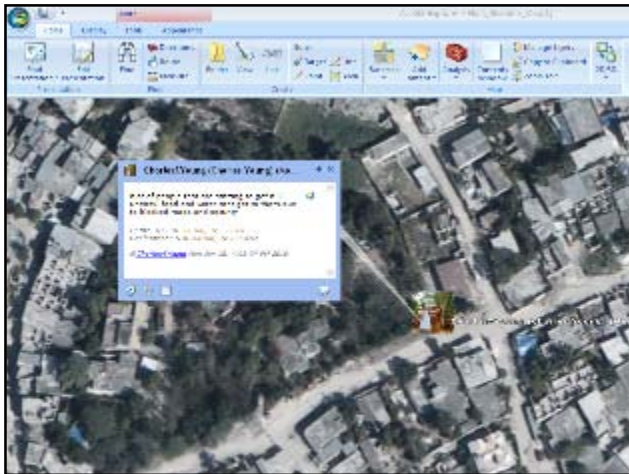
Streets Imagery Millions of Maps . . .
 . . . Being Served Each Day

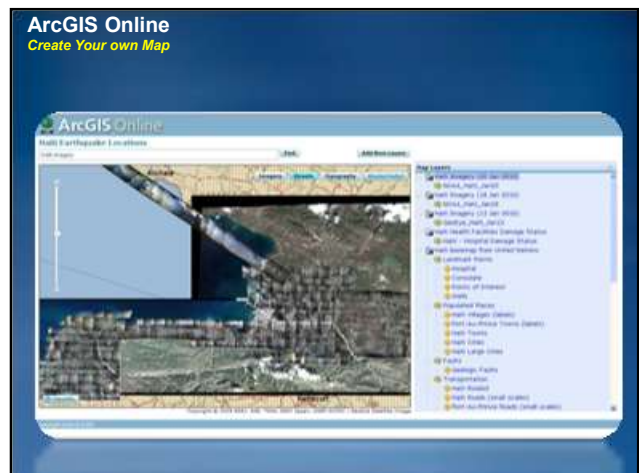
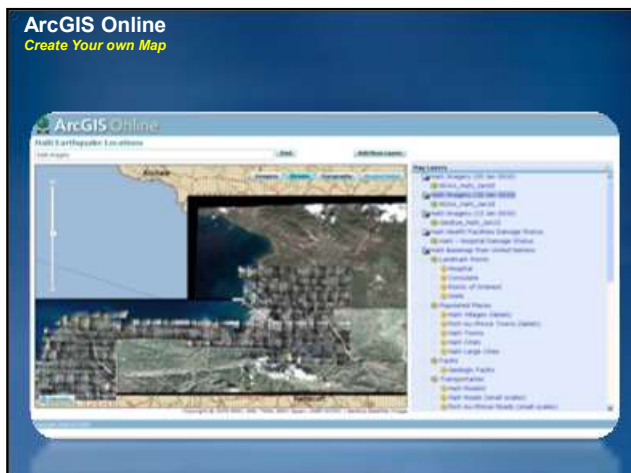
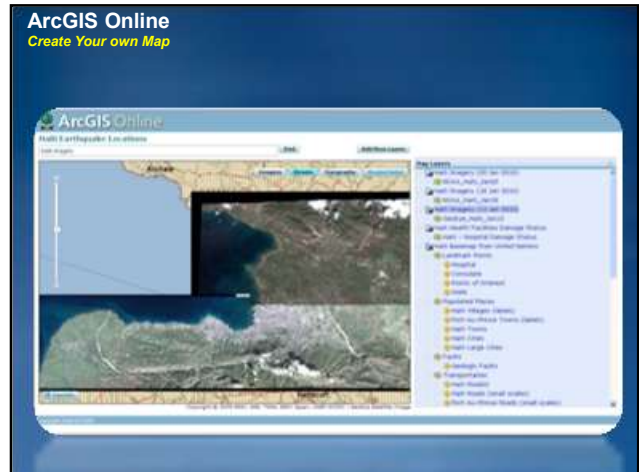
Topographic Demographic & Thematic

