FOSS4G 2007
Victoria BC

Convergence, Standards, Open Source Geospatial, and Web 2.0

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Autodesk

Overview

- World Challenges
- World IT Trends
- Standards, Commoditization, and Open Source
- Convergence, Standards, and Open Source
- Open Source Web 2.0 Mapping and Field Force Participation
- Autodesk Announcement

World Challenges

Worldwide Challenges

- **Global climate change**
  - Requires remedial action
- **Aging infrastructure**
  - Requires massive investment
- **Shrinking workforce**
  - Workers retiring faster than they can be replaced
- **Declining productivity**
  - Utilities, construction, …
- **Interoperability challenges**
  - Islands of technology

Challenge: Sustainable Development

- ***LEED***
  - *Leadership in Energy and Environmental Design*
  - Standards for environmentally sustainable construction
  - U.S. Green Building Council (USGBC)
  - Inception in 1998
- **As of July 2007**
  - 14,000 projects
  - 50 US States and 30 countries
  - 1.062 billion square feet

Challenge: Aging Infrastructure

El Paso Gas Explosion 2

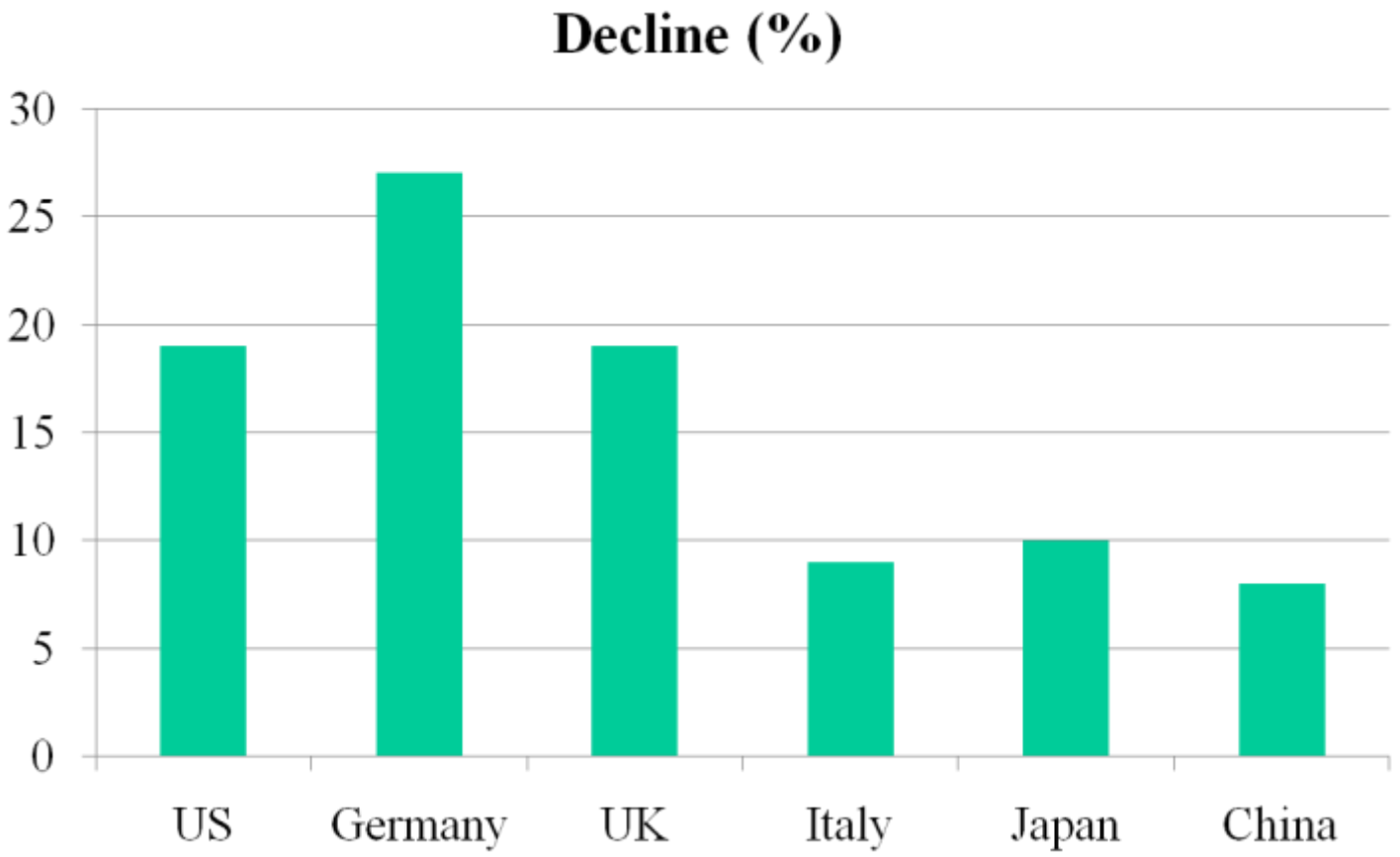
Quebec Overpass Collapse 2007

Steam Explosion 2007

Minneapolis Bridge Collapse 2007

Challenge: Aging Workforce

Decline in Number of Workers Aged 35-44 by 2010



Challenge: Aging Workforce in the Utility Industry

- **Average age of utility workers is close to 50**
- **By 2010, as many as 60 percent of today's experienced utility workers will retire.**
  - Study by American Public Power Assn
  - Loss of critical knowledge
  - Inability to find replacements with utility-specific skills
- **Aging work force is #1 concern of utility HR executives**
  - Survey by *Carnegie Mellon University Electricity Industry Center*
- **20 % decline in productivity forecasted**
  - *Booz Allen study*

Annual Construction Spend

Worldwide $ 2.3 trillion per year

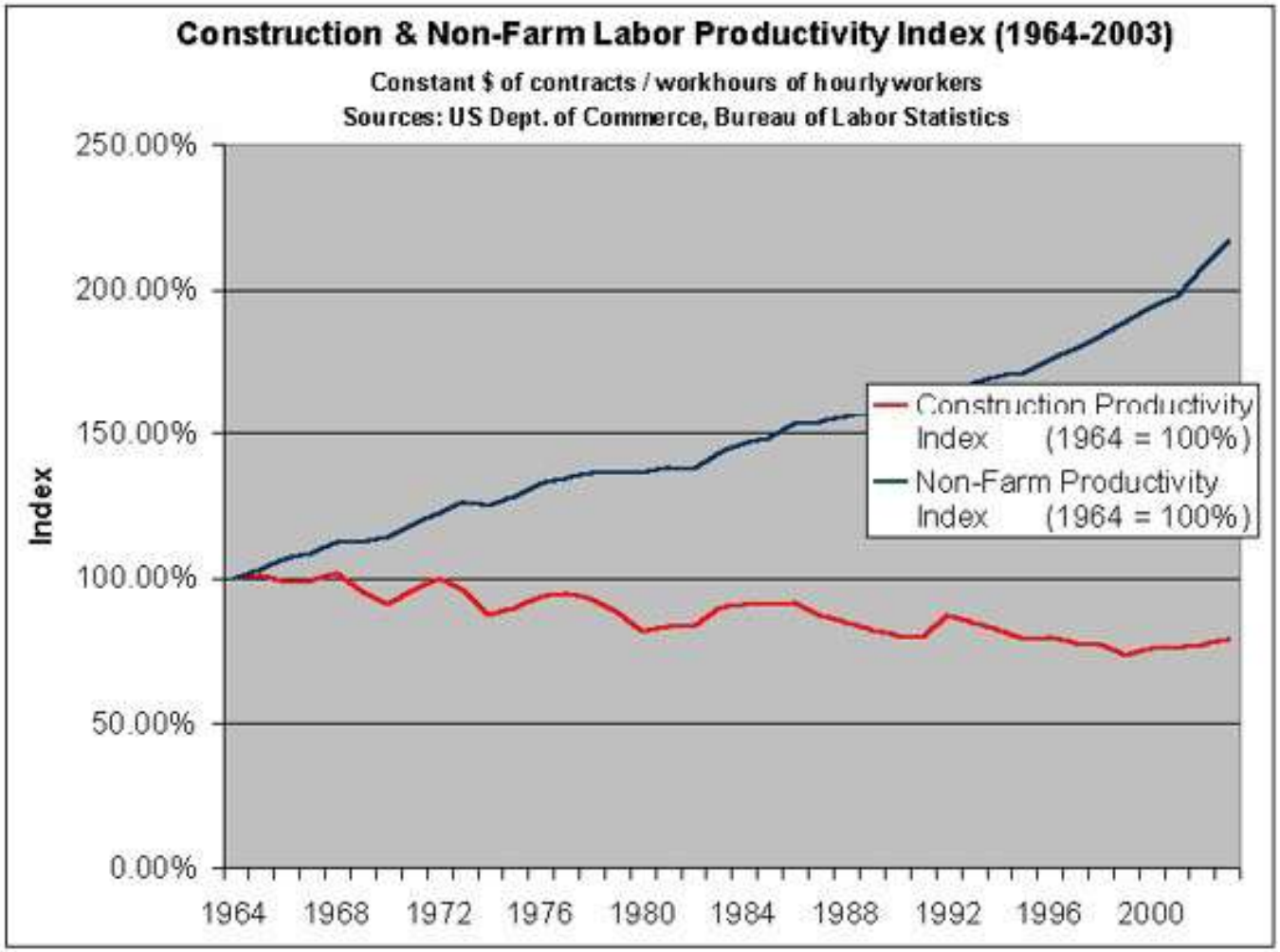
China $ 88 billion (1Q 2007)

