



Kansai Open Source 2007

Web 2.0 and Open Source Geospatial in the Real World

Geoff Zeiss, Director of Technology

Autodesk®



Worldwide Challenges

Global Climate Change



The Norwegian Nobel Committee

THE NOBEL PEACE PRIZE FOR 2007

The Norwegian Nobel Committee has decided that the Nobel Peace Prize for 2007 is to be shared, in two equal parts, between the Intergovernmental Panel on Climate Change (IPCC) and Albert Arnold (Al) Gore Jr. for their efforts to build up and disseminate greater knowledge about man-made climate change, and to lay the foundations for the measures that are needed to counteract such change.

Sustainable Infrastructure

- **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



Aging and Impaired Infrastructure



Singapore Nicoll Highway
Subsidence
Expressway



verside

explosion



Minneapolis Bridge Collapse 2007

Quebec Overpass Collapse
2006

Northeast Blackout 2003



Emergency Response Needs



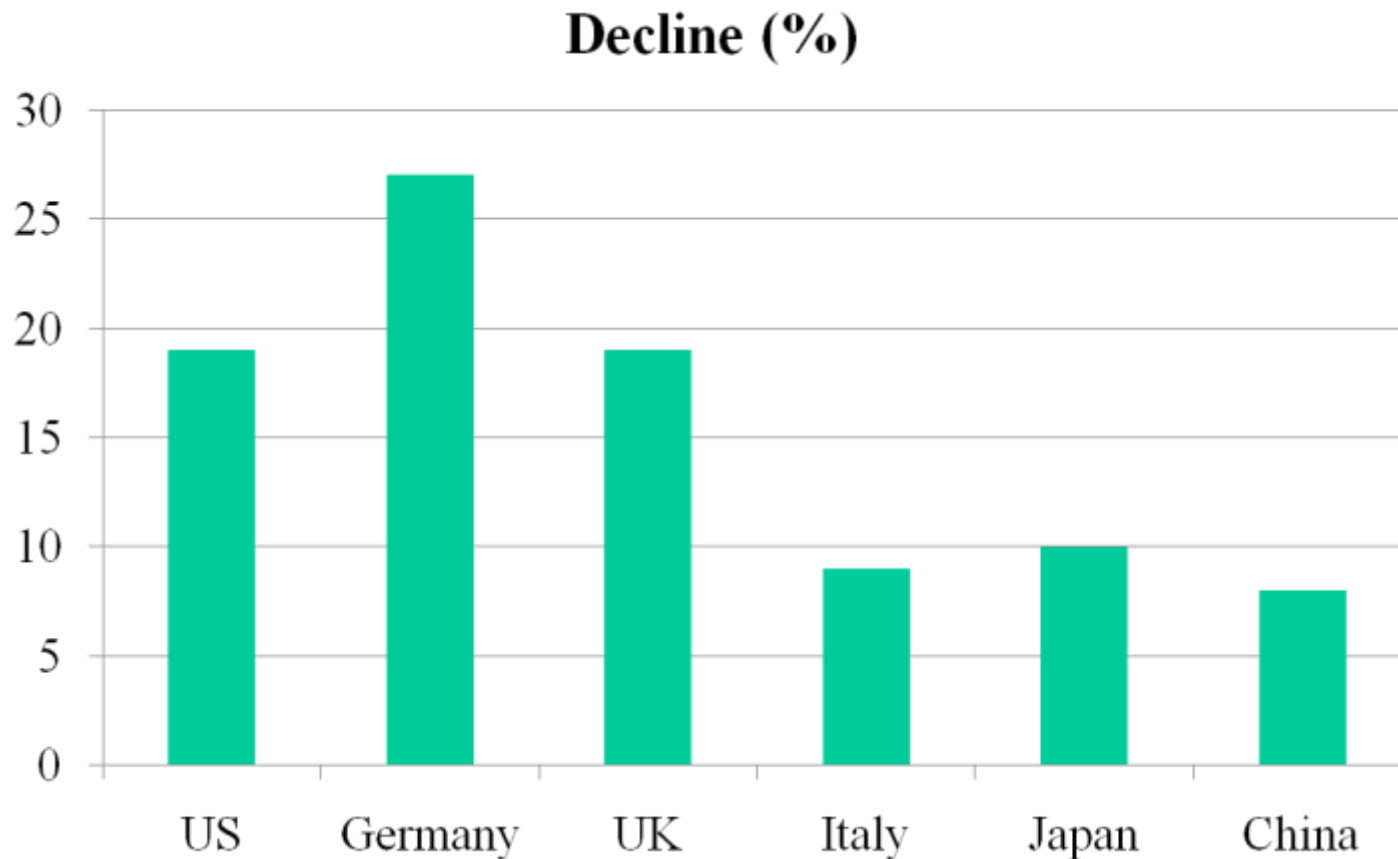
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Yogyakarta Earthquake 2006

Oklahoma City 1995

Challenge: Aging Workforce

Decline in Number of Workers Aged 35-44 by 2010



Annual Construction Spend

Worldwide \$ 2.3 trillion per year

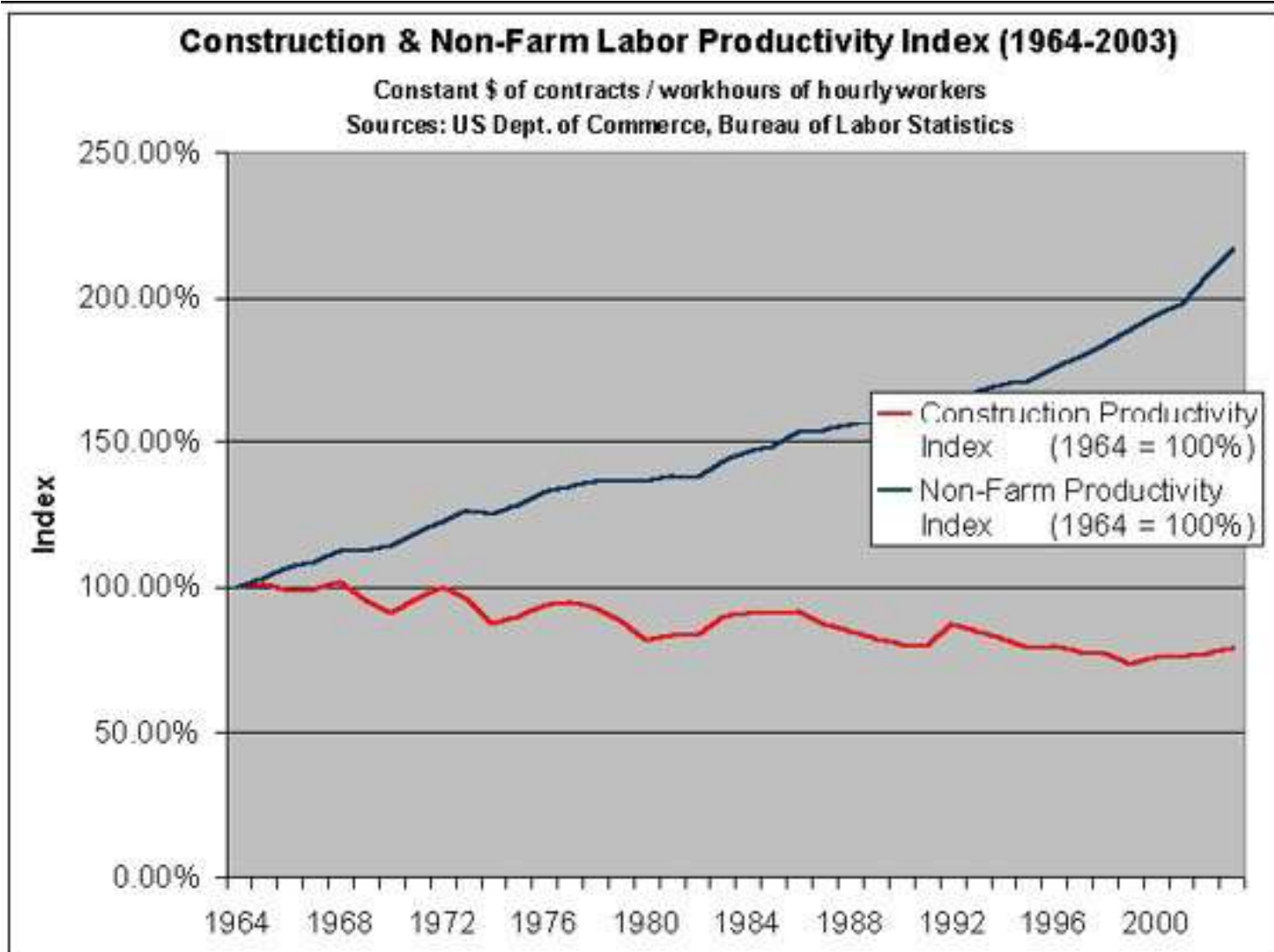
China \$ 88 billion (1Q 2007)

