Next Generation Geographic Information System (GIS) in the State of Hawaii – Lets Go!
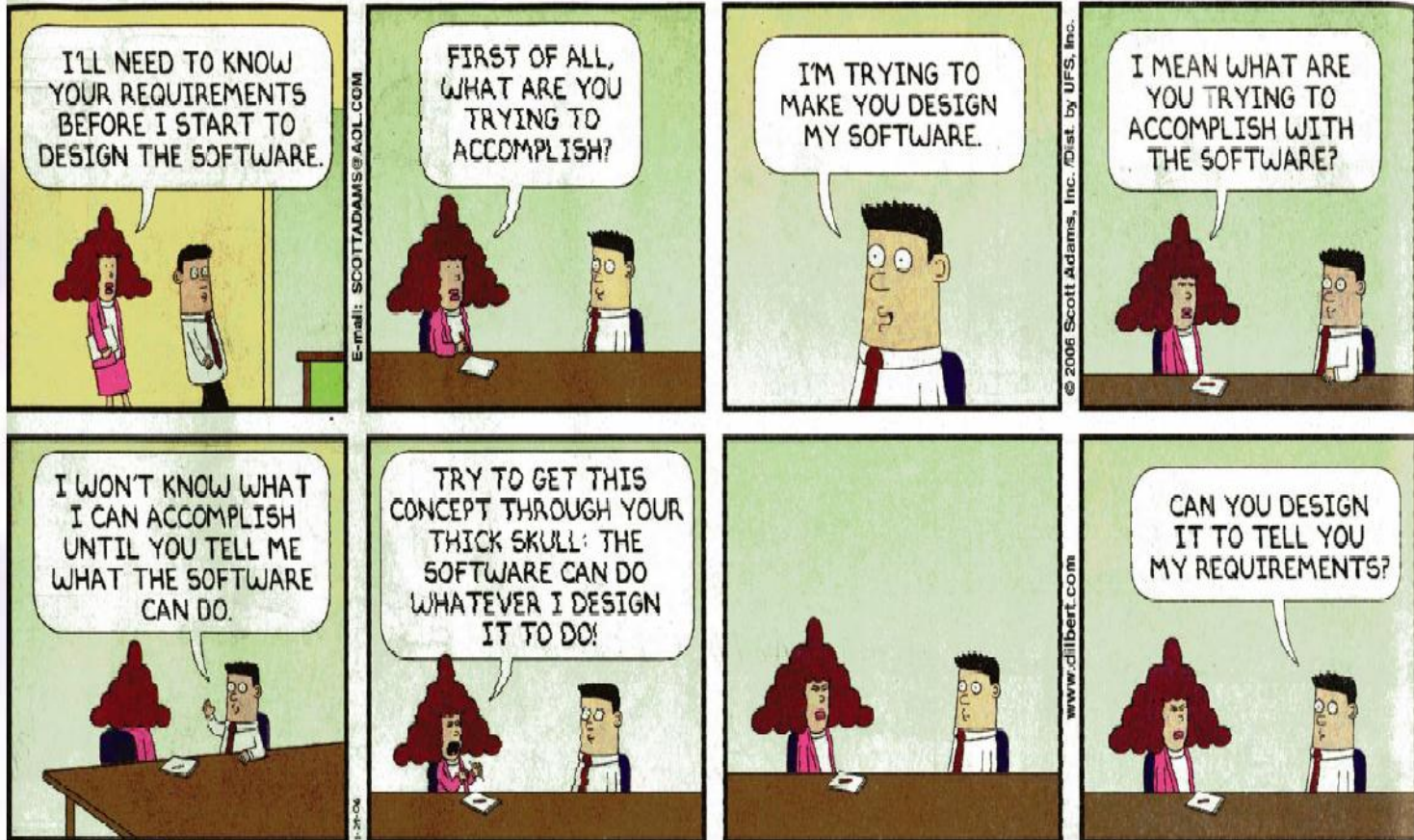
Sanjeev "Sonny" Bhagowalia
Chief Information Officer (CIO), State of Hawaii
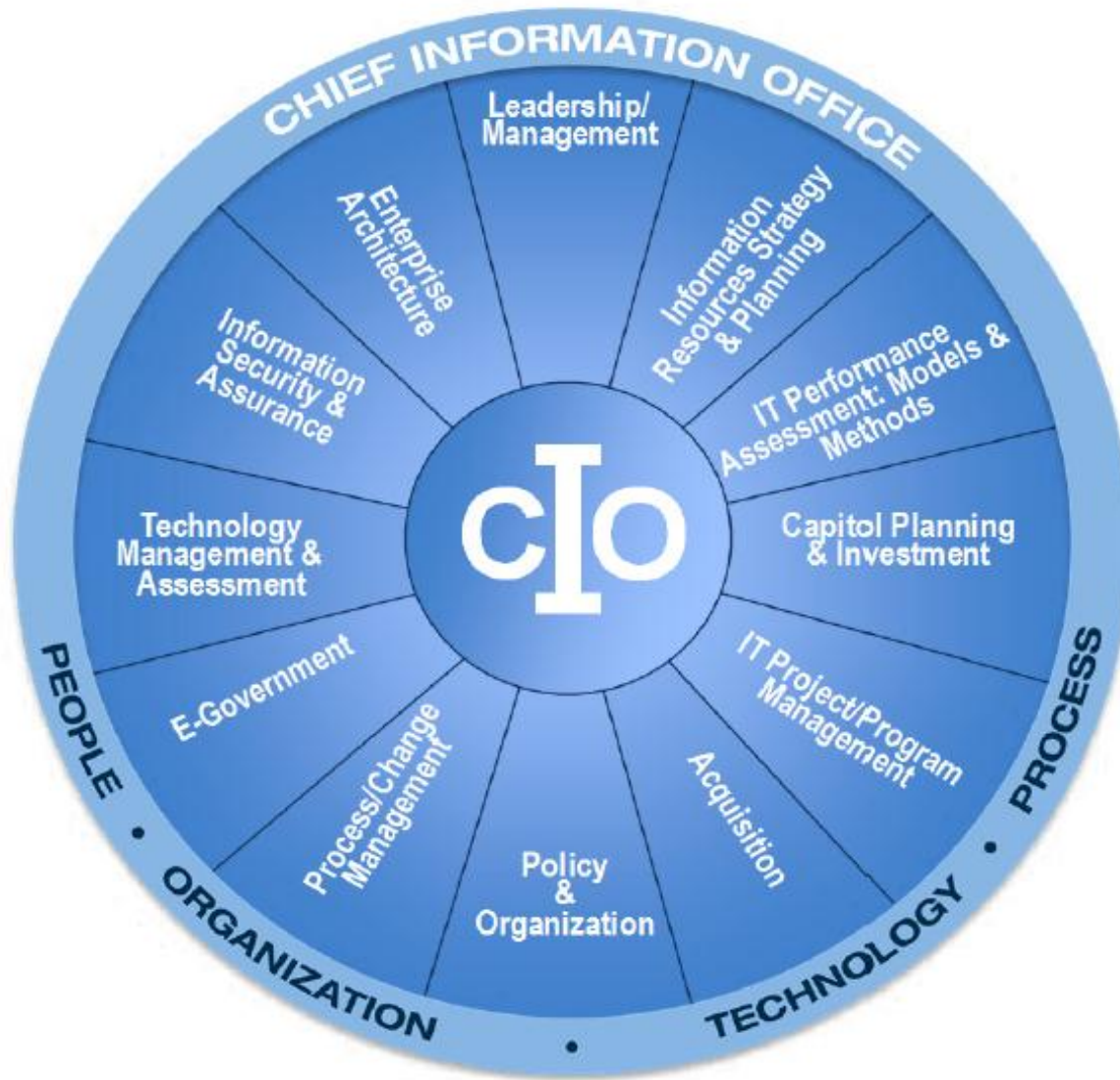March 5, 2012

Agenda

- Background | 10 min

- The Hawaii GIS Program & Working Group(s) | 10 min

- Vision for Hawaii and The Role of GIS | 10 min

- GIS Challenges And Opportunities | 10 min

- Next Steps | 5 min

- Pau Hana

GIS Requirements?