India $ 50 billion per year

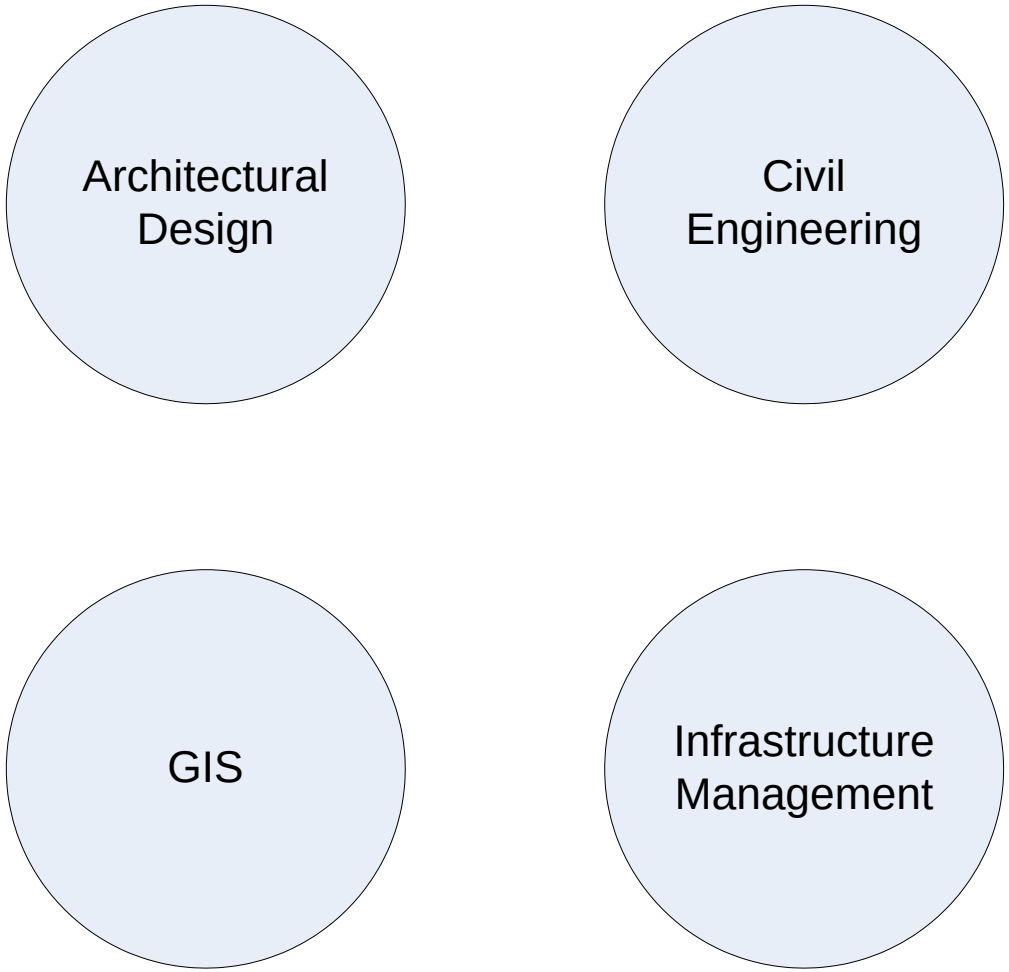
Canada $68 billion (in 97$) per year

US $1.2 trillion per year

Challenge: Construction Productivity



Challenge:
Islands of Information



Challenge: Interoperability

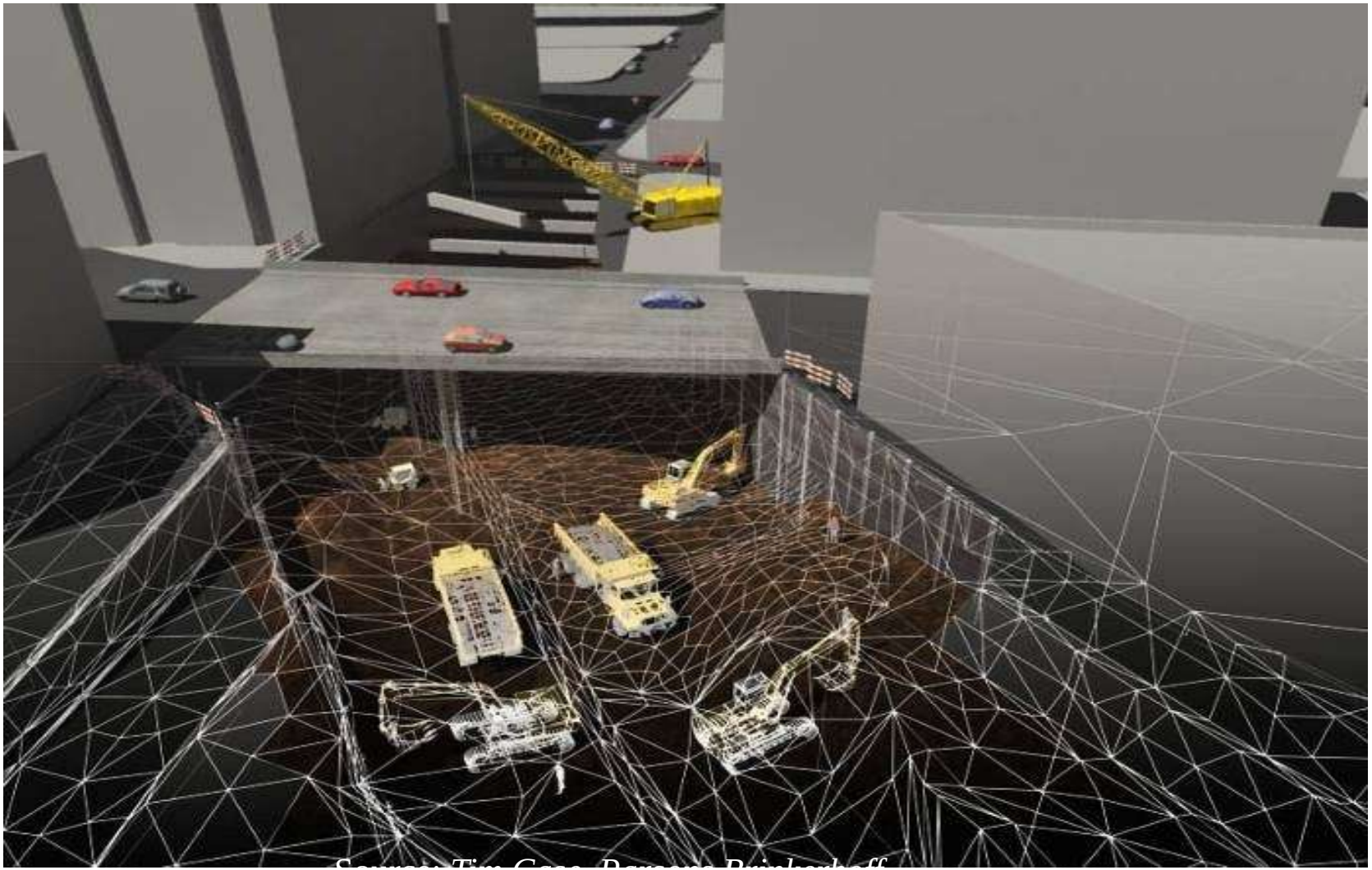
2002 National Institute of Standards and Technology (NIST) Study