India \$ 50 billion per year

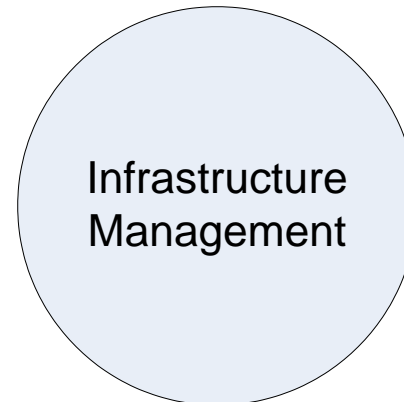
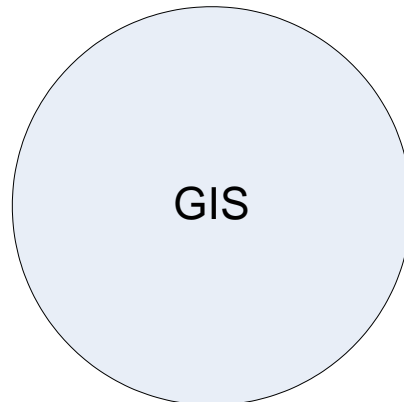
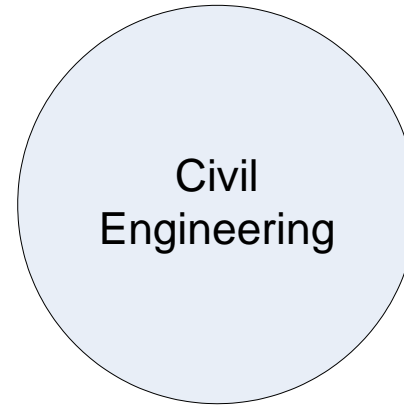
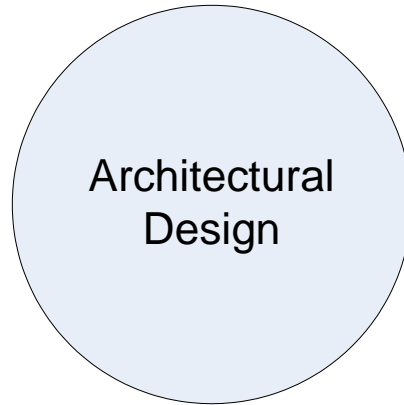
Canada \$68 billion (in 97\$) per year

US \$1.2 trillion per year

Challenge: Productivity



Operational Efficiency: Islands of Information

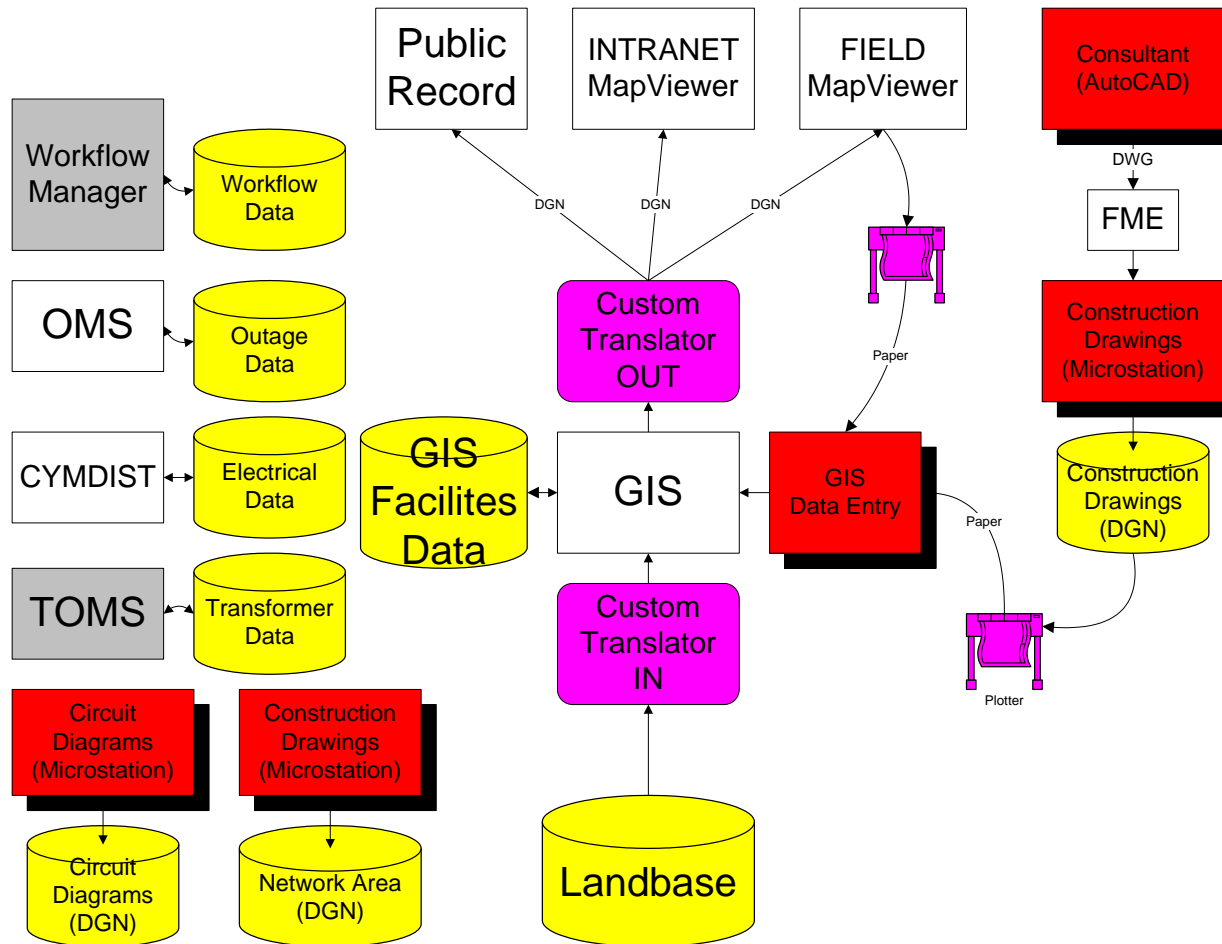


Operational Efficiency: Value of Interoperability

2002 National Institute of Standards and Technology (NIST) Study

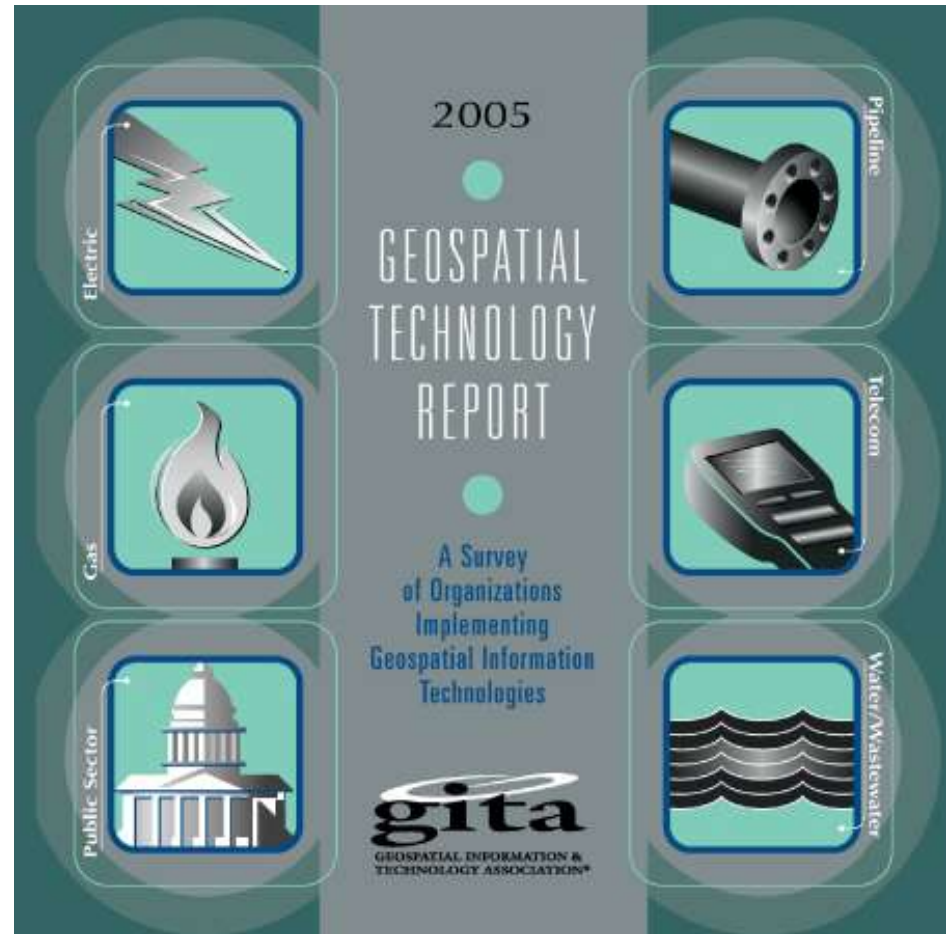
- Quantified efficiency losses in the U.S. capital facilities industry from inadequate interoperability over entire facility life-cycle.
- Estimated poor interoperability costs **\$15.8 billion**
- “Likely to be a conservative figure” - NIST

Typical Utility System Map



Challenge: Multi-Vendor Interoperability

Annual GITA survey of utilities



Challenge: Multi-Vendor Interoperability

Year	Number of organizations surveyed	Proportion using more than one GIS	Proportion sharing data
2002	187	NA	NA
2003-2004	204	1/3 - 1/2	2/3
2005	294	60%	2/3
2006	386	70%	2/3

Challenge: Proliferation of Formats

Perhaps we need a
Format Non-
Proliferation Treaty!