Source: DILBERT by Scott Adams

Source: http://www.ndu.edu
Source: http://www.cio.gov

The Open Government Initiative

Transparency promotes accountability

Participation allows people to contribute ideas/expertise; government benefits from broad knowledge sharing

Collaboration encourages cooperation within government and with industry

An <u>Innovation</u> Agenda* defines the building blocks of innovation

- Open Government

+

- Partnerships
- Entrepreneurship
- Prizes, Challenges, and Grants
- Idea Generation
- Innovative Science & Technology
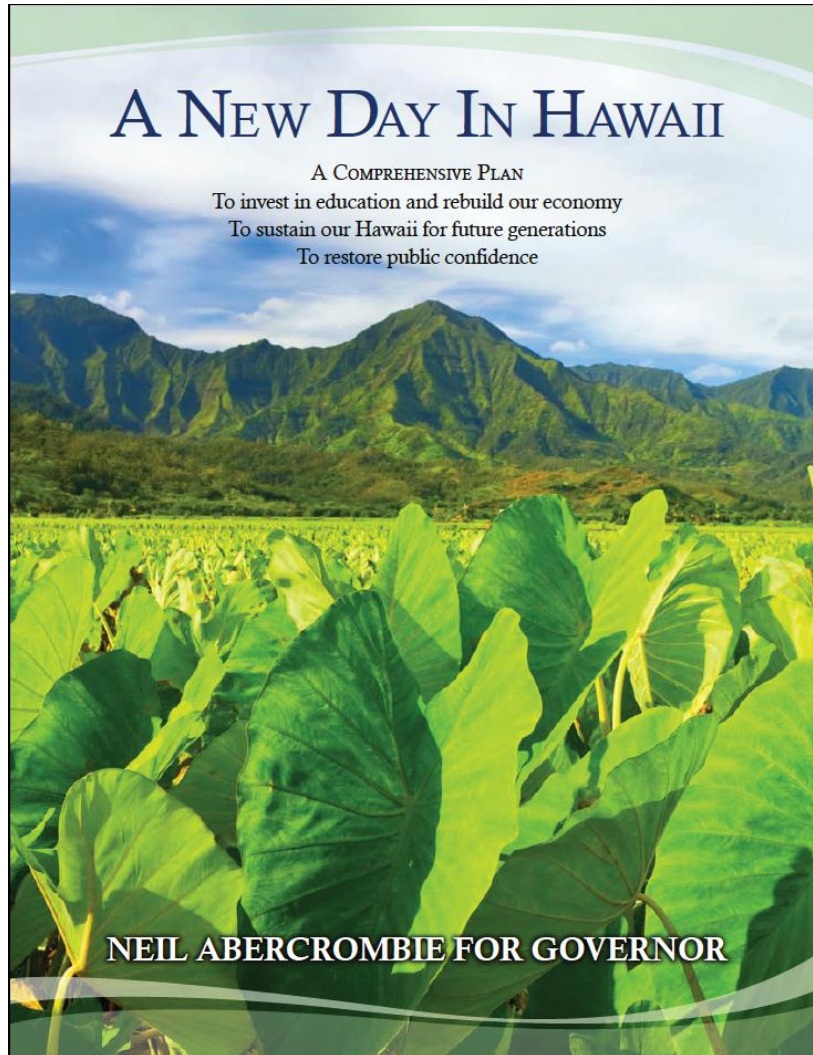- Creative Funding Strategies
- Promoting Competitive Markets

"A Strategy for American Innovation", published Sept 2009

State of Hawai'i
IMT

Hawaii Pacific GIS Conference 2012
Honolulu Convention Center March 5-7, 2012

disaster management;
imagery;
information technology;
planning
Surveying;
health;
utilities;
natural resource management;
conservation;
invasive species;
local and national data

There are 200 Services we provide in State of Hawaii – 150 are citizen-facing! GIS Possibilities abound…

The New Day Vision

A New Day In Hawaii

A Comprehensive Plan
To invest in education and rebuild our economy
To sustain our Hawaii for future generations
To restore public confidence

NEIL ABERCROMBIE FOR GOVERNOR

- **GROWING A SUSTAINABLE ECONOMY**

  - New Day Work Projects
  - Renewable Energy
  - Food Security
  - Innovation Economy
  - Improvements on Public Lands
  - Environmental Stewardship
  - Culture, Arts, Creative Industries

- **INVESTING IN PEOPLE**

  - Early Childhood
  - Education and Workforce Development
  - Healthcare Transformation
  - Safety Net, Homelessness, Public Safety
  - Housing

- **TRANSFORMING GOVERNMENT**

  - Information Technology
  - Fiscal Management
  - Operations Management
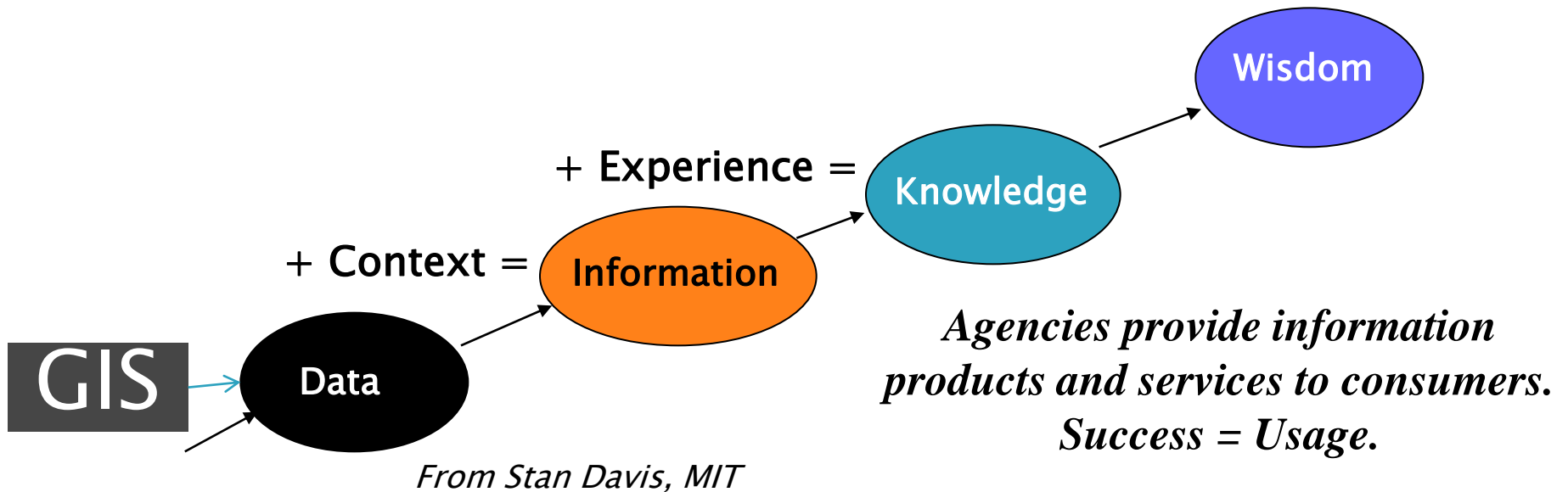 - Customer Service
  - Civil Defense and Security