- Quantified efficiency losses in the U.S. capital facilities industry from inadequate interoperability over entire facility life-cycle.
- Estimated inadequate interoperability costs $15.8 billion
- “Likely to be a conservative figure” - NIST

Rule of thumb: 90% of cost of a facility incurred during operations and maintenance

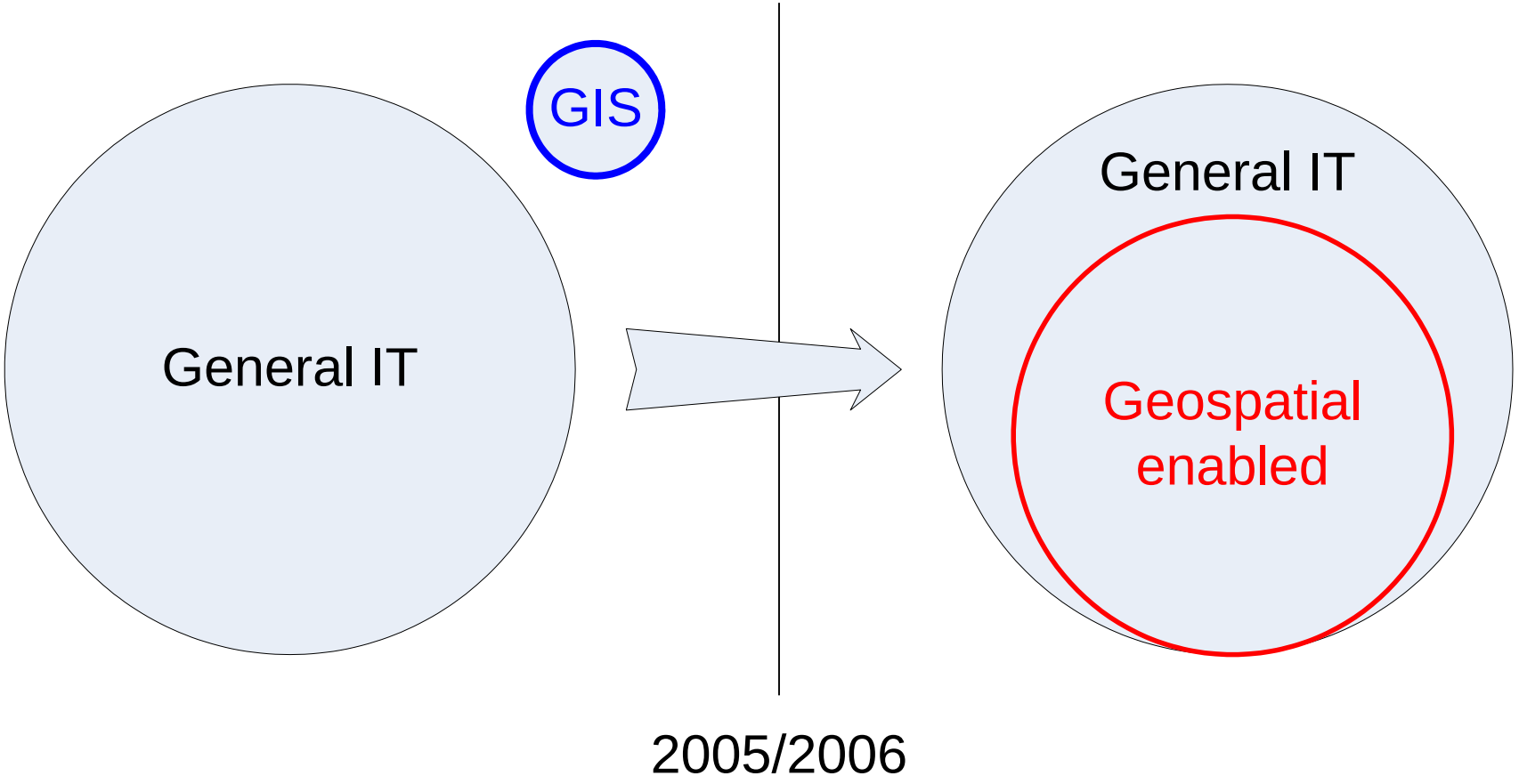
World IT Trends

Trend: Convergence
Breaking Down of Islands of Technology



Source: Tim Gage, Persons Brinkerhoff

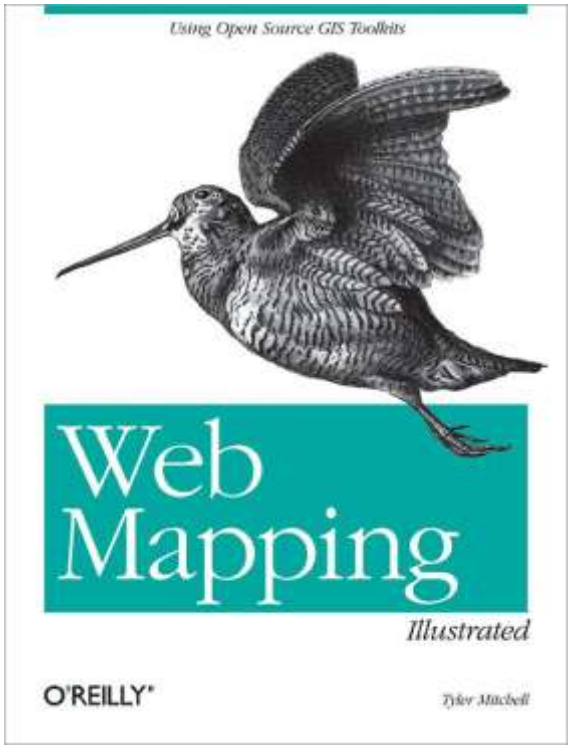
Trend:
Geospatially-enabled IT

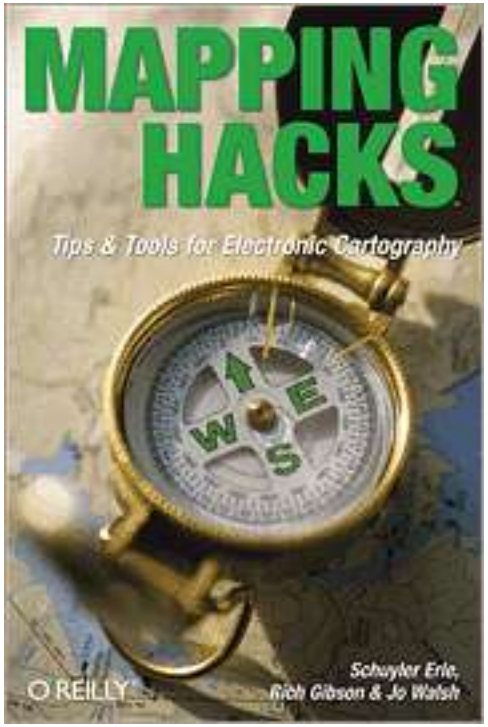


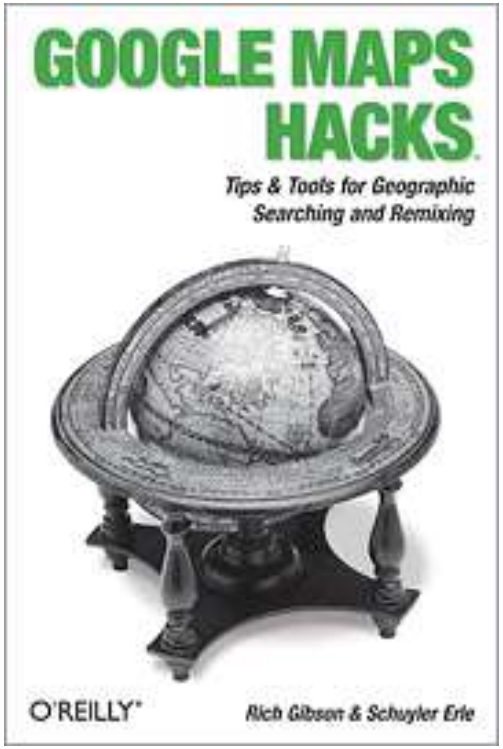
Geospatially-enabling Examples

- **Mass Market Web Applications**
  - Google, Microsoft, Yahoo, MapQuest,…
- **Spatial databases (RDBMS)**
  - Oracle, DB2, Informix
  - PostGIS/PostgreSQL, MySQL
  - Coming soon: SQL Server, Ingres
- **Spatial CAD/BIM**
  - Autodesk, Bentley, …

Trend:
Geospatial-enabling







Trend: Web 2.0


WIKIPEDIA
English
The Free Encyclopedia
1 618 000+ articles
Français
L'encyclopédie libre
438 000+ articles
日本語
フリー百科事典
322 000+ 記事
TIME
PERSON OF THE YEAR
Google Earth
nloads
OSGeo
Your Open Source Compass
Journal home
Advance online publication
Current issue
Archive
Supplements
Web focuses
Multimedia
About the journal
News
Special Report
Internet encyclopaedias go head to head
Jim Giles
Jimmy Wales' Wikipedia comes close to Britannica in terms of the accuracy of its science entries, a Nature investigation finds.