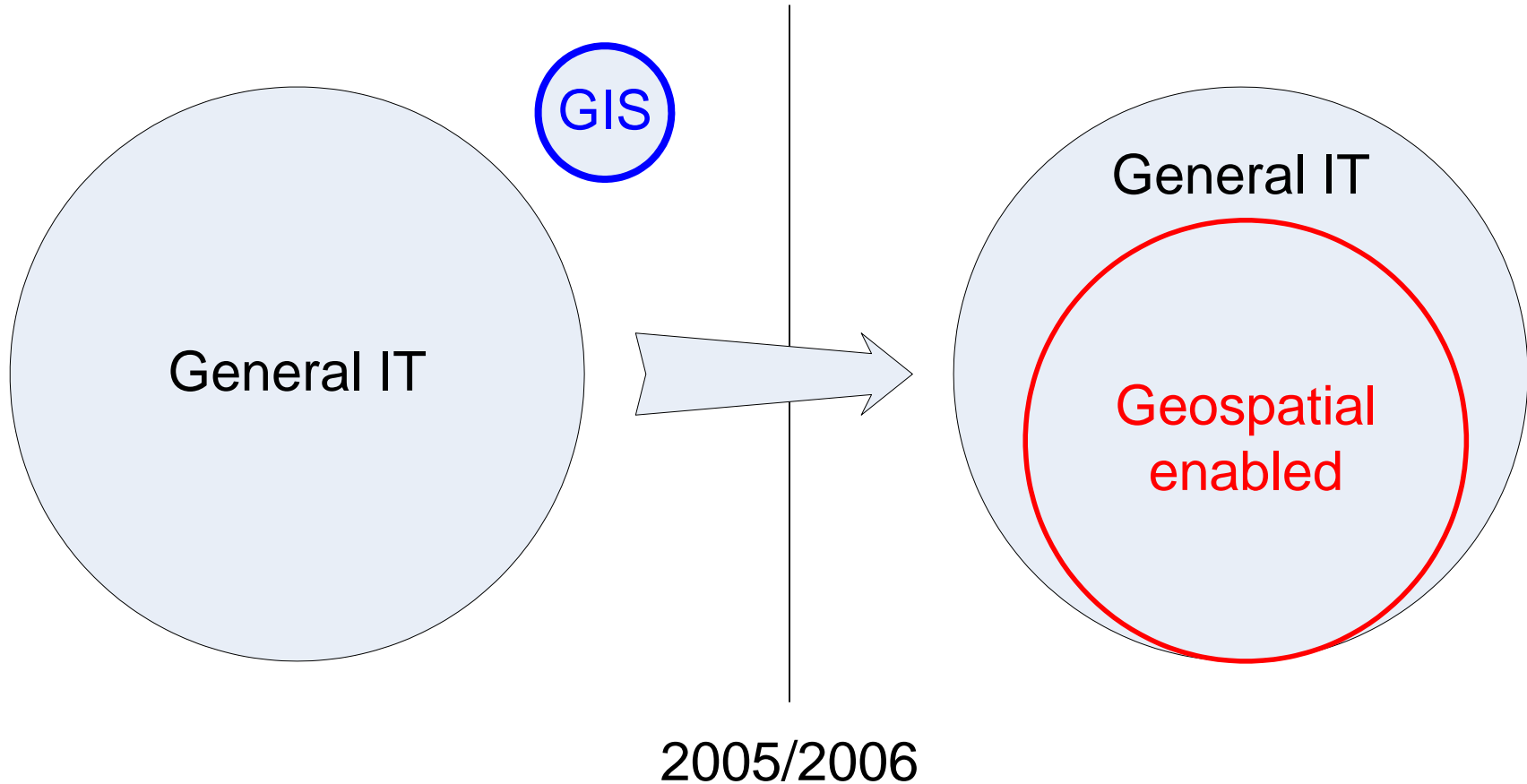


Industry is Developing New Technologies

New Technologies

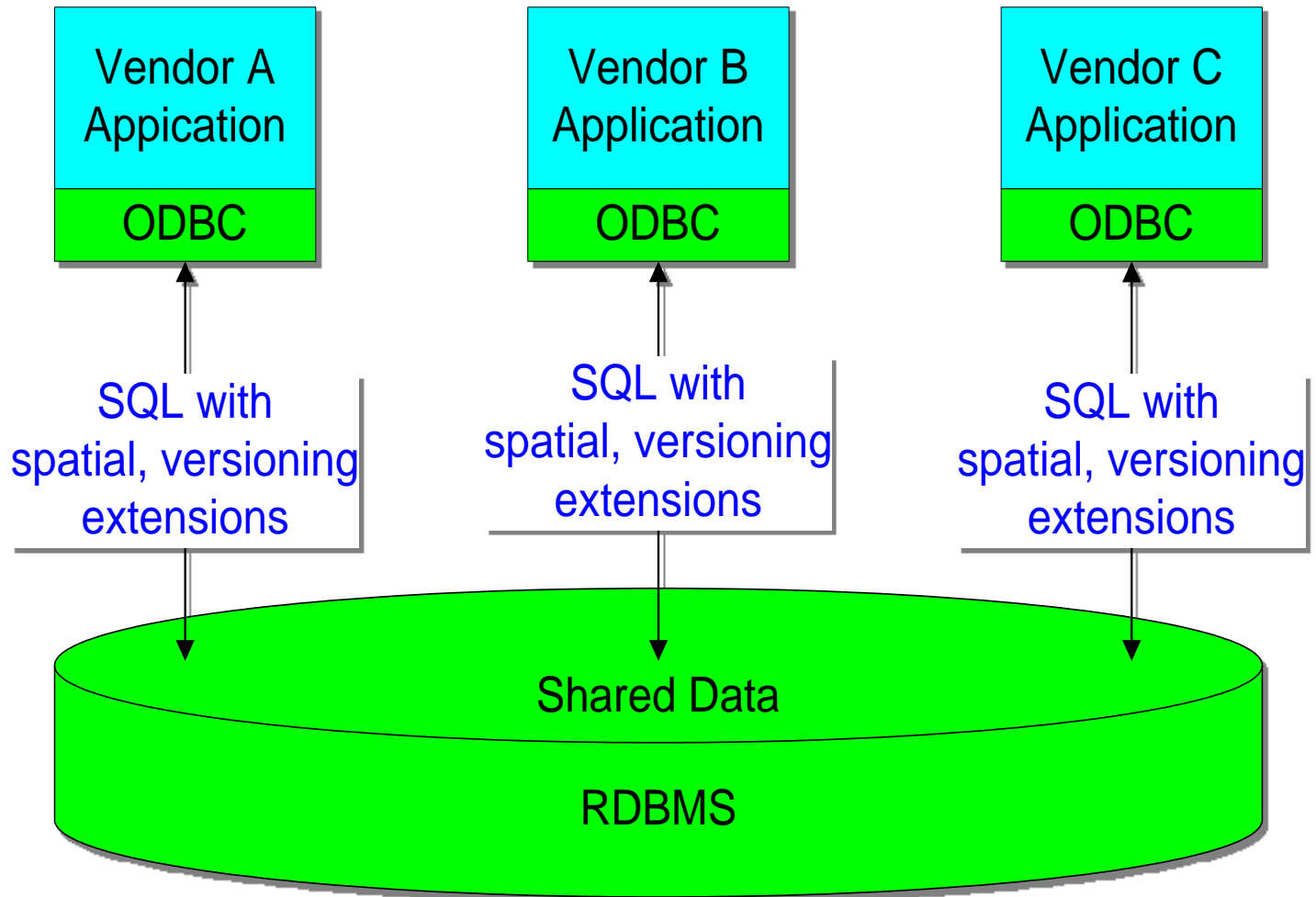
- **Location-enabling**
 - Web, RDBMS,...
 - CAD, BIM ...
- **Single point of truth**
 - Ex. spatially-enabled RDBMS
- **Smarter design**
 - Rule-based data creation and editing
- **Standards**
 - OGC
- **Web 2.0**
 - Enables participation

Location-enabling IT



Examples: Web search, RDBMS, CAD, architectural design, engineering,
...

Single point of truth



Smarter Design: Rule-based electrical design applications

- **Rule-based electrical design**
 - Voltage drop calculation
 - Sag analysis
 - Guying
 - Automatic bill of materials
 - Integrated compatible units
 - Job estimating
- **Benefits**
 - Improved productivity
 - Inexperienced workers productive sooner

Web 2.0 Enables Participation

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



OSGeo
Your Open Source Compass

Journal home >

- Journal home
- Advance online publication
- Current issue
- Archive**
- Supplements
- Web focuses
- Multimedia
- About the journal

News

Nature 438, 500

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.

Wikipedia vs Encarta



CHART OF THE WEEKLY ALL SITES MARKET SHARE IN 'EDUCATION - REFERENCE', BASED ON VISITS. TIME PERIODS REPRESENTED WITH BROKEN LINES INDICATE INSUFFICIENT DATA. GENERATED ON: 08/25/2006. COPYRIGHT 2006 (C) 'HITWISE PTY LTD'.