State of Hawai'i
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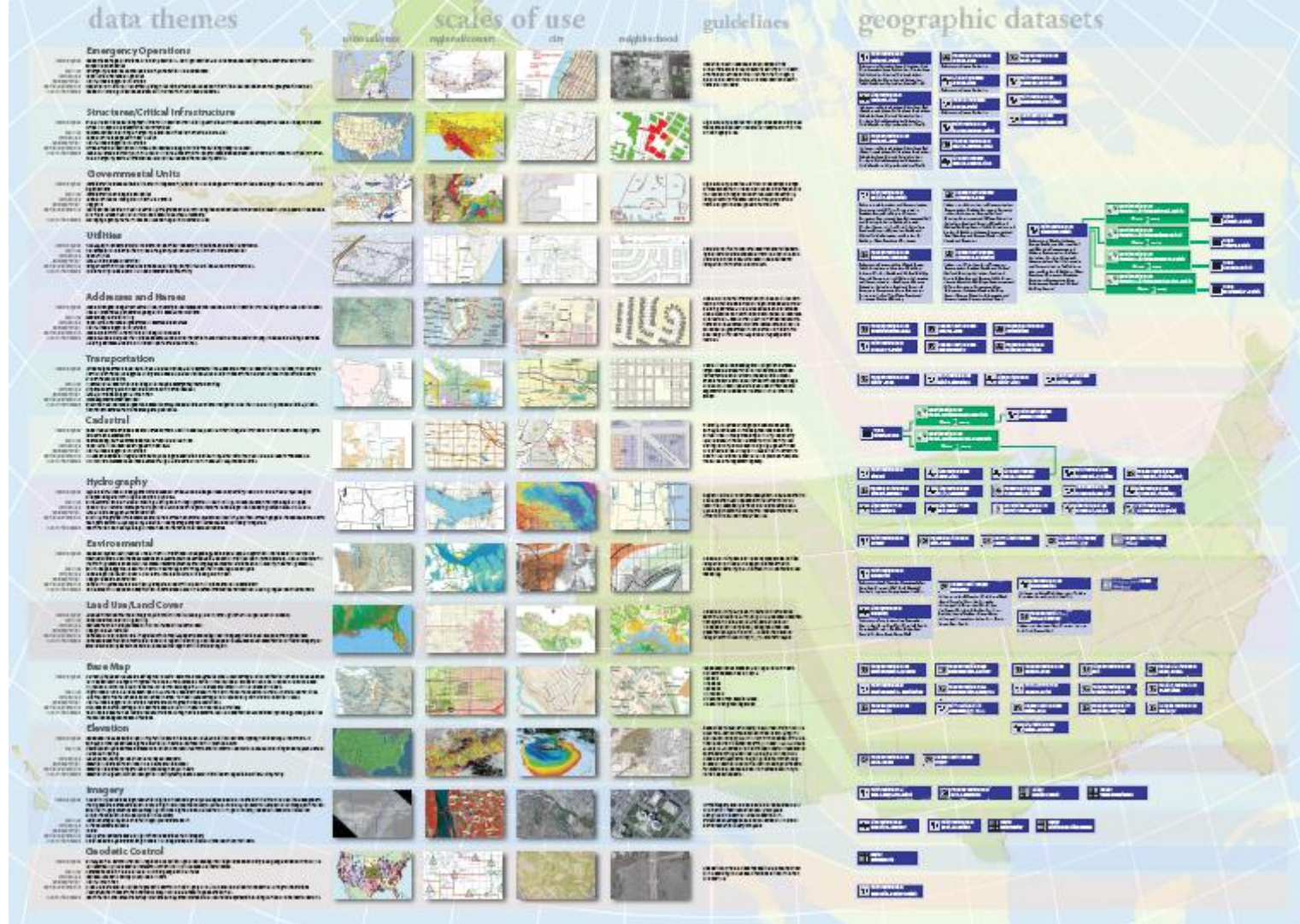
The Promise and the Reality

A Geo-Spatial Value Proposition for Hawaii

How are state government agencies impacted
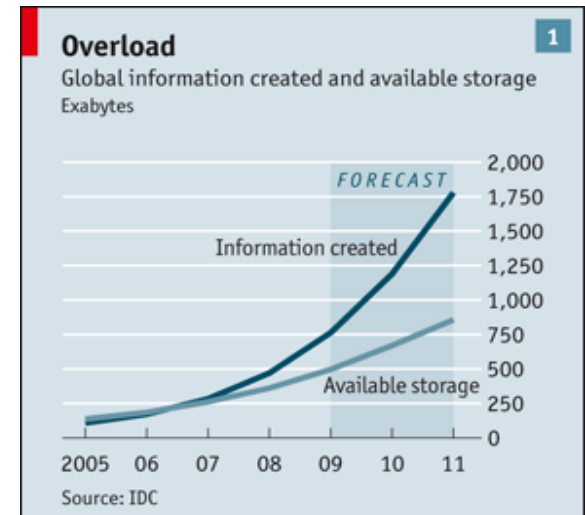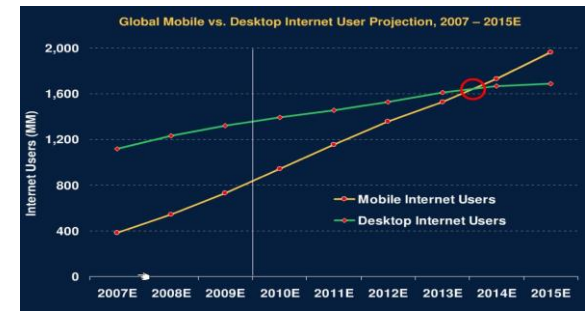*by the information Age and Economy?*

Wisdom

+ Experience = **Knowledge**

+ Context = **Information**

GIS → **Data**

Agencies provide information products and services to consumers. Success = Usage.

From Stan Davis, MIT

Challenge: **How do we institutionalize information and knowledge practices where "geo-enabled" information and knowledge is integrated into Systems/Apps, widely shared, available in a Timely, Secure Manner and used for decision-making?**

![Federal Computer Week - Strategy and business management for government leaders](Federal Computer Week logo)

## 6 bold tech predictions: Fact or fantasy?
FCW (December 8, 2010)

1. 20% of businesses will own no IT assets by 2012 (Gartner)
2. 75% of Stand-Alone IT Departments will disappear by 2015 (Corporate Executive Board)
3. One trillion devices will be connected to the Internet by 2013 (Cisco) – Current = 35B
4. The government can save $1 trillion in 10 years by harnessing certain proven technologies (Technology CEO Council)
5. 25% of personal computing devices sold will be tablets by 2015 (Forrester Research)
6. Data will grow by 800% in the next five years with 80% Unstructured Text/Media (Gartner)

Mobile will be bigger than desktop internet in 5 years
-- Mary Meeker, Morgan Stanley, April 2010

Global Mobile vs. Desktop Internet User Projection, 2007 – 2015E

- Mobile Internet Users
- Desktop Internet Users

Overload
Global information created and available storage
Exabytes

FORECAST
Information created
Available storage

2005 06 07 08 09 10 11

Source: IDC

Volume of digital information increases tenfold every five years & the data is replicated many times over!