Trend: Open Standards

Advancing open standards for the information society

Standards and Open Source

Standards, Commoditization, and Open Source

C, C++	**->**	**Gnu C, C++ compiler**
POSIX	**->**	**GNU/Linux**
HTTP	**->**	**Apache Web Server**
SQL, ODBC	**->**	**MySQL, PostGreSQL**
SMTP, POP	**->**	**Sendmail, etc.**
.Net	**->**	**Mono**

Commoditization: Apache Foundation

NCSA HTTP Server and the Apache Group

- Eight ex-NCSA programmers support *HTTPServer*
- Apache Group coordinated "patches“

Challenge: commercializing the web

- IBM and others trying to decide how to monetize web

Creation of the Apache Foundation

- 1999 IBM helped Apache Group form legal entity
- Provides organizational, legal, and financial support for the Apache web server.

Apache Web Server

- Running on over 70% of the world’s web servers

Standards to Watch

OGC Simple Feature Spec

OGC Simple Feature Specification

- Points, lines, closed polygons, rasters

OGC SFS Extensions (Adopted Jan 2007)

- Cartographic text

Future

- Feature Stylization
- Metadata
- Linear topology
- Polygon topology
- Linear referencing systems
- Long transactions

Standards for Convergence

Industry Foundation Classes(IFC)

- International Alliance for Interoperability (IAI)
- Dedicated to the improvement of productivity and efficiency in the construction and facilities management industry
- *ifcXML*

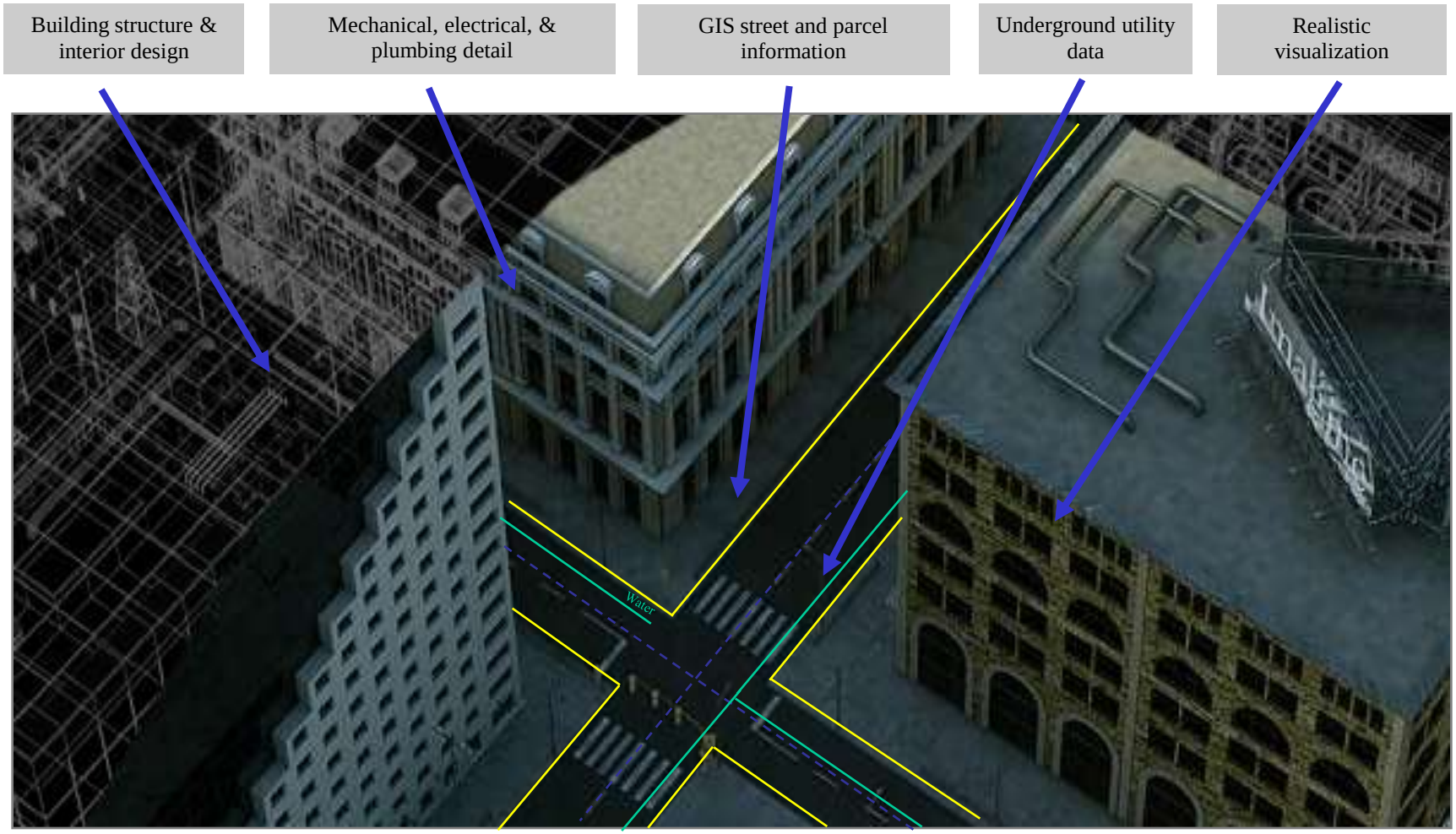
Open Geospatial Consortium (OGC)

- WMS, WFS, GML, …

OGC-IAI alliance

- IFC 2x3g

Convergence Means Integration



Enables Simulation of a City

OUTSIDE

3D exterior urban visualization

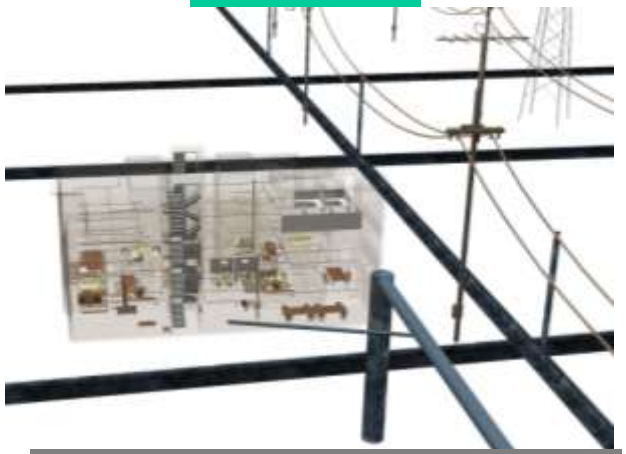
Including:
- Utility structures
- Full city blocks of 3D detail
- Precise spatial orientation
- Line of Sight calculations
- Space – to – Sidewalk view

INSIDE

Full interior, 3D visualization

Including:
- Utility / HVAC systems
- Furniture
- Mechanized lifts / elevators
- Walls, doors, windows
- Precision architectural detail