Open Standards



Advancing open standards for the information society

Standards create fertile ground for 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 Example: Apache Foundation

•NCSA HTTP Server and the Apache Group

- Mid 90's: Apache Group formed by eight NCSA HTTP Server programmers
- Objective to coordinate "patches"

•Challenge: commercializing the web

- IBM and others
- Trying to decide how to monetize web

•Creation of the Apache Foundation

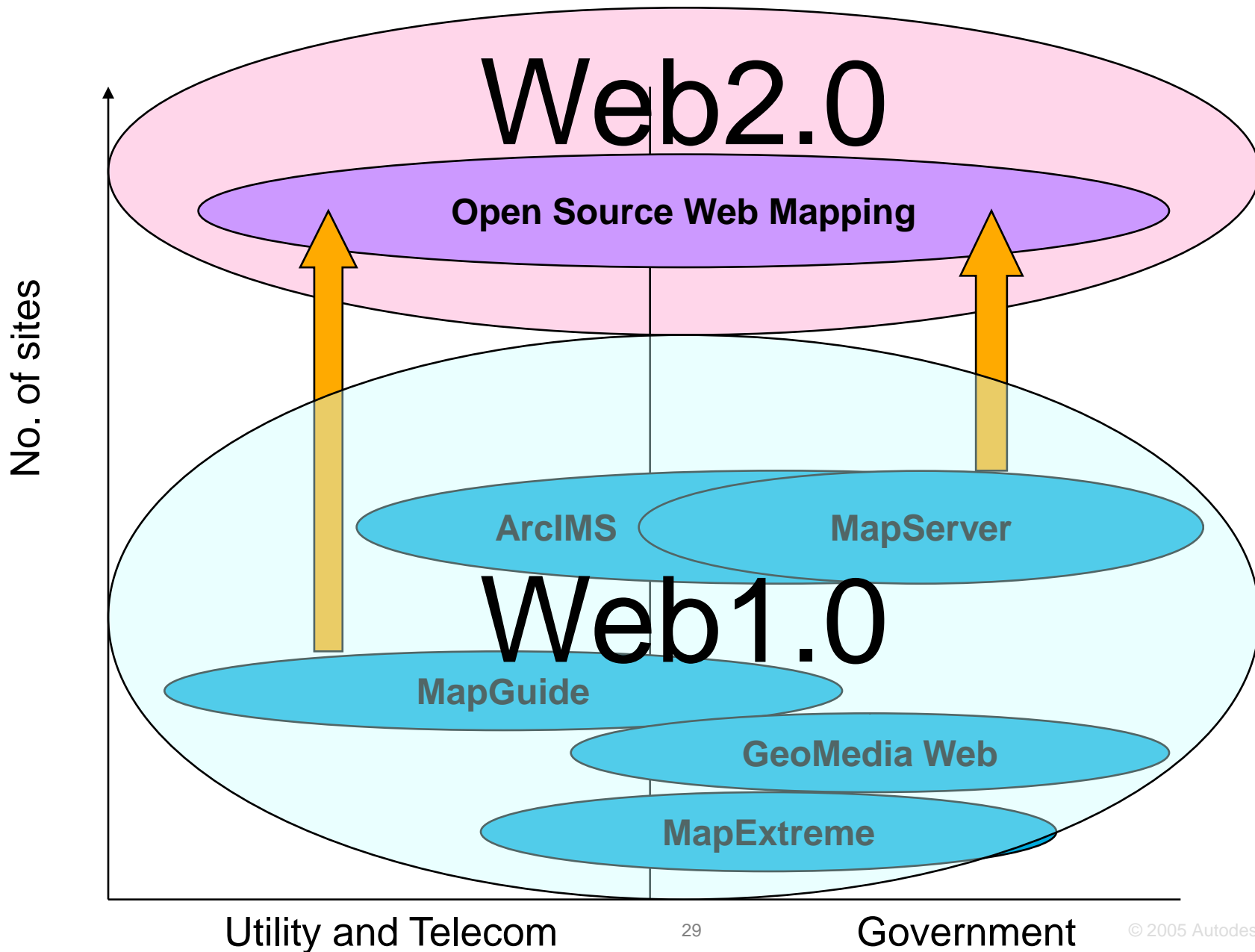
- 1999 IBM decided to support the Apache Web Server
- Members of the Apache Group formed the Apache Foundation,
- Legal entity, to provide organizational, legal, and financial support for the Apache web server.

•Result: Apache Web Server

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

Web Mapping is Commoditized

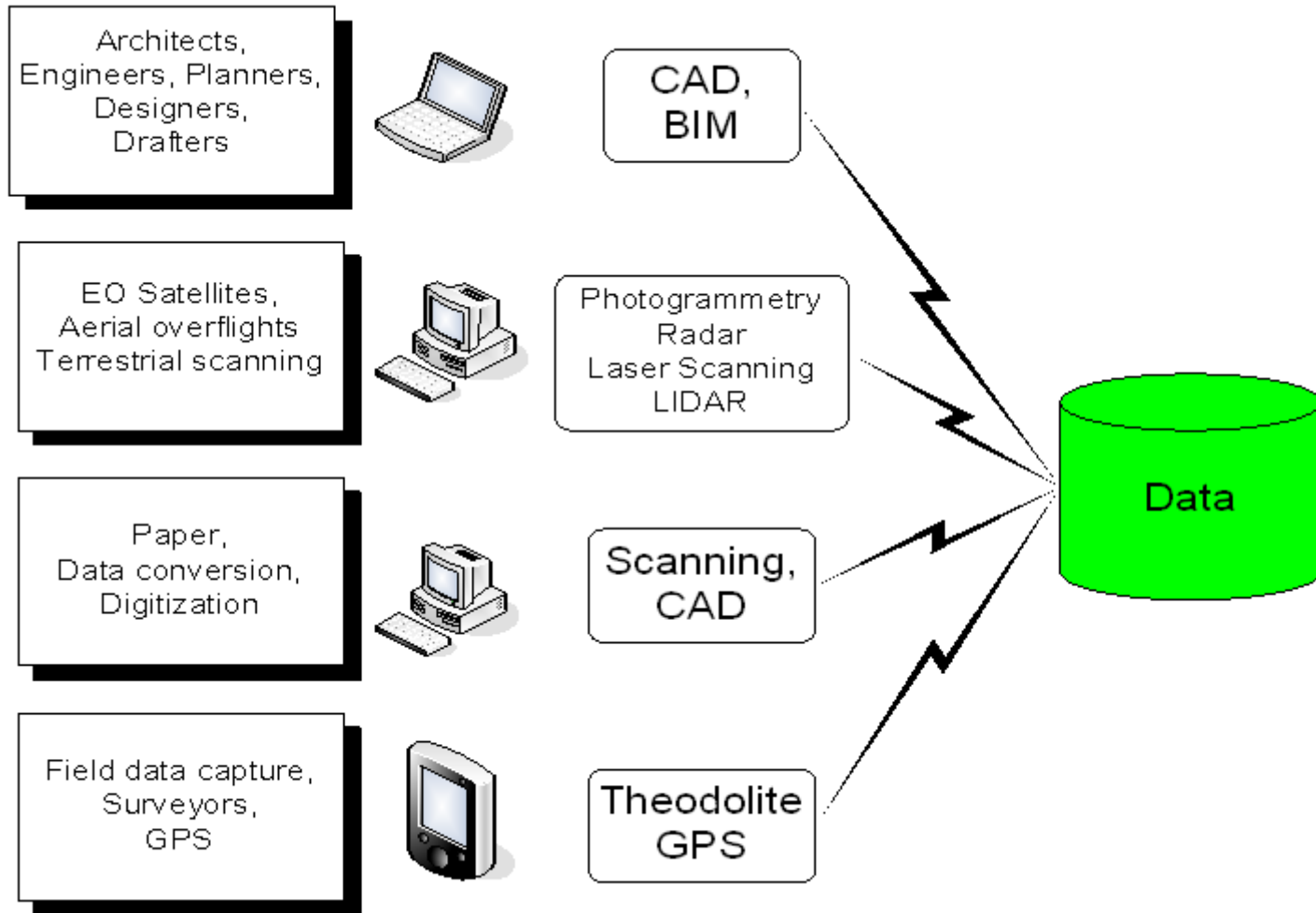
- **Web mapping should be open source**
 - Analogy with *Apache Web Server* in late 90's
 - Less complex than desktop applications
 - Becoming commoditized
 - Successful open source community around *MapServer*
- **User benefits**
 - More frequent software releases
 - Faster innovation, support for standards
 - Lower cost of ownership