State of Hawai'i IMT

Context: Maximum sharing and flow of information and knowledge
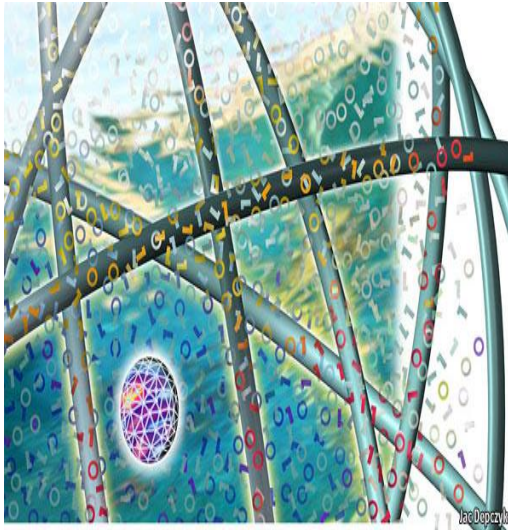
- YouTube is now **second largest search engine** in the world

- 1.5 million pieces of content shared **daily** on Facebook

- On-line newspaper readers are **up 30%**

- 250 million visitors **each month** to Myspace, YouTube, and Facebook (*none were around 6 years ago*)

- **Mobile devices** will be world's primary connection tool to the Internet in **2020**

As big an issue *outside* your organization as *within* it

NASCIO 2011 Survey*

The 2011 State CIO Survey
OCTOBER 2011

NASCIO
Representing Chief Information Officers of the States

TechAmerica
WHERE THE FUTURE BEGINS

Grant Thornton

A New C⁴ Agenda

Perspectives and Trends from State Government IT Leaders

CONSOLIDATION

COLLABORATION

CLOUT

CHANGE

39 Questions

▸ Roles & Governance

▸ Legislative Affairs & Advocacy

▸ Financial Management, Funding and Budget

▸ Collaboration

▸ Consolidation and Shared Services

▸ Cloud Computing

▸ Sourcing Strategies and IT Workforce

▸ Health Care

▸ Business Intelligence and Business Analysis

▸ Mobility

Conclusions

▸ State CIOs are changing

◦ How they provide services

◦ The Source and diversity of their revenue streams

◦ Their relationship with the legislature

◦ How mobile devices and apps connect citizens to their government

*http://www.nascio.org/publications/

State of Hawai'i
IMT

Trends You Need to Watch

1. Consumerization & The Tablet
2. The Infinite Data Center
3. IT Consumption
4. **Context Awareness**
5. Hybrid Clouds
6. Fabric Data Centers
7. IT Complexity
8. Patterns and Analytics
9. The Virtual Enterprise
10. Social Networking

TOP 10

Source: Top 10 Trends and How They Will Impact Data Centers and IT, David Cappuccio, Vice President, Chief of Research

New Updates from Gartner – Access to Anything, Anywhere, Any Time

1) **30 billion** pieces of content were added to Facebook this past month.

2) Worldwide IP Traffic will **quadruple** by 2015.

3) Over **107 trillion** emails were sent this year (89% of which were spam).

4) **Today's employees can access**

   ▸ Over 1 Billion Web pages (and growing)
   ▸ 350,000 iPhone and Over 100,000 Android Apps
   ▸ 10,500 Radio Stations, 5,500 magazines, 300+ TV Networks

   Source: Top 10 Trends and How They Will Impact Data Centers and IT, David Cappuccio, Vice President, Chief of Research

Gartner and GIS (2011)

Source: "Hype Cycle for Government Transformation (July 2011)"

Hawaii Baseline Overview

- 18 Departments & University of Hawaii
- $157.5 million IT/IRM budget
- 746 IT/IRM staff
- Over 500 applications
- 200 lines of business
- High duplication of effort
- Wide funding disparities
- Some focused areas of excellence

Current View of Operations

"HAVE-NOTS"

SERVERS APPS
DATA

VERTICALLY "STOVE-PIPED" LINES OF BUSINESS
NO/LOW REDUNDANCY, POINT-TO-POINT, INCONSISTENT, FRAGILE, RISK-PRONE SECURITY

LIMITED
Centers of Excellence

PORTAL DATA

DESKTOP SECURE NETWORK BLACKBERRY
WEB ACCESS

"HAVES"
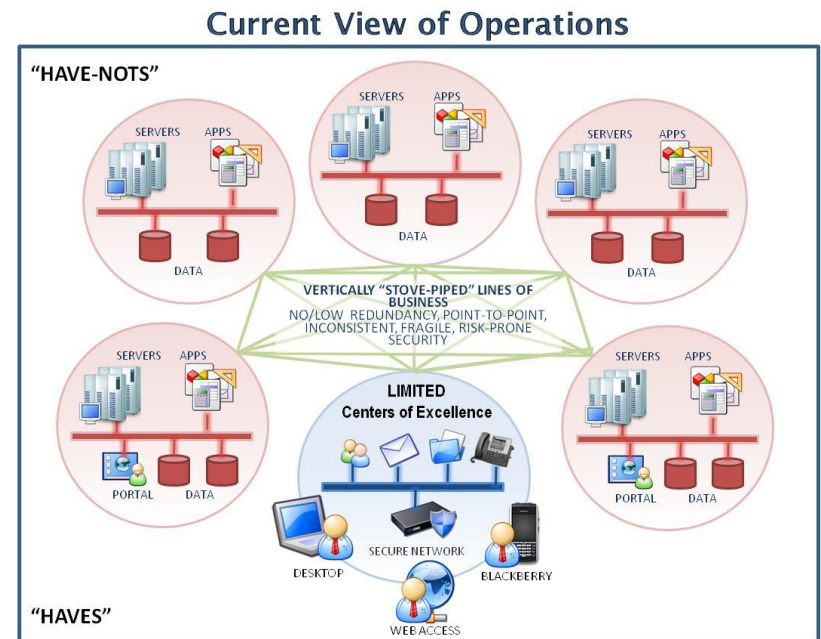
Many disconnected silos of effort