UNDER



3D subterranean visualization

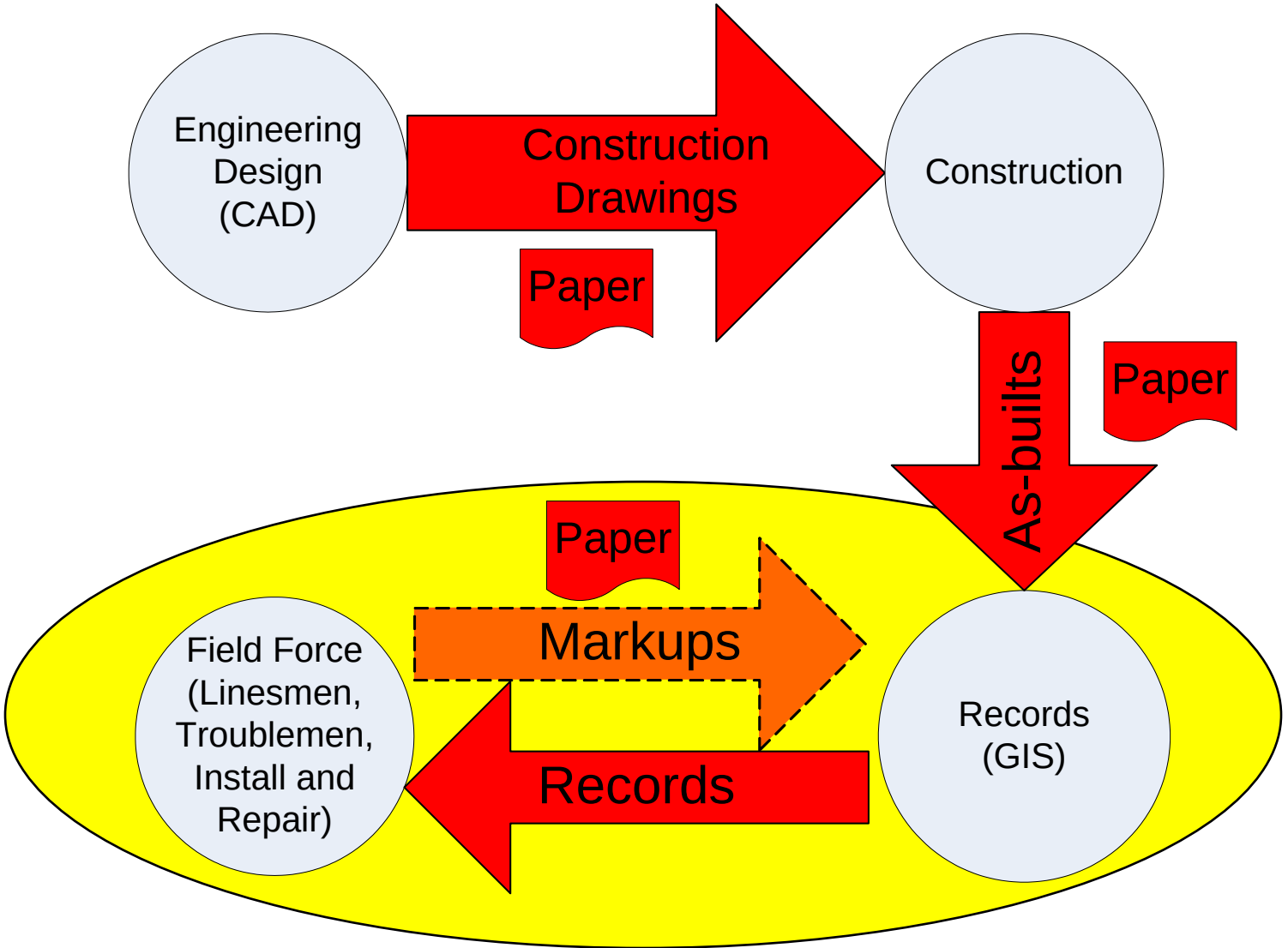
Including:
- Sewer systems
- Utility / Phone systems
- Electrical systems
- Access routes / portals
- Precision CAD detail

Implications for eGovernment

- First response
- Emergency planning
- Operations and maintenance
- Urban planning

Challenges in Utilities, Telecommunications Firms, and Local Government

Challenge: Islands of Information



Challenge:
Inefficient Business Processes

- **Islands of technology**
  - Engineering, Construction, Records, Operations
- **Information flow is inefficient**
  - Paper
  - Backlogs
- **Redundant data and processes**
  - Field does not participate in data maintenance
  - As-builts redigitized from paper
- **Data quality issues**
  - Business processes inhibit data quality
- **Expensive**
  - Compared to banking, retail, and airline industry, utilities and telecom have not begun to reap the full benefits of automation

Flawed process: Field Force Disenfranchised

- Who knows your facilities first hand ?
  - **Field -**Thousands or tens of thousands of field staff
- Who requires accurate data to do their job ?
  - **Field - *Returns*** typically 25% to 30% of all work orders.
- Who “owns” the Records database ?
  - **Never Field -** Records, engineers, managers, …
- What is the trend in the quality of the Records database ?
  - **Decreasing -** Typical accuracy: 70-80%

Challenge: Aging Workforce in the Utility Industry

- **Biggest problems facing the US power industry according to *American Public Power Assn***
  - Loss of critical knowledge
    - Average age of utility workers is close to 50
    - By 2010, as many as 60 percent of today's experienced utility workers will retire.
  - Inability to find replacements with utility-specific skills
- **HR executives in the utility sector overwhelmingly listed the aging work force as their number one concern.**
  - 2005 Survey by *Carnegie Mellon University Electricity Industry Center*

Infrastructure Management Challenges

- X **Islands of Information**
  - X Paper-based interoperability
- X **Redundant data**
  - X Redundant processes
  - X Backlogs
  - X Poor data quality
- X **Expensive**
- X **Exacerbated by aging workforce**

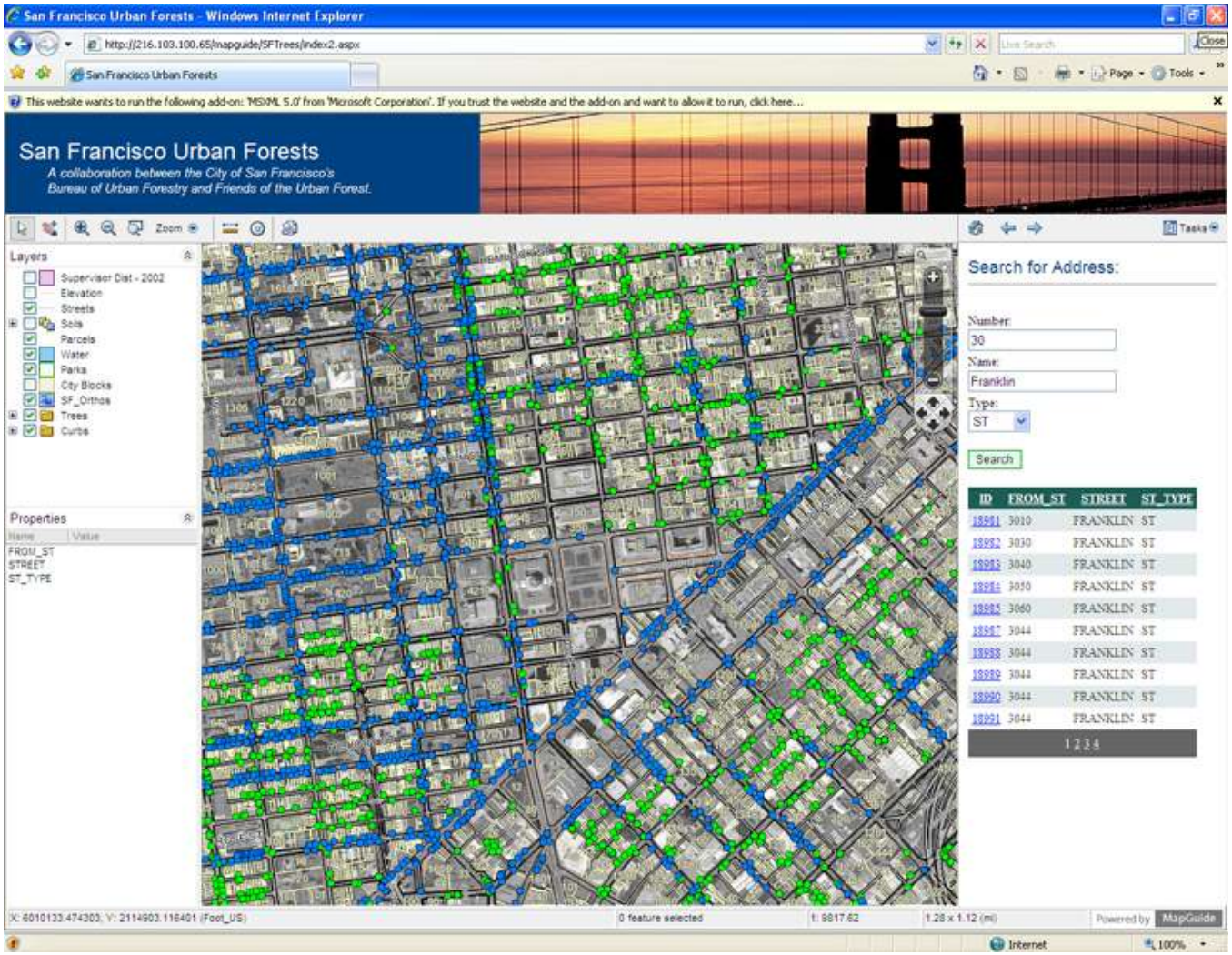
Convergence: Web 2.0 and Field Force Participation

What is Web 2.0 ?