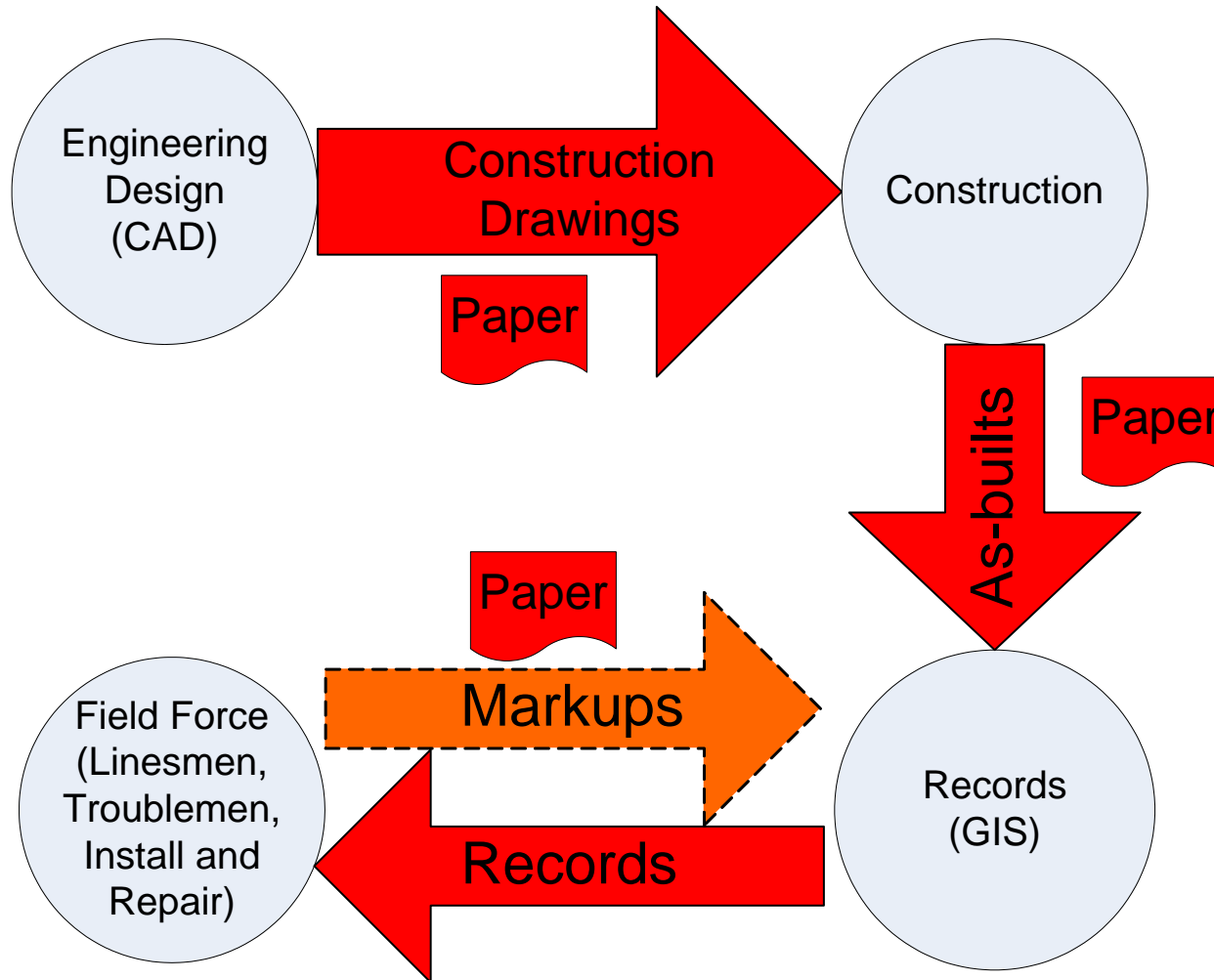


Infrastructure Information Flow in Utilities and Telcos

CAD/BIM is a Primary Data Source of Precision Infrastructure Information



Inefficient Flow of Infrastructure Information



Infrastructure Management Challenges

- ✗ Information silos
 - ✗ Vendor interoperability
- ✗ Redundant data
 - ✗ Redundant processes
 - ✗ Poor data quality
- ✗ Expensive
- ✗ Exacerbated by aging workforce

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
- **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*

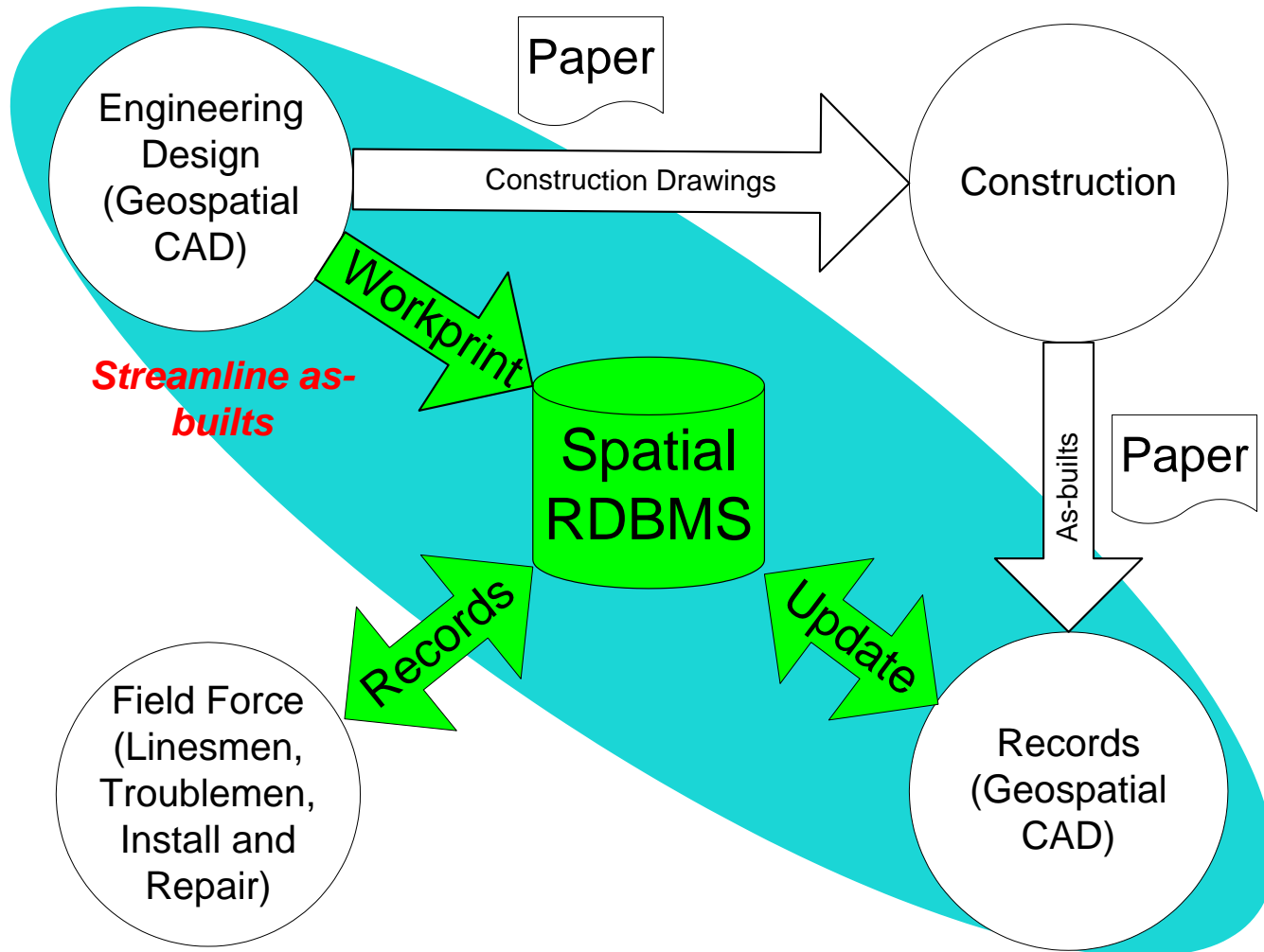
Components of the Solution

- **Single point of truth**
 - Shared spatial data
 - Eliminates data redundancy
- **Spatially-enabled CAD**
 - Reduces paper flow
 - Eliminates backlogs
- **Web 2.0**
 - Enables field force participation

Benefits of Single Point of Truth

- **Eliminates data redundancy**
- **Enables business processes that drive data quality**
 - Eliminates backlogs,
 - Enables field force participation
- **Universal open data access**
 - Data accessible via SQL, ODBC
 - Multi-vendor interoperability

Spatially-enabled CAD



What is Web 2.0 ?

Web 1.0

DoubleClick

Ofoto

Akamai

mp3.com

Britannica Online

personal websites

Evite

Domain name speculation

Page views

Screen scraping

Publishing

Content management systems

Directories (taxonomy)