Preliminary Future Enterprise IT Architecture Vision
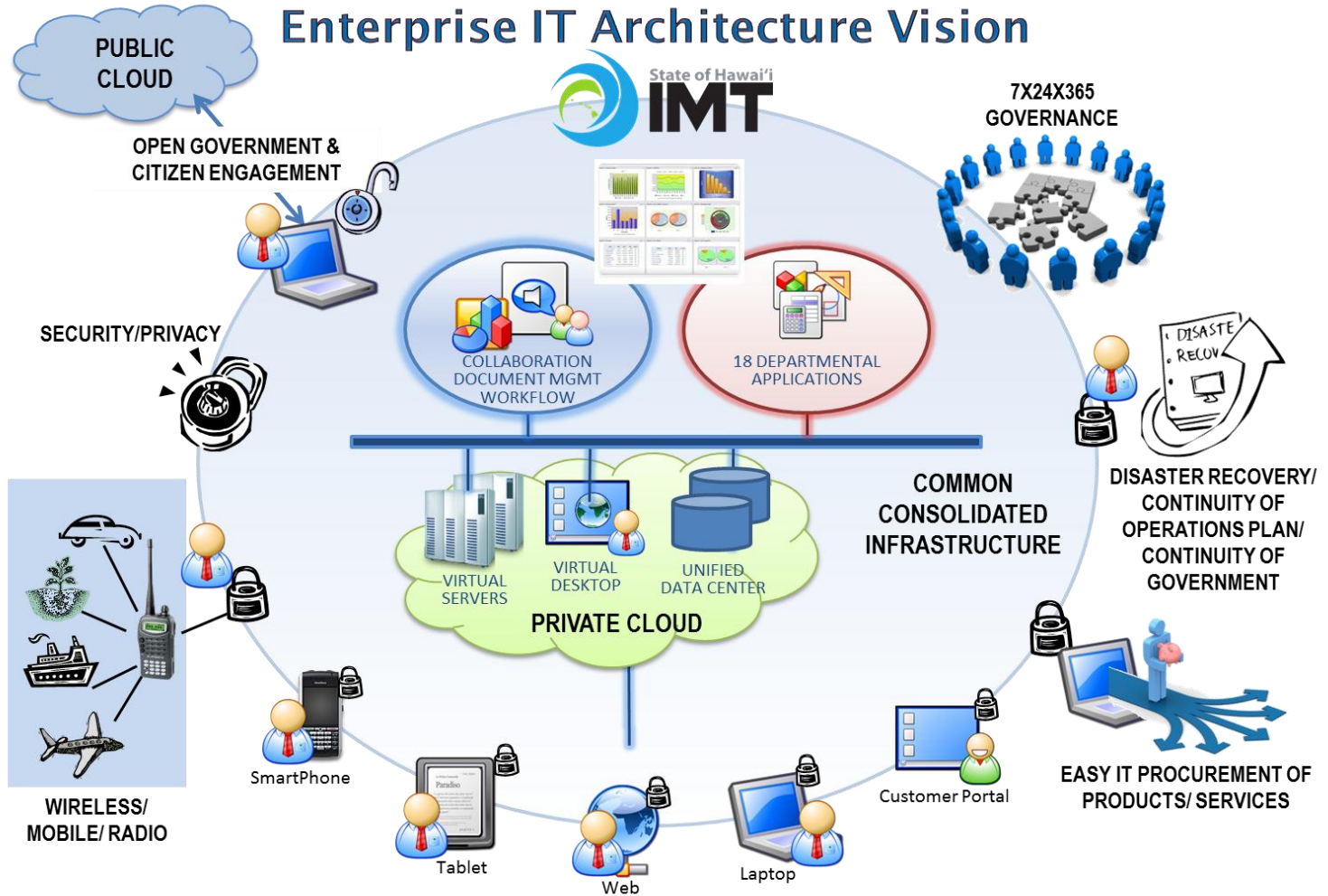
Access to the right information – anywhere, any time, any mission, securely and reliably

Our Study Found:
Top 10 Areas of Opportunity
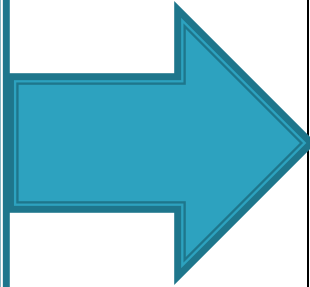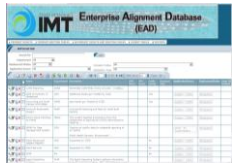
1. **Governance**
   - Creating and Reenergizing Advisory Committees
   - Policies and Procedures
   - Investment Planning and Oversight
   - IT Transformation Roadmap
   - Strategic Plan
2. **Disaster Recovery (DR) and Continuity of Operations (COOP)**
   - Where, What, When, and How
3. **IT Procurement**
   - Leverage Federal schedules
   - State-wide enterprise licensing and "buys" for hardware, software, and services
4. **Security and Privacy**
5. **Open Government and Social Media**
   - Facilitate, integrate, and ensure
6. **Collaboration and Work Flow**
   - Document management (inter and intra-departmental) and work flow
   - Web content management
   - eSignature
7. **Enterprise Applications**
   - Geographic Information System (GIS)
   - Cloud Computing
   - E-Mail in Cloud
   - Legacy System Modernization
8. **Enterprise Infrastructure**
   - Network extension and improvement
   - Data Center enhancement
   - Virtualization – server and desktop
9. **Wireless/Mobile/Radio**
10. **Cross-Cutting Business Process Identification**

Hawaii's Transformation Framework
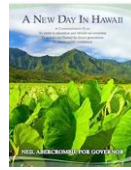
Management and Oversight (Governance)

1 State of Hawai`i Business and IT/IRM Transformation Strategic Plan

2 Business Transformation Plan / IT Transformation Plan

Enterprise Architecture

3 As Is | T & S Plan | To Be

Projects

4 Triage | Pilots | Major Initiatives

Business Process Reengineering

Incremental improvements and delivery

Notional Transformation Schedule

Initiation 3/16/11 · 6/1/2011 · 9/30/2011 · Draft Strategic Plan 4/1/2012 · Final Strategic Plan Submitted 7/1/2012 · 7/1/2013 · Ongoing

ORGANIZE AND PLAN | **CENTRALIZE AND IMPLEMENT**

PHASE A | **PHASE B** | **PHASE 1** | **PHASE 2…**

PLAN

Phase A steps
1 · 6/1-10/11 · Mobilization
2 · 6/13-7/1/11 · Interviews
3 · 7/3-7/29/11 · Data Collection Data Center
4 ·
5 & 6 · 8/1-8/19/11 · Focus Groups Benchmarking
7 · 8/22-9/2/11 · Report Development
8 · 9/5-10/7/11 · Report Delivery

11/1/11 – 6/30/13 | **7/1/2013 ….**

PHASE A
- Identify and hi...
- ...ess the c... IT landscape
- ...tify an... IMT staff
- ...to... h governance processes
- ...n for the future of IT in the State
- ...distribute Executive Order

PHASE B
- Formalize governance processes and structures
- Define a detailed "to be" architecture
- Execute proof –of-concept projects
- Develop and finalize the Strategic Plan
- Introduce legislation and secure funding

PHASE 1
- Modernize and consolidate IT infrastructure
- Centralize IT procurement to leverage buying power
- Centralize IT resources underneath the CIO
- Develop and enforce common technology standards
- Standardize business applications and productivity tools
- Consolidate common services and business functions

DO

Immediate-Term (Triage) Needs/Projects

Near-Term Needs/Projects

Long-Term Needs/Projects

State of Hawai'i IMT

State GIS Program
Geographic Information System
Office of Planning, State of Hawaii

ABOUT THE PROGRAM

"Improving efficiency and effectiveness in government decision-making through education, facilitation, and coordination of GIS mapping technologies"

Hawaii's GIS Program is tasked with "...planning, coordinating, and maintaining a comprehensive, shared statewide planning, and geographic information system and associated geospatial database. The office shall be the lead agency responsible for coordinating the maintenance of the multi-agency, statewide planning and geographic information system and coordinating, collecting, integrating, and disseminating geospatial data sets that are used to support a variety of state agency applications and other spatial data analyses to enhance decision making. The office shall promote and encourage free and open data sharing among and between all government agencies." (§225M-2(b)(4), HRS)

In carrying out its statutory mandate as the lead agency for the statewide GIS program, the Office of Planning (OP) supports and coordinates GIS efforts across state agencies in addition to conducting spatial analysis and mapping for projects and initiatives in OP, the Department of Business, Economic, Development and Tourism (DBEDT), and other State agencies.

PROGRAM COMPONENTS

State GIS Database

OP is responsible for managing the State GIS database. The GIS Program encourages and facilitates sharing of data among agencies to minimize stove-piping of data, thus cutting costs and reducing duplication of effort. The State GIS database contains over 200 data layers, including contributions from federal, state, and county agencies.

State GIS Website

The State GIS website (http://hawaii.gov/dbedt/gis) contains a wealth of information for decision-makers, the public, and GIS experts alike. The site has nearly 200 downloadable GIS data layers for use in mapping and GIS analysis, as well as popular downloadable maps and easy-to-use web mapping services. The site is a well-known resource across Hawaii and even the nation. OP's GIS Program was the first government agency in Hawaii to offer public GIS data sets for download at no charge.