Web 1.0		Web 2.0
DoubleClick	-->	**Google AdSense**
Ofoto	-->	**Flickr**
Akamai	-->	**BitTorrent**
mp3.com	-->	**Napster**
Britannica Online	-->	**Wikipedia**
personal websites	-->	**blogging**
Evite	-->	**upcoming.org and EVDB**
Domain name speculation	-->	**search engine optimization**
Page views	-->	**cost per click**
Screen scraping	-->	**web services**
Publishing	-->	**Participation**
Content management systems	-->	**wikis**
Directories (taxonomy)	-->	**tagging ("folksonomy")**
Stickiness	-->	**syndication**

Source: Tim O'Reilly "What is Web 2.0?"

Example: San Francisco Urban Forest

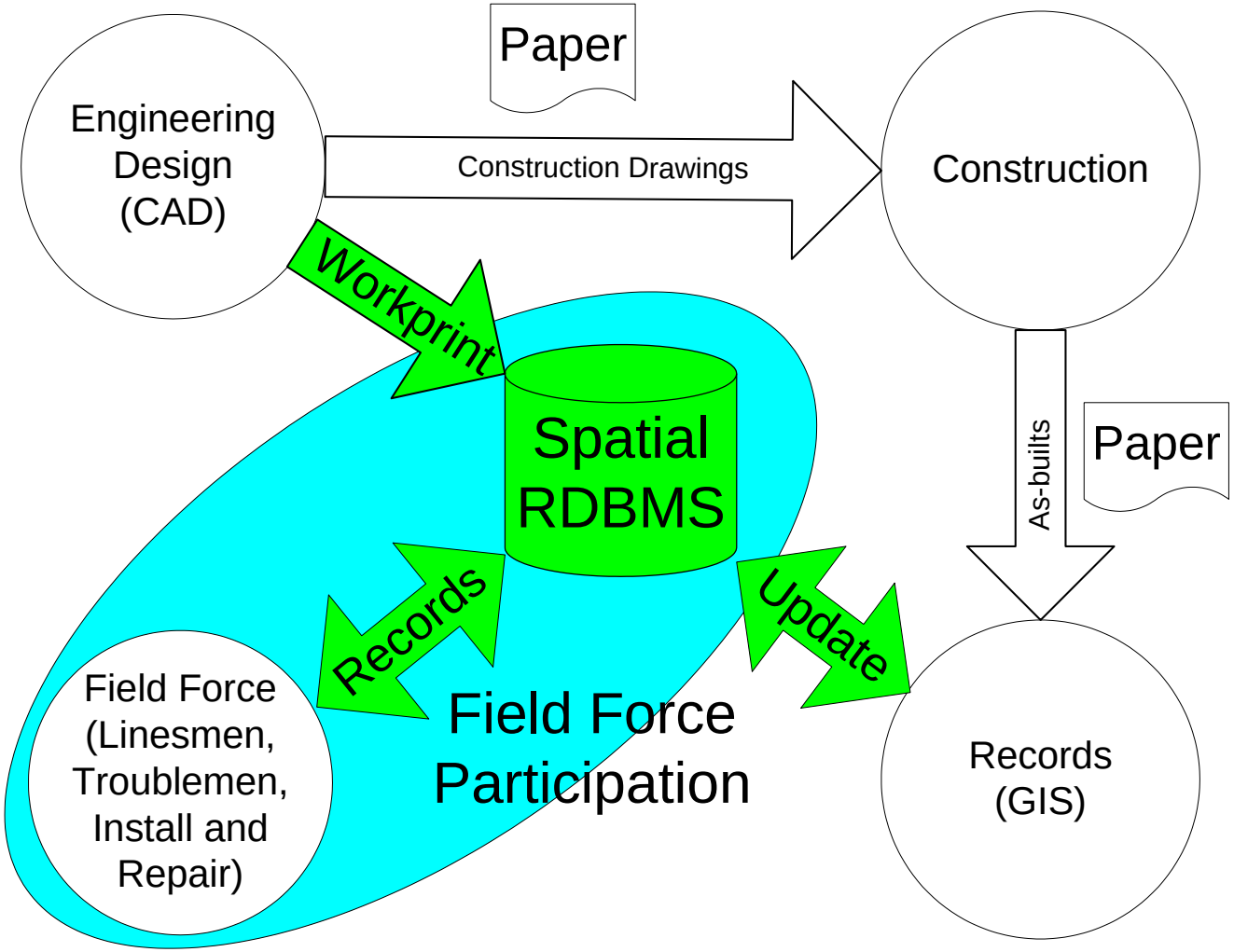


What does Web 2.0 mean for a utility or municipal government ?

- Web 1.0 is about ***publishing***
- Web 2.0 is about ***participation***.

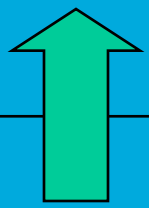
- Web 2.0 enables ***harnessing the collective intelligence***
  - Data is accessible to everyone who can use a browser
- Web 2.0 ***enfranchises*** the field force
  - Enables field force to participate in data maintenance

