8 billion = Number of basemap requests per month on AGOL

14,000 = Unique requests per second

12,000 = New Items created per day

100,000,000 = Unique people who have accessed ArcGIS
Modern GIS is participatory
Every GIS user needs data provided by other users

- All of us depend on other users for some of the information that we use in our GIS work.

- We’ve all worked for years on data sharing among GIS users and communities
Millions of users around the world are building their data layers

- For their areas of interest
- And themes

- And at all levels of geography
  - Neighborhoods
  - Communities
  - Regions
  - States and Provinces
  - Nations
  - The Oceans
  - Entire World
These data are georeferenced
All GIS layers fit onto the earth’s surface

- And can be combined with anyone else’s shared information layers

*It’s easy to integrate GIS Layers*
By building your own GIS
Authoritative crowd sourcing

- Your data layers
- For your jurisdictions

You are contributing to the GIS of the World

Collectively filling in GIS layers globally
Meanwhile GIS is moving to the cloud
Continuously expanding network of computers

• Every layer has a URL – its web address

• Making layers easy to access online

• Building and sharing our own data -- combining all of our layers …

• Growing and expanding every day … across hundreds of thousands of GIS organizations worldwide

• Not just GIS users, but all kinds of public and crowd-sourced maps

GIS provides the integration engine
Web GIS enables sharing and use

Portals organize information in catalogs -- the content that you are interested in

Helps you organize your view for access to information items
- Your personal work
- Your Workgroup, Department, and Enterprise
- Your Community

Enables combining your information with others

A Living Atlas of Useful Geographic Information Items
App trends

• The explosion of smart phones and devices launched the app revolution
• Highly focused consumer apps on our devices
• Mapping apps are among the most popular
• Anyone with a smart phone knows how to use maps
• Many want maps that do more – GIS maps

• And maps provide the most common GIS experience
It All Begins with a Map

- Online Maps have an interface
- Called an “App”
- Targeted and purpose-built

Sharing Your Work
Information Item Sharing is growing rapidly … in addition to data sharing

ArcGIS Open Data
GIS Data Sharing is Changing

From "simple" dataset sharing to sharing useful information items
GIS data sharing enables access to better information

From Data Copies on Disk

- Dynamic
- Up-to-date
- Best Available
- A Click Away

To Ready To Use Information Items Available Anywhere
GIS is Participatory

• **GIS is for Organizations**
  Purpose-driven maps for executives, managers, decision makers, operations staff, field crews, constituents

• **GIS is for Communities**
  Share a common location (geography) or work in the same field

• **GIS is for Public Engagement**
  Engage with the public. Tell Stories. Gather feedback. Share your work.
Linda Beale
The implications in practice
How does it impact your work?

- Examples:
  - Communities provide background and meaning to your work
  - Your results are only as accurate as your data
    - Great available data...arghhh through an API?!
    - With modeling, context matters

Public Records Databases API

Application Programming Interfaces (API) allow programmatic access to some of the information
Terrain Models (free download from ArcGIS Online)

- Multi-Directional Oblique Weighted (MDOW) hillshade
- Swiss Hillshade
- Cluster Hillshades
- Sky Models
- Historic Dots
- Filled Contours
- Illuminated Contours
- Hachures
- Shadow lines
- Chromastereoscopic tinting
- 3D Choropleth
Science pervades our society. Understanding of science does not.

“Scientists must learn to communicate with the public, be willing to do so, and indeed consider it their duty to do so.”

GI Scientists are learning to communicate with the public, should be willing to do so, and consider it their duty.
Flow of Content is now multidirectional

• Crowdsourcing, wikis, OSM, citizen science, open data: we collect things no one would ever collect, vet and improve content, gain realtime awareness, do it faster and cheaper, find novel uses.

• The move to mobile and persistent connectivity has accelerated this

• What makes something “authoritative” is becoming more complicated
Crowdsourcing Content + Mobile
Citizen Science + GIS

Collaborating with the public to do everything from data collection to developing technology, models, methods, vetting, and disseminating knowledge.

No GIS user is an island: Adding and Re-sharing is a force multiplier

Social GIS allows us to tackle more ambitious projects
Citizen Science – White House Science Fair
Citizen Science – White House Science Fair

Barrier to entry is low – e.g. Twitter hashtag
Social GIS can build on existing social networks
Agency + Citizen Engagement / Reporting

BioBlitz: Citizen Science in the National Parks

The Hawaii Volcanoes National Park BioBlitz, held on May 15 and 16, 2015, was the latest in a series of citizen science events. It brought together more than 170 leading scientists and traditional Hawaiian cultural practitioners, more than 850 students and thousands from the general public.

Approaching a Decade of Citizen Science
Overview

Citizen Science is a configuration of the Crowdsouce Reporter group application template that allows members of the public to report sightings of wild plants and animals. The application has been optimized for smartphones but is responsibly designed to be used on smartphones, tablets, and desktop computers.

The Citizen Science application presents one or more maps that can be used to report an observation. Users can anonymously submit new reports, review existing reports, and comment and vote on reports or observations submitted by other users. They also can authenticate with their social media or ArcGIS Online credentials and track the status of problems or observations they have reported.

You may be interested in

ArcGIS for State Government includes several related maps and apps that also can be configured in your organization:

- Crowdsourc Manager
- Wildlife Management Area Locator
Social GIS > Data

It is also sharing know-how, methods, techniques, and models (re: Open Science)

Analysis and results shared too
An Audience ≠ Community

• An audience is one-way, non-interactive, not social

• A great online community offers something you can’t get anywhere else – e.g., authoritative content, knowledge, models, peer reviews, etc.
How to Foster Community

• Amy Jo Kim “Online communities must grow organically, not be rigid, overly-planned.” Let the community figure-out who it is, what it exists for, it’ll be more successful.

• Let people decide how much (and how) they’ll interact with the community – tailor their own experiences – not one-size-fits all.

• Facilitate reputation building (many methods) – it is the “trust” economy, not just formal credentials.

• Takes much more than just technology!!
Tenents of Open Data

(1) open to everyone
(2) lineage
(3) persistence (doesn’t disappear)
(4) real people behind this / accountability / authoritative
(5) open formats
(6) open discussions
(7) updatable
Successful Communities

- Great content, consistently delivered
- Designed to share – works best in a “give/get” relationship
- Allow one-to-one connections, many-to-one, and one-to-many relationships. E.g., citizens reporting potholes
- Responsive & accountable
- Allow good work to get promoted (likes, views)
People are *ready* for GIS

A profound change in GIS

- Web GIS is about deploying all of our collective content across the new *cloud* computing infrastructure

- And making GIS apps for use by virtually *anyone*

- Can be used *anywhere*

*The human dimension of GIS*
The role of GIS professionals will be critically important

- We need people with geographic literacy
  - With the skills, passion, and commitment to continue to build, assemble, and share the world’s geography.
  - Professionals who can build important analytics enabling us to combine our shared information layers
  - People with skills in GeoDesign and Planning
  - People with skills in Spatial Analysis and the ability to plan for, analyze, and evaluate alternatives
Engage Socially and Think Open

- Learn how to share and leverage intelligent information items. Share your work, not just your data.
  - Maps, Scenes, Layers of all kinds, Analytics, Apps

- Access the best available information
  - “Authoritative” is typically, but not always, better

- Leverage information from the entire community. Just because it wasn’t built with ArcGIS, it shouldn’t be ignored.
  - ArcGIS
  - Other systems
  - Google
  - Open Street Map
  - Open source
  - Etc.

- Share your work and serve others
Thanks Very Much
Linda, Mark, and Clint