Stickiness

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Web 2.0

Google AdSense

Flickr

BitTorrent

Napster

Wikipedia

blogging

upcoming.org and EVDB

search engine optimization

cost per click

web services

Participation

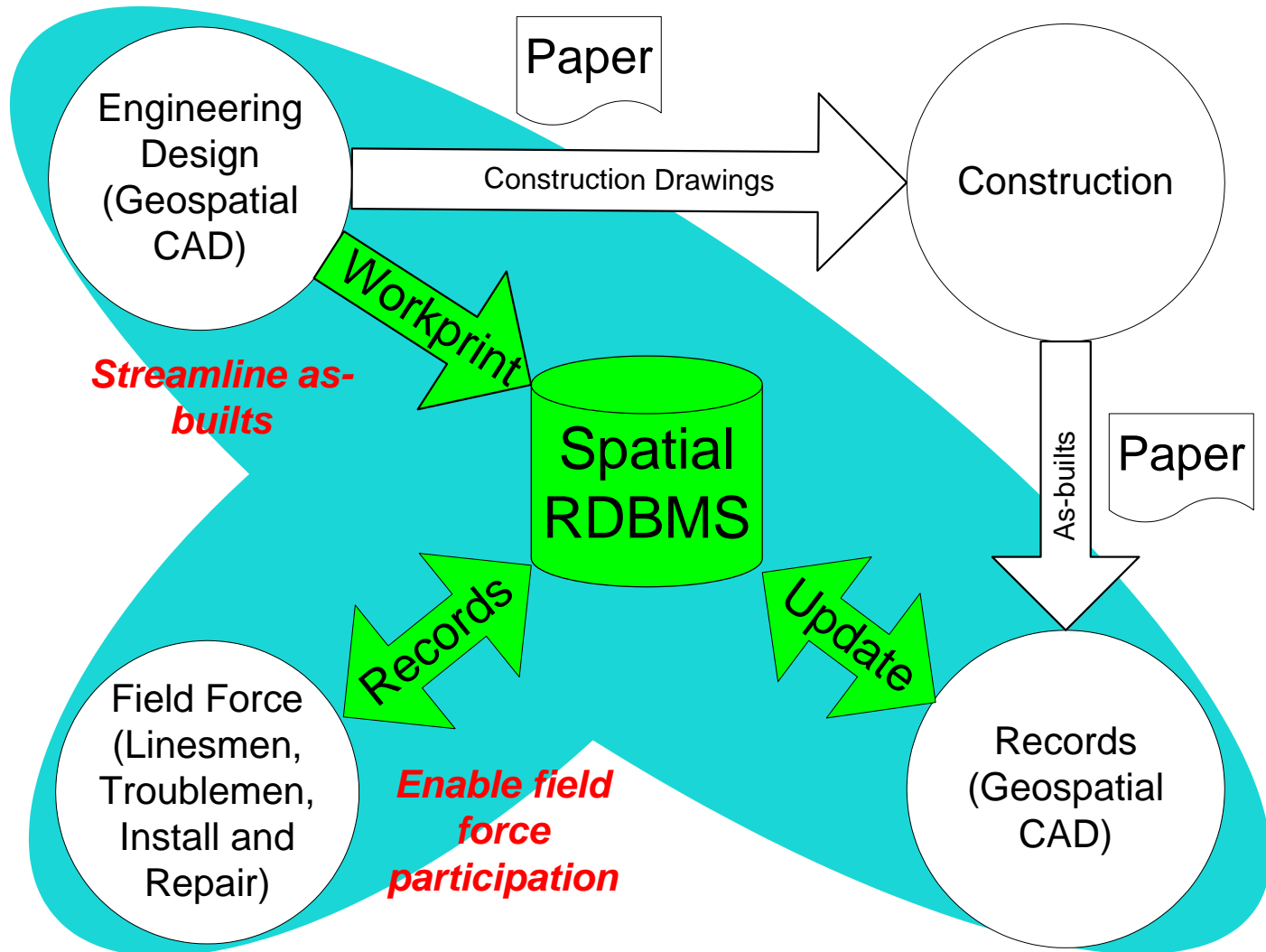
wikis

tagging ("folksonomy")

syndication

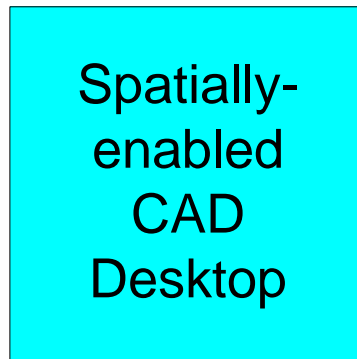
Source: Tim O'Reilly "What is Web 2.0?"

Web 2.0 Enables Field Participation

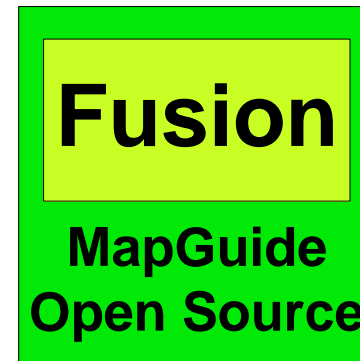


Web 2.0 Open Source Web Mapping Platform

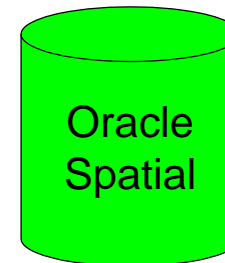
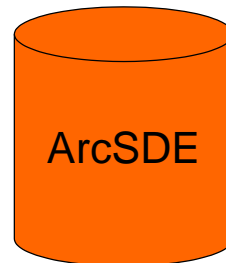
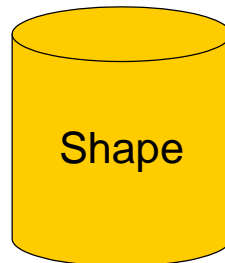
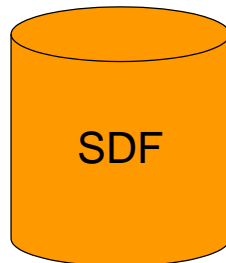
Desktop Applications



Web Applications



Feature Data Object API



Web-based Spatial Editing

- **FDO**
- **Map Guide Open Source + Fusion**
- **OpenLayers extension for vector creation and editing**
- **FeatureServer**

MapGuide Open Source

Deploy on...



Windows

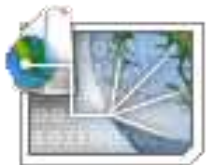


Linux

Develop with...



Serve with...



Microsoft IIS



Apache Web Server

Browse with...



Internet Explorer



Safari



Mozilla Firefox

FDO Data Access Technology

Autodesk, **Third-Party** and **Open Source** FDO Providers

Databases

- Oracle®
- Oracle Spatial
- ArcSDE®
- MySQL®
- Microsoft® SQL Server™
- ODBC Compliant DB
- ESRI Personal GeoDatabase
- GRASS
- PostGIS/PostgreSQL

Vector Data Formats

- SDF
- ESRI SHP
- WFS
- DXF
- MapInfo .TAB
- U.S. Census TIGER/Line
- Arc/Info Coverage
- GML
- U.K. .NTF
- INTERLIS
- S-57 (ENC)
- SDTS
- KML

Raster Data Formats

- JPG2K
- MrSID®
- TIFF/GeoTIFF
- ECW
- DEM
- ESRI Grid
- DTED
- NITF
- WMS
- NLAPS Data Format
- GRASS
- GMT
- HDF4/HDF5
- HFA
- PCRaster
- RMF
- SGI
- WCS

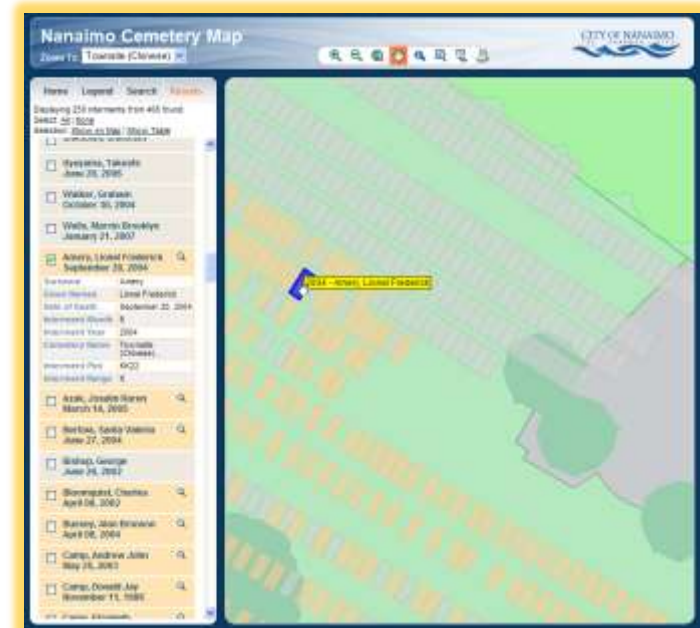
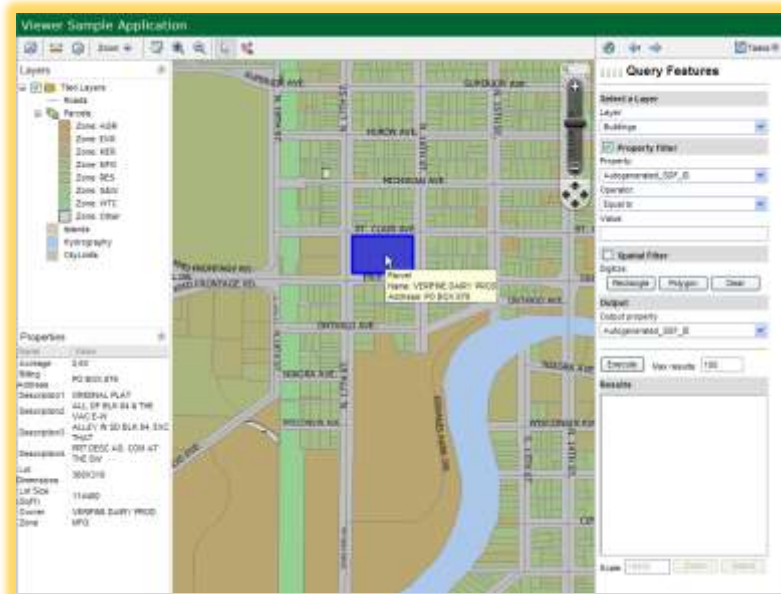
FUSION

Flexibility for design and control

- Customizable library of web mapping tools and controls
- Created through open source


MapGuide Open Source layout...