State GIS Coordination

In executing its statutory mandate as the lead agency for GIS in State government, OP supports and tracks GIS efforts across State agencies. As part of its new partnership with the State Chief Information Officer, OP looks forward to even more coordination and collaboration with this group. OP is a founding member and sits on the Board of Directors of the Hawaii Geographic Information Coordinating Council (HIGICC), a non-profit organization consisting of members of Hawaii's geospatial community. HIGICC's goal is to provide coordination of geospatial activities among GIS users from all sectors. OP is also a member of the National States Geographic Information Council (NSGIC), a national organization committed to efficient and effective government through the prudent adoption of geospatial information technologies.

GIS Mapping, Analysis, and Technical Support

The GIS Program conducts mapping and analysis for projects and initiatives in OP, DBEDT and other State agencies, as well as providing technical support and GIS guidance to all State GIS users.

PROGRAM FACTS

Number of Datasets/Layers on State Server
271

Number of Downloadable Layers on GIS Website
179

Number of Web Mapping Services Deployed
54

Number of Downloadable Maps on GIS Website
142

Sample Data, Maps, and Services at GIS Web Site
LSB Land Locator (Prototype Application), Enterprise Zone Locator, 2010 Census Thematic Maps, Census Interactive Online Maps , Hawaii Biomass Resources, Geothermal and Warm Ground Water, Rainfall and Rain Gauge Stations, Solar Irradiance and Radiation, Wind Energy Resource, Tsunami Evacuation Zones, Ocean Recreation Areas, Water Quality Classifications, Agricultural Lands of Importance to the State of Hawaii (ALISH)

Hawaii State GIS Partners
Federal: NOAA, USGS, US Census Bureau, DOA/NRCS, USFWS, USACE, NPS, NGS

State/County: OIMT, ICSD, DBEDT, DOA, AG, DOE, DOH, DLNR, DOT, OHA, HCDA, LUC, County of Hawaii, City and County of Honolulu, County of Kauai, County of Maui,

Others: Hawaii Geographic Information Coordinating Council, Pacific Disaster Center

Hawaii GIS Program Positions
3

* All figures as of January 20, 2012

KEY ACCOMPLISHMENTS

- With County, State and Federal partners, built the State GIS database, containing data developed and contributed by all levels of government.
- Maintains the State GIS database, adding, updating and organizing data and metadata.
- First government agency in Hawaii to create (non-FGDC) metadata for all public layers, listing data source, date, scale, attribute definitions, etc.
- First government agency in Hawaii to offer public geospatial data for download over the Internet at no cost.
- Participated in (and often helped to organize) several joint funding agreements with other County, State and Federal partners to acquire such critical data sets as TMK parcels, satellite imagery data, and digital topo maps.
- Maintains a State GIS User email list in order to disseminate information about new and updated data and upcoming events of interest to the State geospatial data user community.
- Maintains the State GIS Website, containing nearly 200 downloadable GIS layers, links to other geospatial data providers and links to various web mapping applications developed by the State GIS Program.

FUTURE INITIATIVES

Since establishment in 1988, the Hawaii State GIS Program in the Office of Planning has undertaken a number of initiatives in a variety of areas related to geospatial data and coordination. Currently, the program is involved in the following initiatives:

Conversion of Hawaii State GIS Database

Although the 200+ layers in the State GIS database have proven to be a great resource for State agencies and the public alike, they will be far more useful to State agencies after they are converted into one or more spatial geodatabases. This conversion will make querying and displaying the data much faster due to the more efficient storage and delivery of data in a relational database. As part of this project, the State GIS Program will convert the existing metadata into metadata meeting the FGDC standard.

Modernizing Hawaii State GIS

The GIS Program is working closely with the new State Chief Information Officer on modernizing the State GIS. A Strategic Planning effort for GIS has just begun, and will include plans to move the State GIS database off of the 7-year old server on which it resides, to current technology, possibly including high-end servers and cloud storage. In addition, the CIO and GIS Program are planning to deliver the data to users in more efficient and user-friendly ways, including web mapping and web feature services and dashboards.

State GIS Program
Geographic Information System
Office of Planning, State of Hawaii

Office of Planning
State of Hawai'i
P.O. Box 2359
Honolulu, Hawai'i 96804-2359
(808) 587-2846

http://hawaii.gov/dbedt/gis
Find us on Facebook
State of Hawaii Office of Planning
twitter @HawOfPlanning

01/09/2012

Jesse Souki/Director, Office of Planning, DBEDT
Joan Delos Santos, GIS Program Manager

Vision

▸ While GIS professionals in the State of Hawaii have done a good job in maintaining GIS as a viable technology and capability of supporting users in existing mission requirements (e.g., online maps, broadband service mapping, basic analytics), the efforts are largely fragmented and not unified in taking advantage of the additional capabilities of GIS in solving many mission needs that remain to be met.

▸ Hawaii GIS can solve many needs with additional new capabilities such as:

  ◦ "On-the-fly", direct, on-line, visualization, mobilization, socialization and business analytics of geo-coded information for decision-making and problem solving

  ◦ A unified registry to avoid duplication of effort and coordinate efforts more effectively

  ◦ New mobile applications that provide needed solutions quicker

  ◦ A geo-spatial governance that is nimble and responsive to customer needs and a marketplace for ideas

  ◦ GIS is included in the Life-cycle management of Information Management

  ◦ An agile open architecture and platform to deliver services for Web 3.0/Gov 3.0

Vision
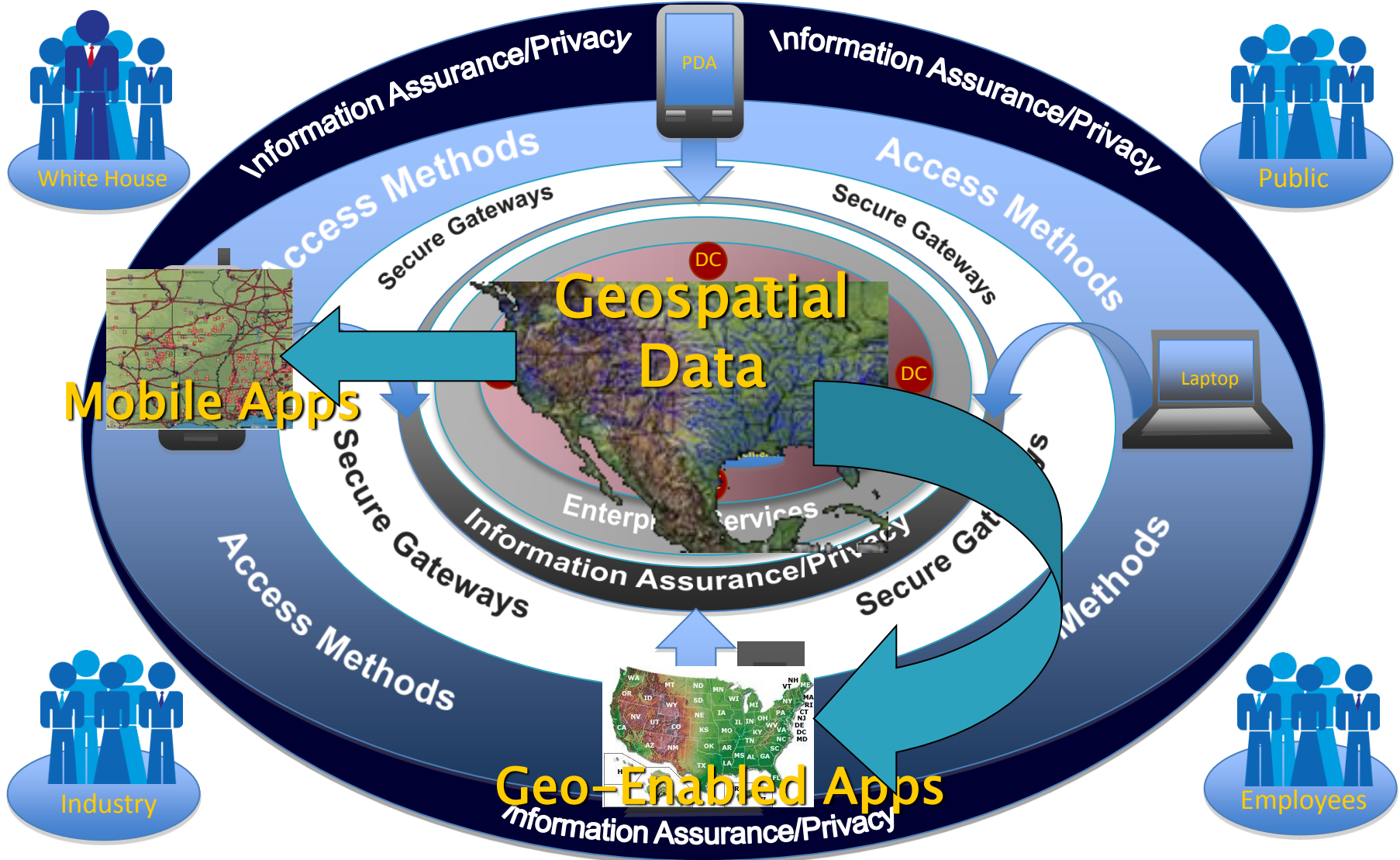
Access to the right information for authorized users any time, anywhere, any mission, securely and reliably