Web 2.0 Enables Field Force Participation

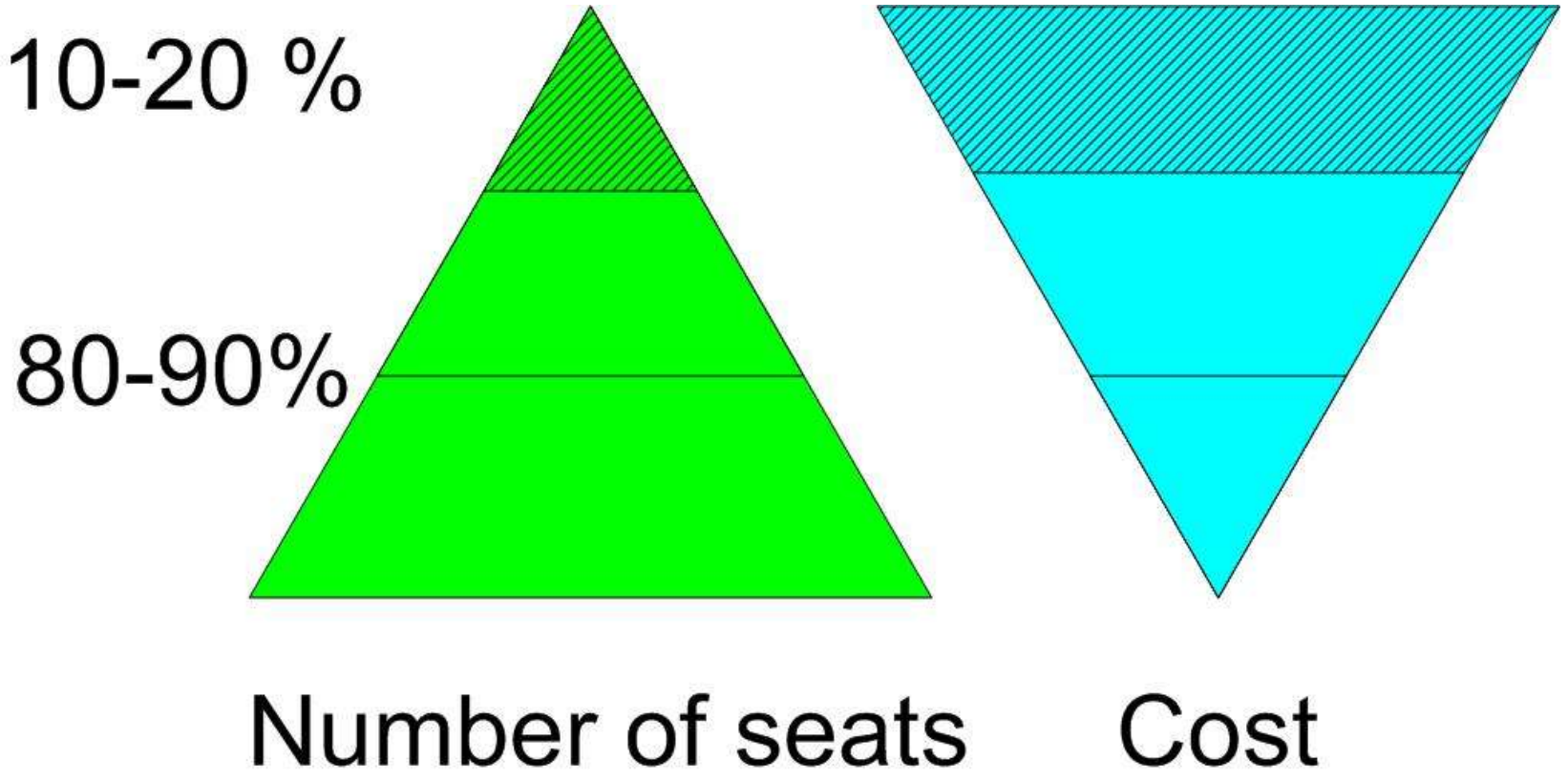


Web 2.0 Enables Field Force Participation

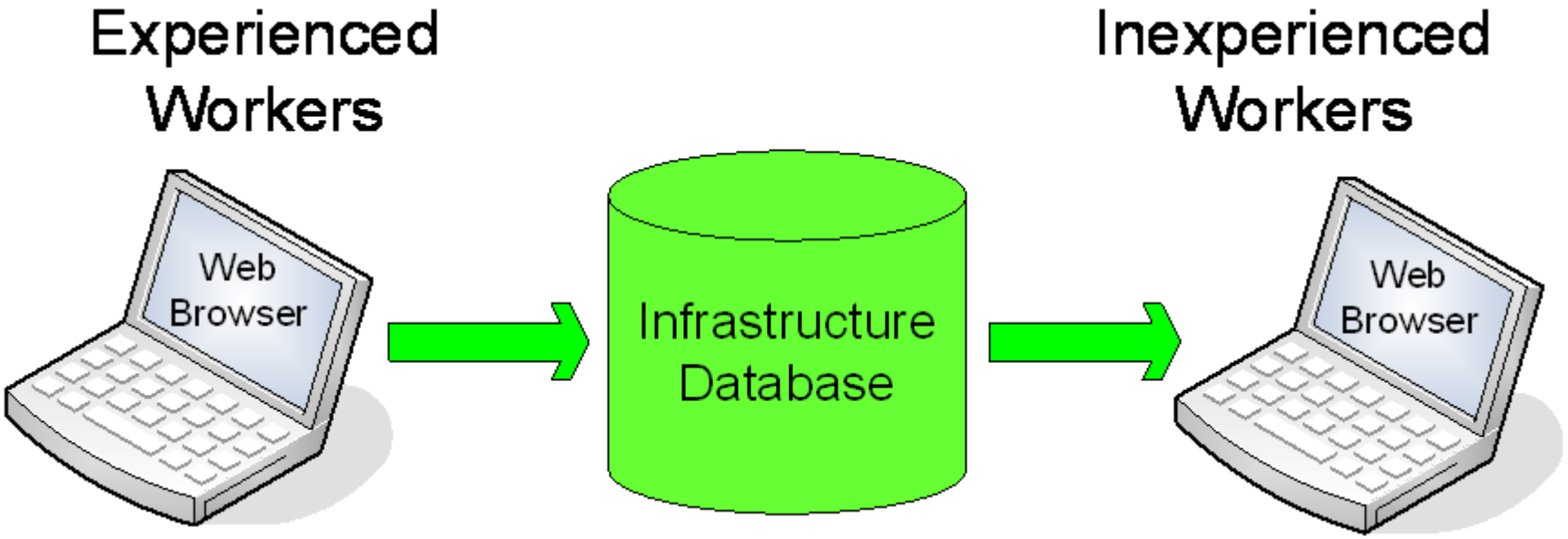
	Users	Appln	Relative number of users
Create	Drafters	CAD	100's
Edit		Web 2.0 Mapping	
View	Field staff	Paper or viewer	1000's