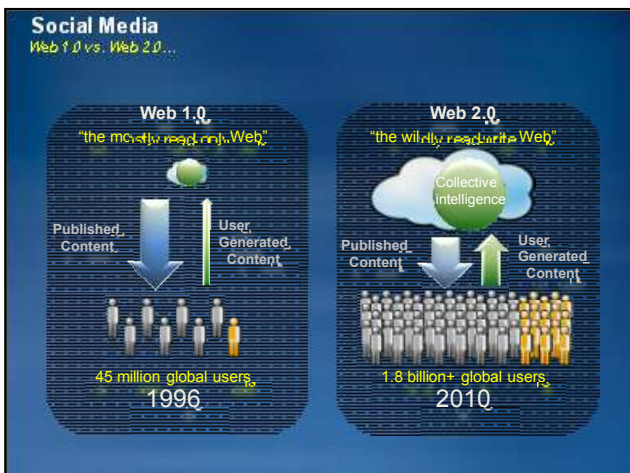
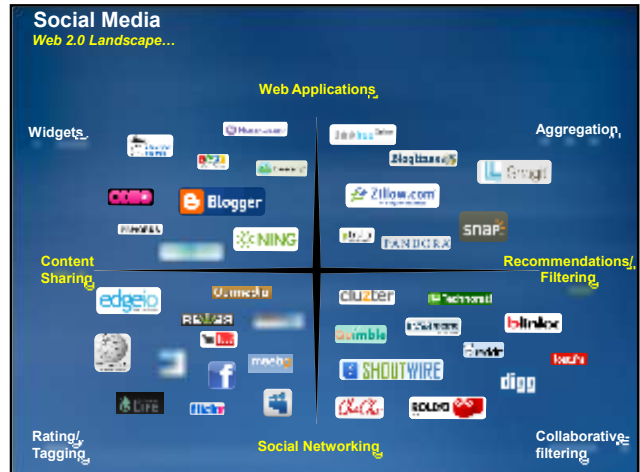
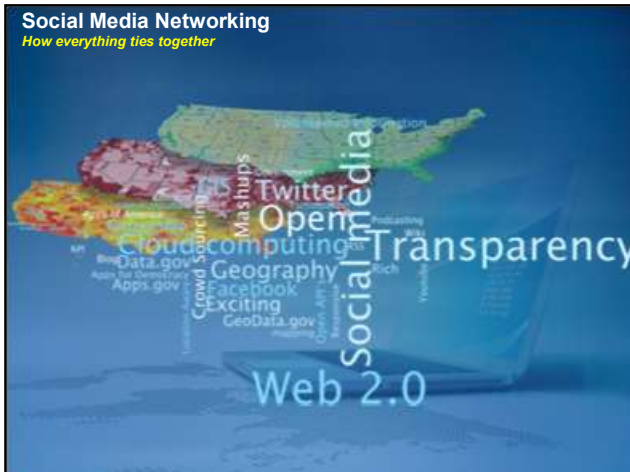
How accurate is a Tweet?

Charles Young (@CharlesYoung) 10k
 a lot of people that are starting to get a flu vaccine. Good and better can't get to them due to blocked roads and security.
 @CharlesYoung Mon Jan 11, 10:27 AM PST 2010

The tweet from Charles Young is overlaid on a map showing a coastal area with roads and buildings. The tweet text is: "a lot of people that are starting to get a flu vaccine. Good and better can't get to them due to blocked roads and security." The map shows a coastline with labels for "PORT JARVIS" and "Delmas".







Mobile

Leveraging the Web with New Functionality & Services

Tablet iPhone

Customizable Applications Capture Photos

... *Connects & Integrates Mobile Workers*

Two Worlds Coming Together

Integration using Standards

Consumers

- Sharing
- Accessing Authoritative Source
- Seeing Up-to-date Data
- VGI

Professionals

- Sharing GIS Maps (stories)
- Publishing Content for Wide Use
- Analysis
- Base Maps
- Using Web for Collaboration