... and with Fusion

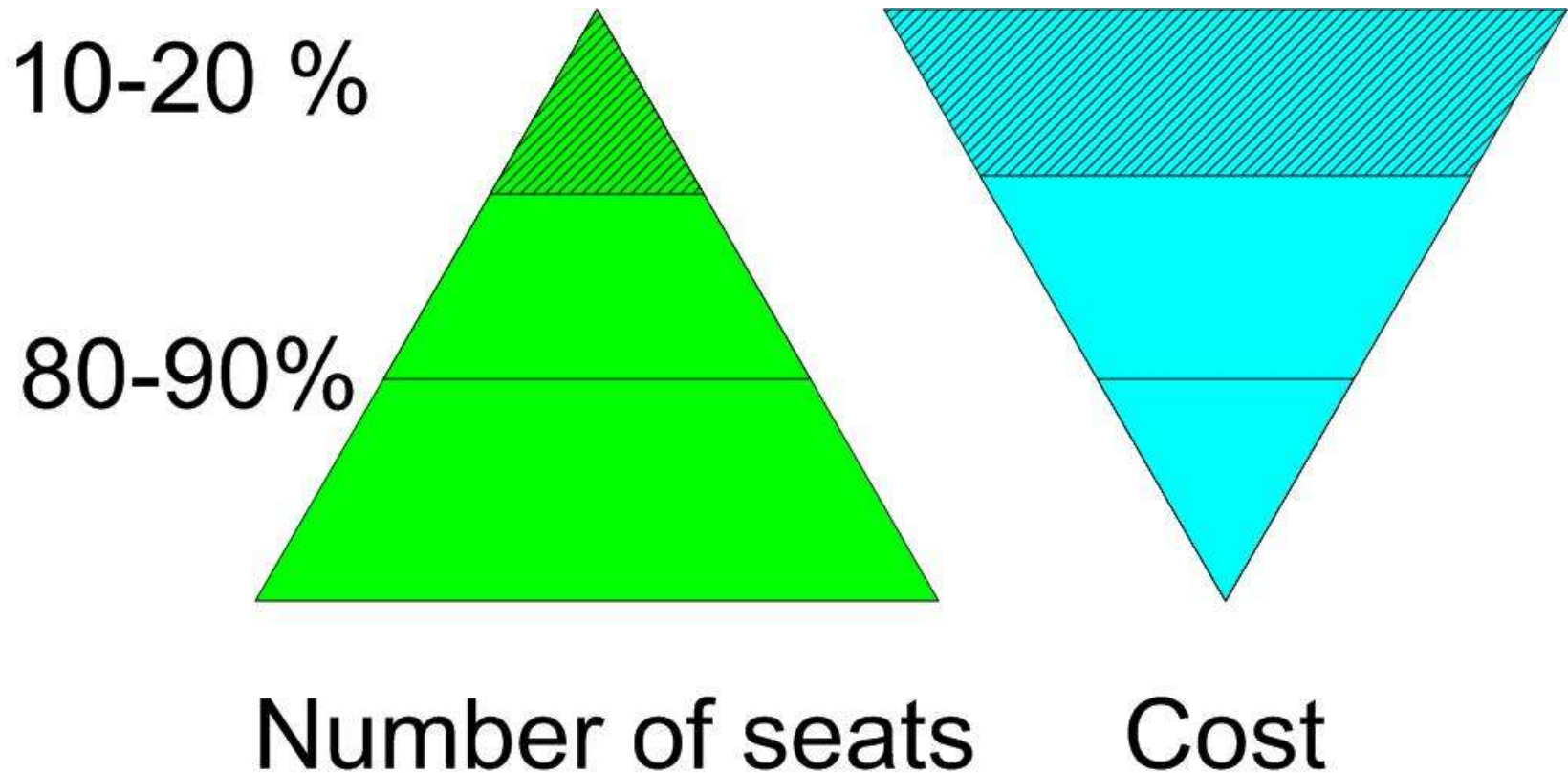


Web 2.0 Enables Field Force Participation

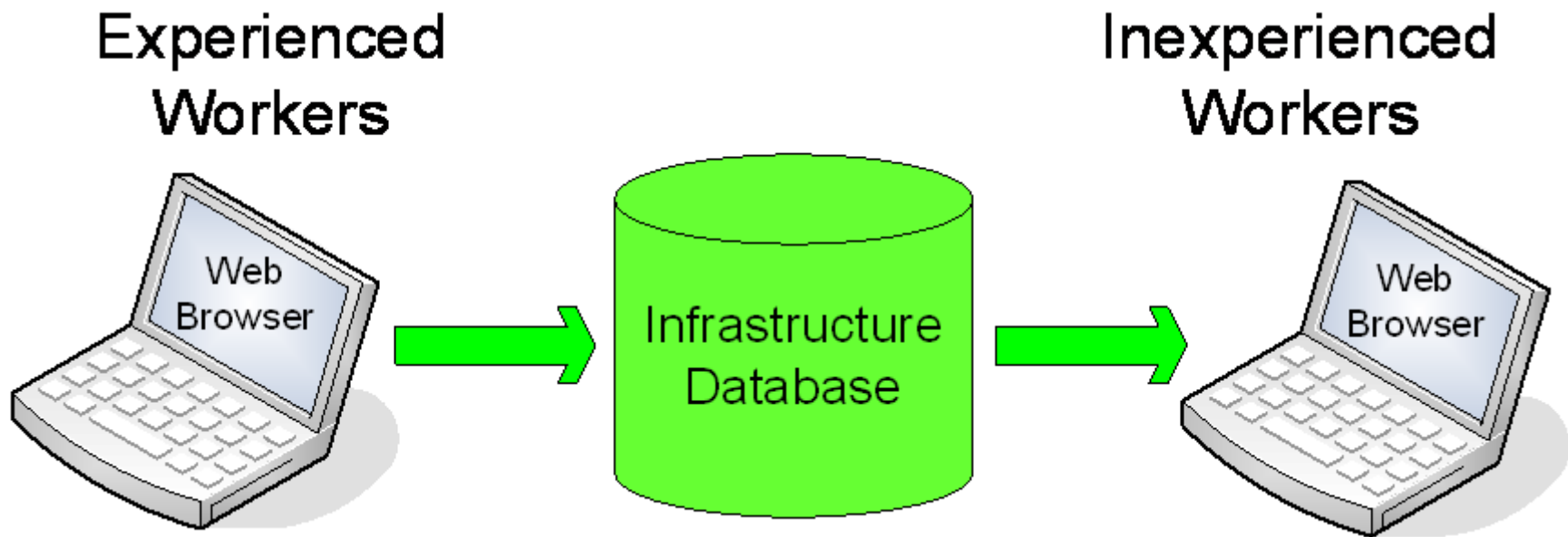
	Users	Appln	Relative number of users
Create	Drafters	CAD	100's
Edit		Web 2.0 Mapping	
View	Field staff	Paper or viewer	1000's