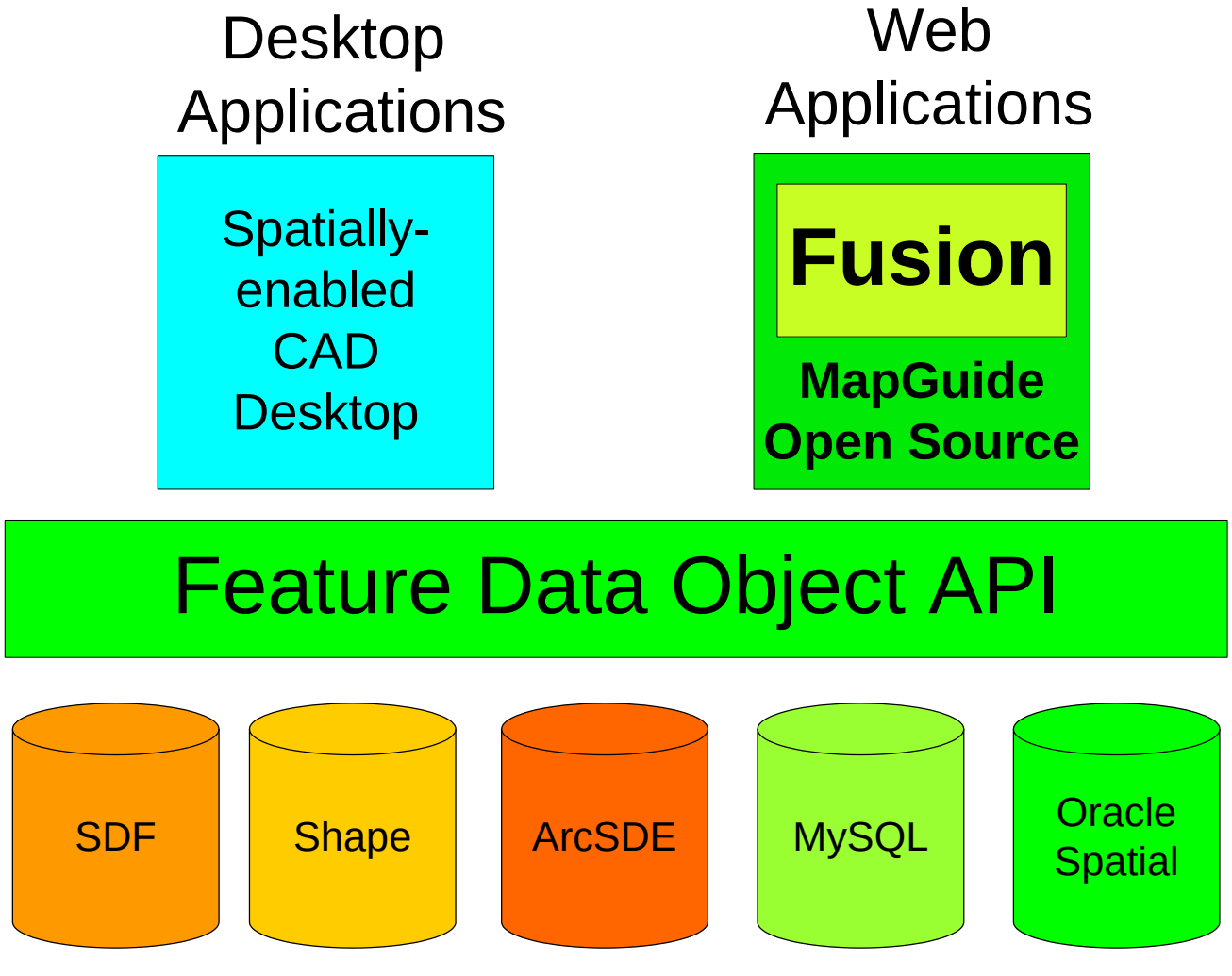
Web 2.0 Democratizes, Reduces TCO



Web 2.0 and the Aging Workforce

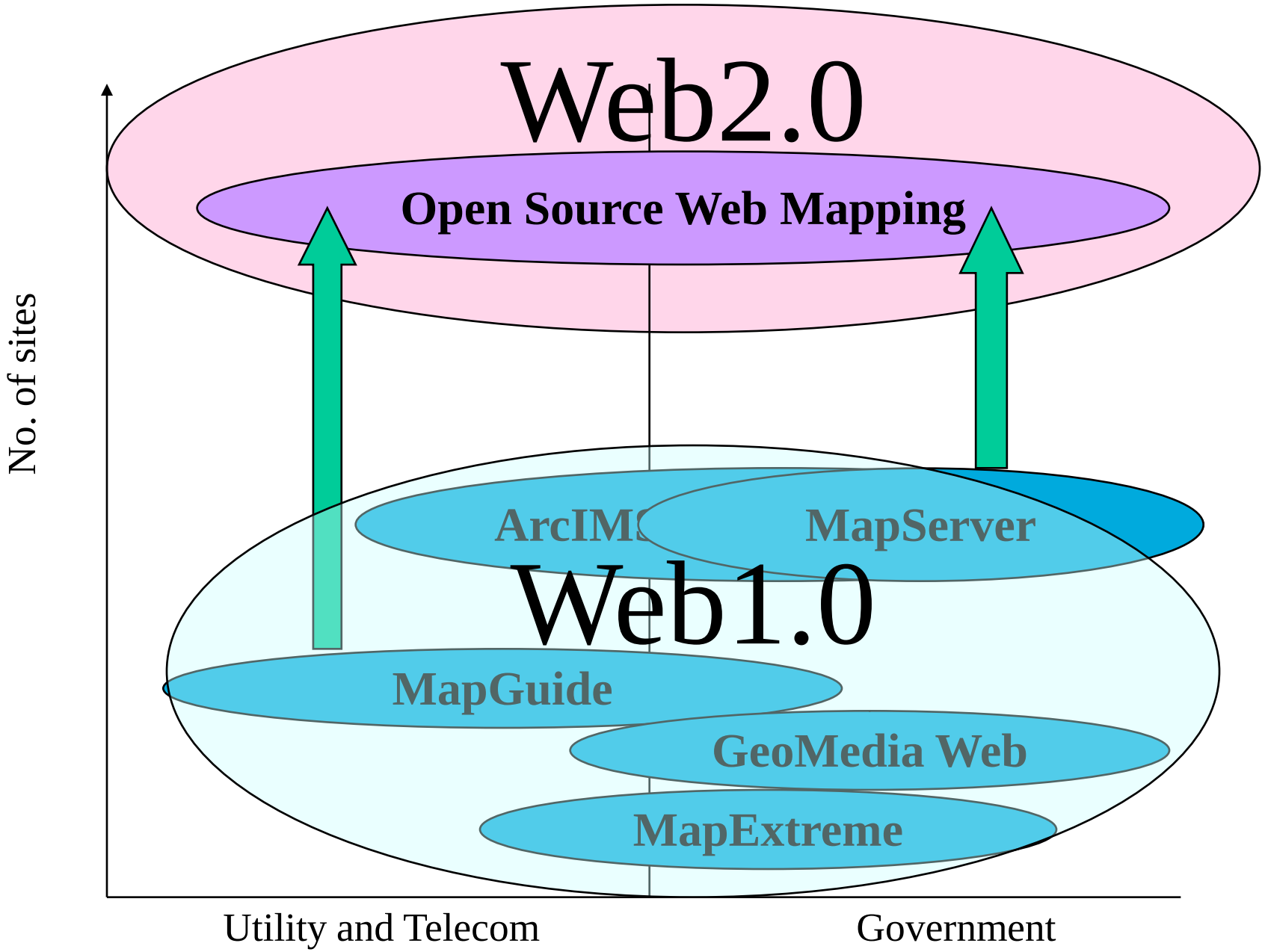


Web 2.0 Open Source Web Mapping Platform



Web 2.0 Open Source Web Mapping Platform

- **Feature Data Object (FDO) API**
  - Open source library supporting full spatial edit
- **Fusion**
  - Open source Web 2.0 application development environment
  - Technology preview *http://mapguide.osgeo.org/*
- **MapGuide Open Source (MGOS)**
  - Open Source web mapping server


Web2.0
Open Source Web Mapping
No. of sites
ArcIMS
MapServer
Web1.0
MapGuide
GeoMedia Web
MapExtreme
Utility and Telecom
Government

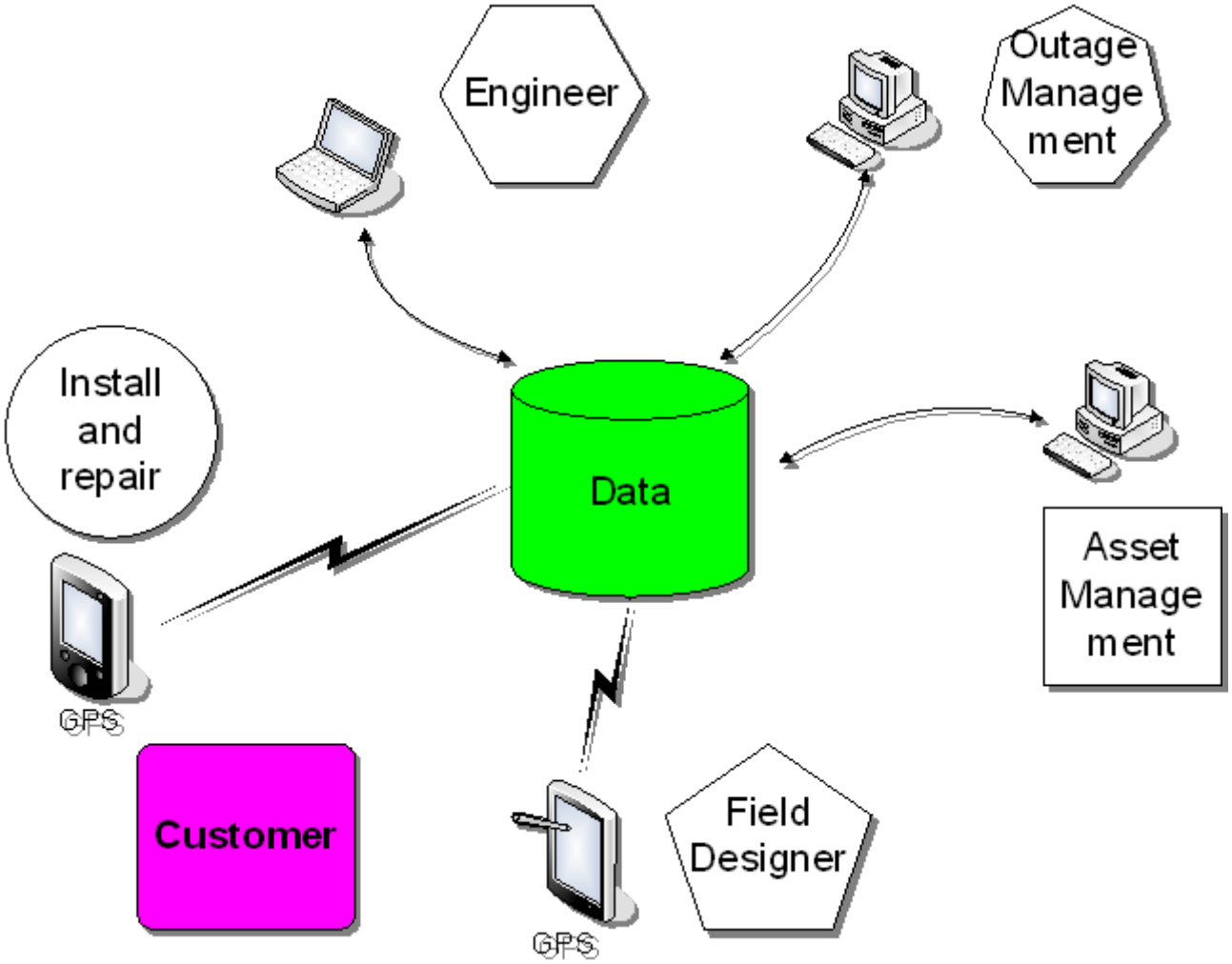
Summary

- ***Convergence* is breaking down islands of technology**
  - Architecture, engineering, geospatial, gaming, 3D simulation
  - Standards for convergence are emerging, Ex. IFC2x3g
- **Standards lead to commoditization**
  - Creates opportunity for open source
- **Convergence benefits eGovernment, utilities, telcos**
  - Emergency response, emergency planning, urban planning, operations
- **Web 2.0 mapping enables field force participation**
  - Open source Web 2.0 platform: *FDO*, *MapGuideOS*, *Fusion*

Autodesk Donating Map Projection Technology to OSGeo

- Autodesk is announcing that it plans to donate coordinate system and map projection technology to the geospatial open source community.
- Acquired from Mentor Software and its founder Norm Olsen.
- Supports the projections and transformations necessary to support over 3,000 coordinate systems worldwide.
- Norm Olsen will join Autodesk as a senior software engineer.
- Mentor is embedded in Autodesk's AutoCAD Map 3D and Autodesk MapGuide Enterprise, and is used by hundreds of thousands of organizations worldwide.
- Autodesk is preparing the source code for donation by ensuring that it is properly documented and organized as an open source project.
- Autodesk expects to donate the software as an open source project to OSGeo by the end of 2007.

Sharing Data Is Good



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