Web Clients Standards (KML) GIS Clients

Base Map Globes UGC GeoRSS GIS Content & Services

Authoritative Source Professionals

... *Benefiting Everyone*

GIS's are Information Systems

Maps are the Interface

GIS Maps

- Interact
- Query
- Edit
- Share
- Analyze
- Combine

Data Model Data Symbology Analysis/Models Workflows Metadata

Geographic Knowledge

Maps are a metaphor for organizing geospatial data

GIS

The System for Using and Managing Geographic Information

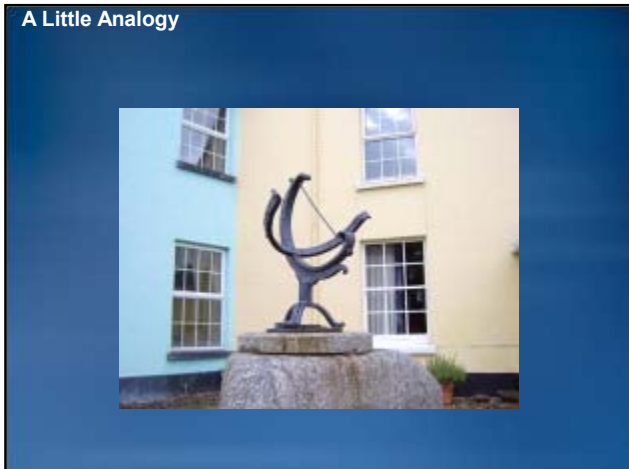
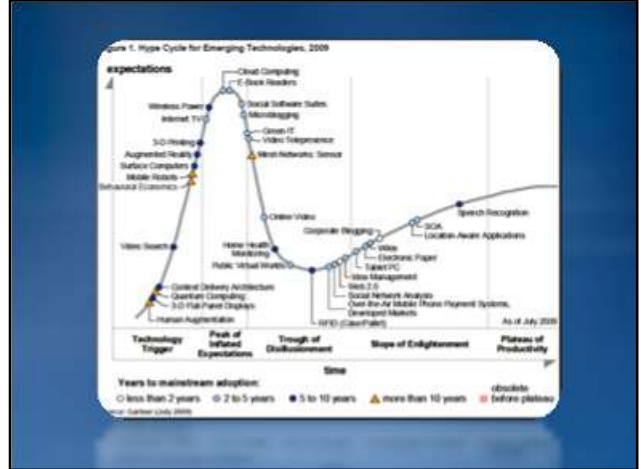
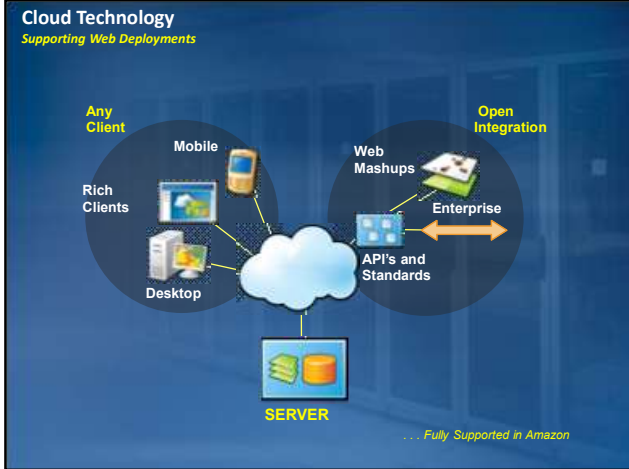
Web **Mobile** **Desktop**

Tomorrow Today Yesterday

Visualize Create Collaborate Discover Manage Analyze

Cloud Enterprise Local

Communicating Geographic Knowledge





Precise Timing

... for about three bucks

The image displays a variety of smartwatches, including a white one with a red cross logo, a black one with a digital display, a yellow one with an analog face, and several others with different designs and colors. In the center, there is a screenshot of a stock market ticker showing various stock symbols, prices, and changes. The background is a solid blue color.



User Generated Content (UGC)

The image is a collage of various user-generated content (UGC) examples. It includes a screenshot of a news article from Reuters titled "Reuters Deals", a map of a region, a social media post from Facebook, and several other smaller images and text snippets. The background is a solid blue color.

Can complement Authoritative Content

Authoritative GIS Content



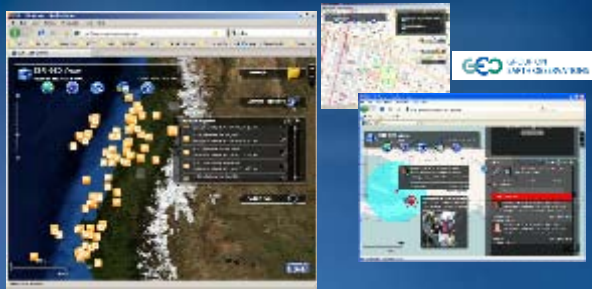
GIS Service Mashups



GIS in Web 2.0 applications

GEO Viewer – Haiti Support

Fuses OpenStreetMap, Commercial Imagery, OGC services, ArcGIS Online, ...
Provides 2-way Twitter Client, Flickr Search, ...



<http://geoss.esri.com/geoviewer>

Direct Relief: Haiti



Direct Relief: Haiti



Direct Relief: Haiti



Direct Relief: Haiti



Direct Relief: Haiti