Vision: Partnership

What OCIO Can Provide for the GIS community...

✓ Desktops and Servers

✓ IT Support; Security Management

✓ App. Development/Mobile Apps; Open Data

✓ Secure Wide and Local Area Networks

✓ Large Capacity Data Storage Solutions/Cloud

Network

TrustNet

S Storage Appliance

GIS Workstation

GIS Server
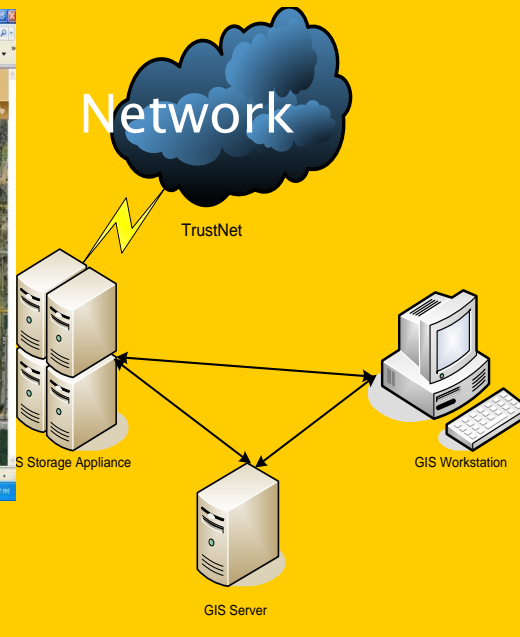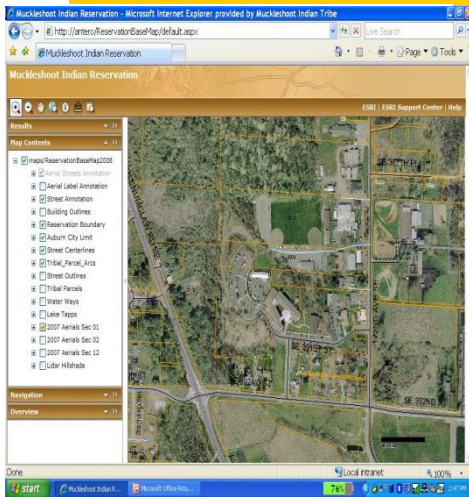
What GIS Supports...

✓ **Realty**

✓ **Title**

✓ **Natural Resources**

✓ **Forestry**

✓ **Irrigation**

✓ **Transportation**

✓ **Fire Management**

✓ **Law Enforcement**

✓ **Decision-Making/Analytics**

What GIS can do for Hawaii...

✓ **Translates and graphically displays land ownership and encumbrance information**

✓ **Accurately display Natural Resource Spatial Data**

✓ **So Much More......**

Vision

Hawaii State GIS – 2020?

GIS in Hawaii – 2020?

Ideas?

Vision
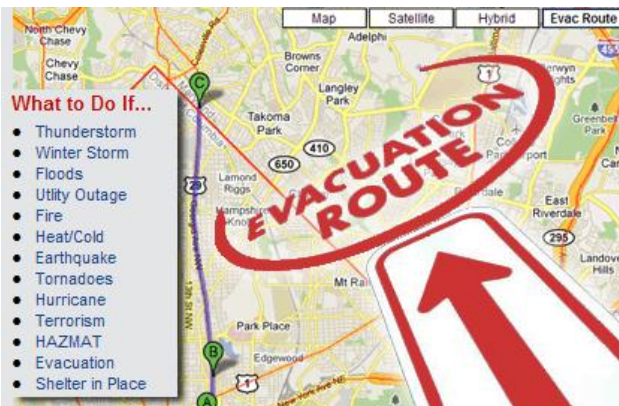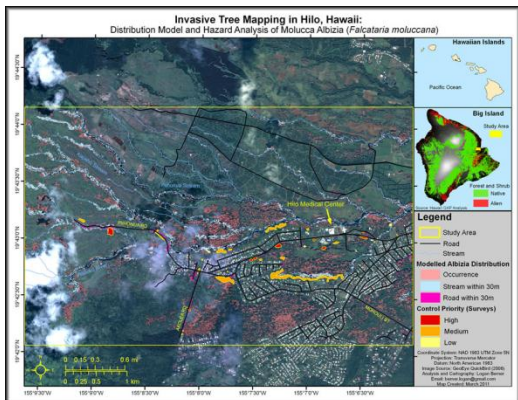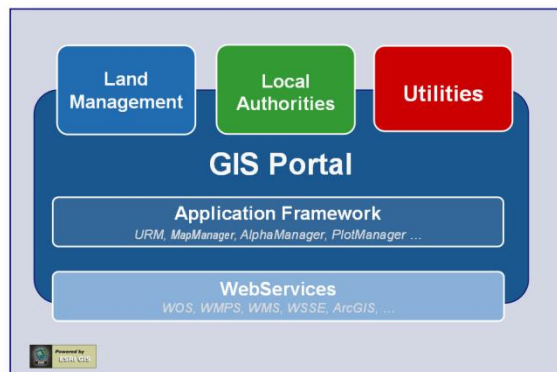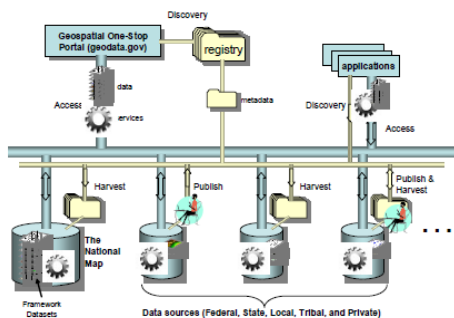
Data.gov - Think Big, Start Small, Innovate!