Web 2.0 Democratizes, Reduces TCO



Web 2.0 and the Aging Workforce





Interoperable Solutions are Real

October 2007

Interoperable Solutions

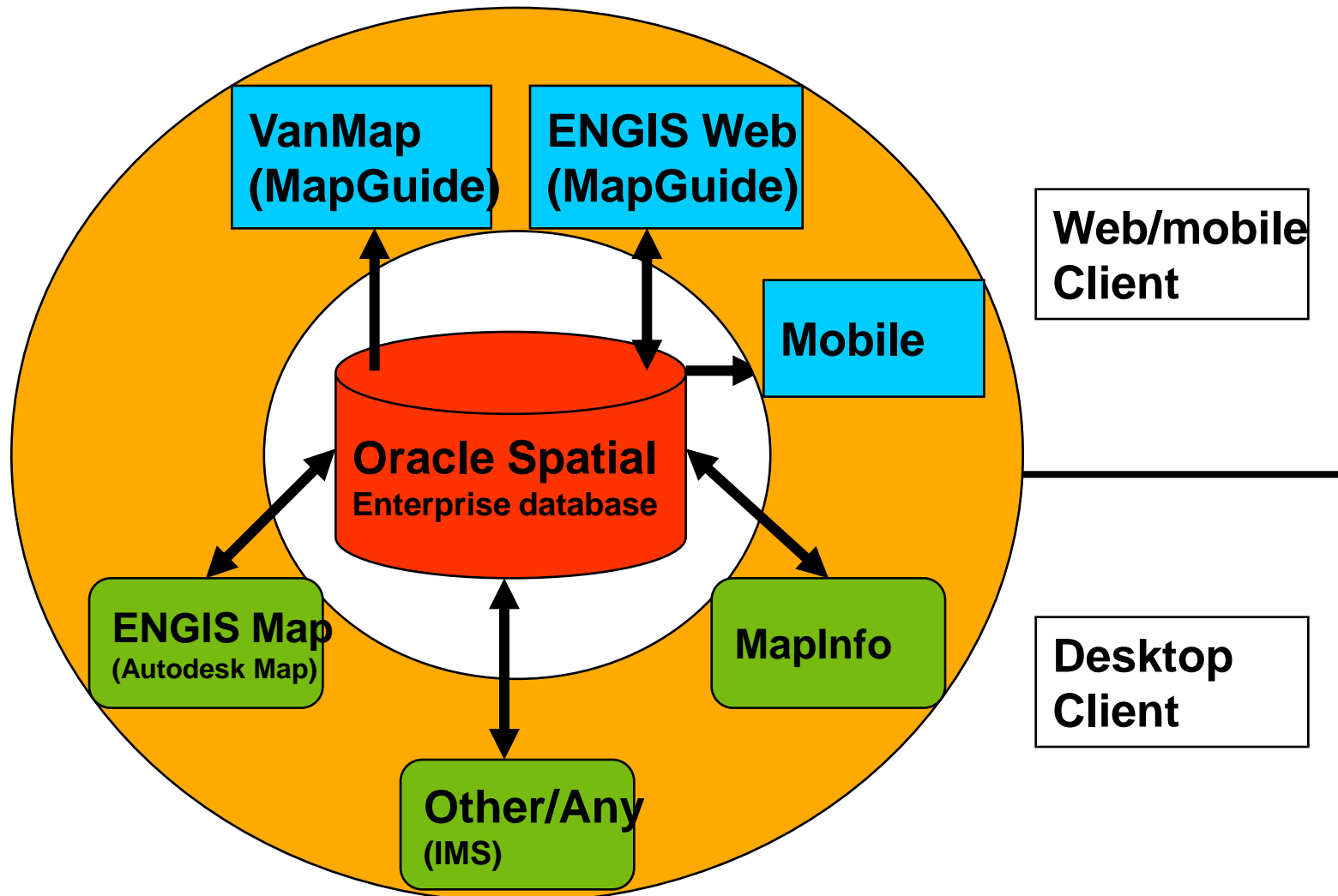
Examples

- **City of Vancouver**
- **Telekom Serbia**
- **Telefonica SP**
- **US Air Force Materiel Command**

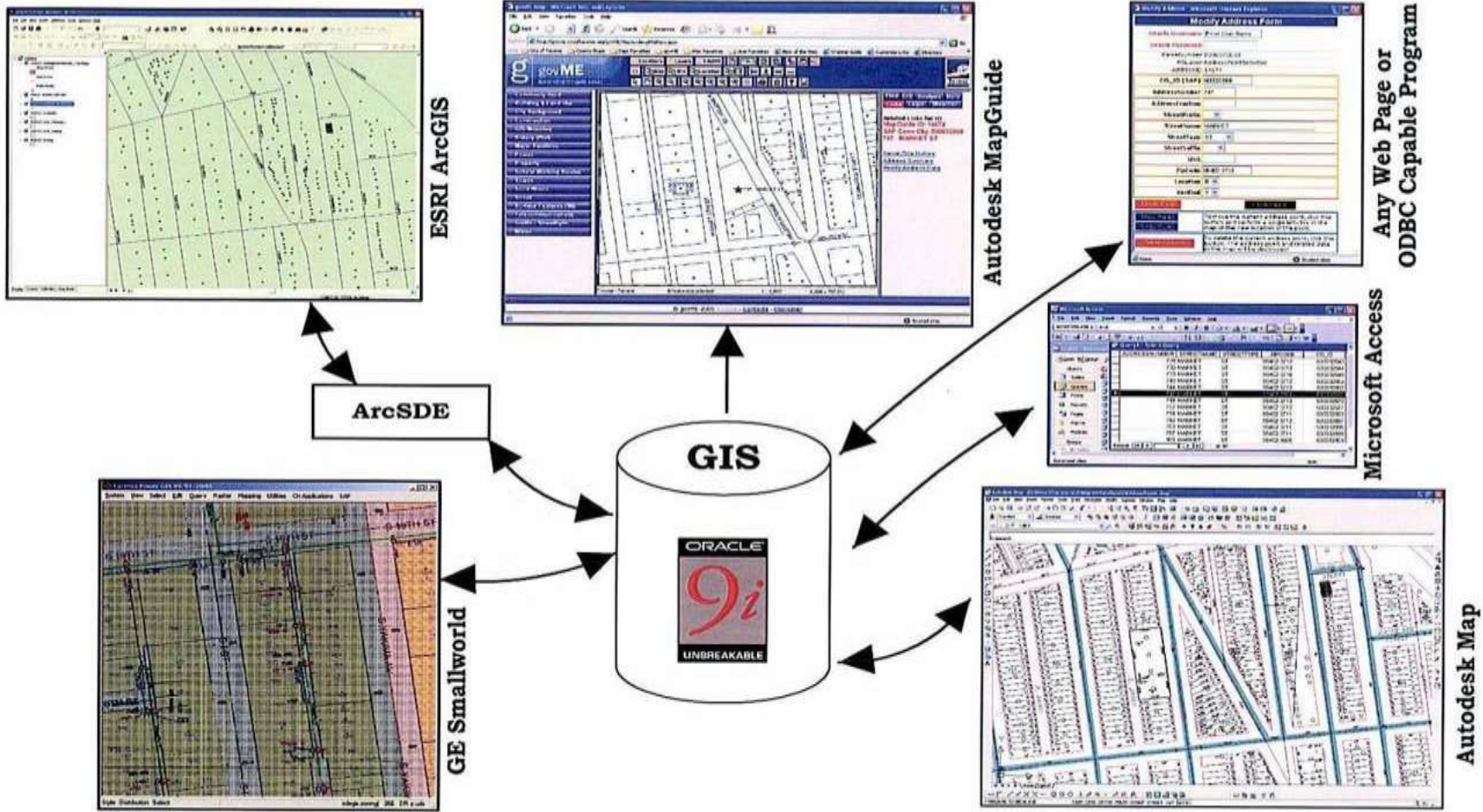
Examples Reported at GITA 2006

- **City of Tacoma**
 - Autodesk, ESRI, GE/Smallworld
- **City of San Jose**
 - Intergraph, MapInfo, ESRI, Bentley

City of Vancouver



City of Tacoma



Telekom Serbia

Single Point of Truth

- Eliminates data redundancy

CAD/GIS integration

- Eliminates redundant data and processes
- Eliminates backlogs

Improved customer service

- Provisioning a telephone line reduced from **40** days to **2** days.

Telefonica SP

Operations

Cost of provisioning reduced
by 40%

Cost of assignments
reduced by 60%

Increased number of
automated assignments

Reduced number of errors



Engineering

Eliminated backlogs

Design lifecycle reduced
from weeks to days

Automated as-builts

SAP integration

Marketing

- More rapid growth in broadband customers
- Cost of targeted marketing to broadband customers reduced
- Identification of broadband dark areas

Telefonica SP

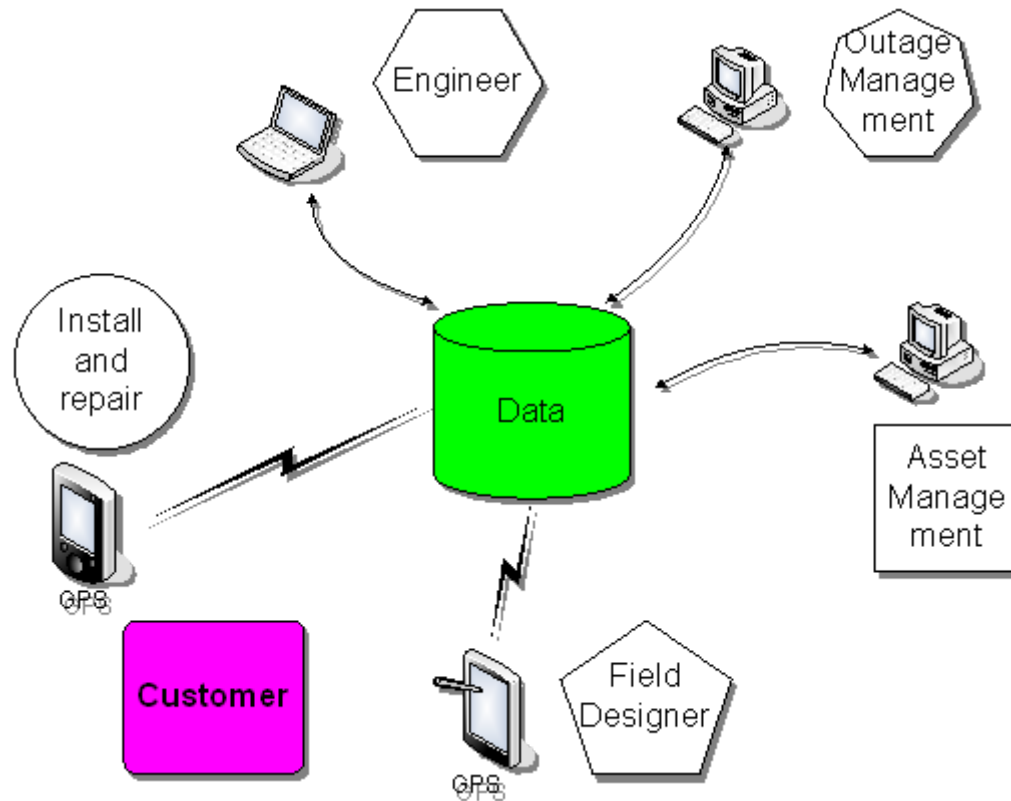
Total investment completely recouped by the end of the project.



Summary

- **Islands of technology**
 - Leads to inefficient flow of design information
- ***Convergence***
 - Breaks down islands of technology in the construction, utility, telecommunications and other industries
- **Web mapping is commoditized**
 - Fertile ground for open source
- **Web 2.0 technologies harness the collective intelligence**
 - Enable field force participation
- **Mitigates challenge of aging workforce**

Sharing Data Is Good



Technology is no longer the
excuse

Autodesk®

www.osgeo.org

geoff.zeiss@autodesk.com

geospatial.blogs.com