Data.gov Quick Facts	May 21, 2009 (Launch)	June 23, 2011
Total datasets available	47	390,753
Hits to Data.gov	2.1 million	204.3 Million
Apps and mash-ups by citizens and government	0	236 + 1020
RDF triples for semantic applications	0	6.4 Billion
Dataset downloads	0	1.6 Million
Nations establishing open data sites	0	19
States offering open data sites	0	26
Cities in North America with open data sites	0	16
Open data contacts in Federal agencies	24	396
Agencies and subagencies participating	7	172
Communities	0	5

Geospatial preview allows on–the–fly visualizations...

Next Generation Data.gov:
A Platform Designed for Data Access & Consumption

http://www.data.gov

Next Generation Data.gov: Contrasting Legacy Data vs. Open Data

Attribute/Characteristic	Legacy Data	Open Data
Core Use Cases	Data Collection, Process Automation, Enterprise Apps	Data Use and Reuse, Data Sharing and Collaboration, Ad Hoc Apps
Key Influences	Corporate Network Computing	Internet, Web 2.0 and the Social Web
Who Benefits?	Data Practitioners	The Rest of Us
Where's the Data?	On Premise	In the Cloud
Organizational Model	Business Process Optimized	Consumption Optimized
Designed for	The PC	The Web
Security and Permissions	Secure	Secure
Accessibility	Very Restricted	Very Accessible
Scalability	Employee Use	Widespread Use
Finding the Data	By Table Name	Searchable Catalog
Data Exploration and Analysis	Add-on PC/Desktop Tools	Native in Platform; In Web Browser
Charts and Maps	Add-on PC/Desktop Tools	Native in Platform; In Web Browser
Ad Hoc Access	None to Limited, guarded by a gatekeeper	Open and unfettered but authenticated
Developer Access	None to limited, rigid access via closed protocols	Open, standards-based, modern (RESTful) APIs
Reporting	Static	Dynamic
Data Usage Metrics	Ask the Gatekeeper	Open

Socrata   The Open Data Company ™

http://www.data.gov

DATA.GOV
EMPOWERING PEOPLE

GEO.DATA.GOV

State of Hawai'i IMT

Vision

- We can apply GIS capabilities to practically help <u>all</u> manner of government and commercial functions:

  - Facilities management
  - Energy conservation
  - Emergency services
  - Traffic management
  - Infrastructure planning
  - Social services
  - Energy policy

  - Broadband
  - Disaster recovery
  - Voter registration
  - Healthcare
  - Education
  - Public notices
  - On and on…

> Don't just think of the technology – think of the potential applications, and we'll find the technology to make it real

Vision

▸ Many of the foundational elements have been developed already (e.g. FGDC, NASCIO)

▸ We can build on those and implement the standards and profiles that exist

▸ GIS is a "Killer App" – let's put the capabilities in place to enable a transformation of government operations in the state!

Our job now is to define, specifically, *what we want to do* in the next 10 years, and then let's *do it!*

GEO.DATA.GOV

NSGIC State Government Geospatial Maturity Assessment

- Top 3 Accomplishments
  - Hired a CIO who is familiar with and a champion of geospatial technology
  - Collaborative purchase of statewide WorldView 2 Imagery
  - HIGICC's creation of a business plan for imagery, metadata and geo-portal

- Top 3 Goals
  - Secure funding for, and conduct, a Strategic Plan for Revitalizing GIS in Hawaii State Government
  - Secure funding for and implement new infrastructure and processes for delivering State GIS data and services
  - Co-host, with HIGICC, the Hawaii Pacific GIS Conference 2012 (3/2012)

- Top 3 Challenges
  - Secure GIS funding from Hawaii State Legislature
  - Hire State GIS Program Manager
  - Renew State GIS users' interest and participation in data sharing and collaboration

Challenges = Opportunities

Five over-arching areas

Infrastructure & Software

- Hardware
- Software
- Network
- Cloud
- Etc.

(1)

Data & Information

- Inventory
- Discovery
- Registration
- Sharing
- Accuracy
- Standards
- Format
- Etc.

(2)

Distribution & Dissemination

- Direct
- Replication
- Feature services
- Map services
- Etc.

(3)

Governance & Collaboration

- State GIS Council (high level)
- HIGICC
- Awareness
- Etc.

(4)

Funding & Procurement

- Haves/Have-Nots
- Pooled funding
- State GIS fund
- ELAs
- Etc.

(5)

What We Need From You

- OIMT is developing the State of Hawai`i Business and IT/IRM Transformation Strategic Plan
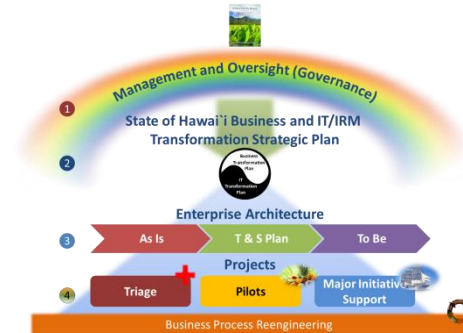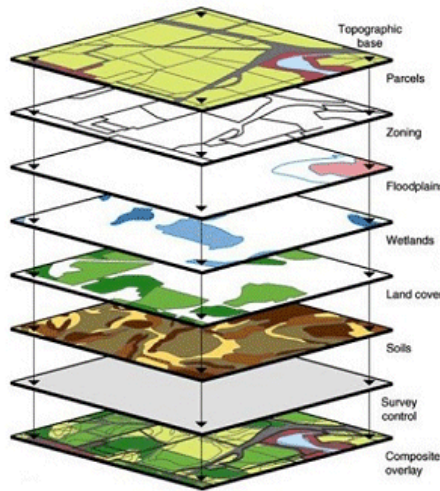
- We need to know from you, how does GIS fit into the future vision for the State, and what does your ideal GIS environment look like?

- How can GIS improve the way we do business in Hawaii? How would universal access to powerful GIS tools make new ways of operating possible?

What's Next?

▸ **Shared Dataset Hosting**
  ◦ GIS in the Cloud
  ◦ Data extraction
  ◦ Data conversion
  ◦ Geocoding
  ◦ Visualization

▸ **Data Discovery Services**
  ◦ Available to agencies as a fee-for-service
  ◦ Allow agencies to discover datasets within their entire public space

▸ **Mobile Applications**

▸ **APIs** – simplify access for developers and publishers

What's Next?

Geo-Spatial Data is A Key Enabler for "Killer Apps"

GIS FOR THE NATION
Proposed Data Sharing Information Model for Local, State, Tribal, and National Data Themes

- ▸ *Geo-data Integration* – Combine capabilities of Geodata.gov and Data.gov

- ▸ Enhanced visualization and data-mashing capabilities

- ▸ "Human knowledge is expected to be doubling by the year 2012." (Alvin Toffler)

- ▸ Geo-aware applications are key.
  How to realize the promise of geospatial information systems (GIS) for the nation?
  - ◦ Geo-data "architected and built-in"
  - ◦ Lightweight geo-applications and mash-ups for Web 2.0/Gov 2.0
  - ◦ Incremental, agile, actionable and affordable delivery

What's Next?

- Business Analytics/Intelligence

- Improved Categorization
  - Metatagging, expanding on published taxonomies; to include Business Reference Model
  - "Folksonomies" that allow the public to create tag clouds or to tag data they find most useful
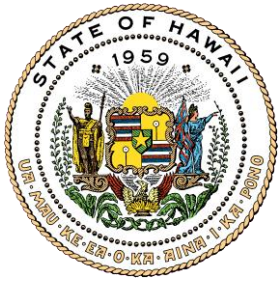
State of Hawai'i IMT

State GIS Program
Geographic Information System
Office of Planning, State of Hawaii

INNOVATION
SUCCESS
EVALUATION
DEVELOPMENT
GROWTH
SOLUTION
PROGRESS
MARKETING

Lets Go!

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