

Smarter Water: The Role of Information Technology in Sustaining the World's Water Systems

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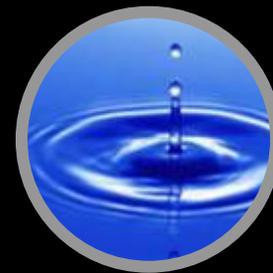
Vice President Global Government & Smarter Cities

IBM Corporation



World Trends

- By 2050 cities will house $\frac{3}{4}$ of the world's population: equivalent to ~world population of 2010



Population growth is stressing every piece of our infrastructure

Water



In the last 100 years global water usage has increased at twice the rate of population growth. Today, one in five people still lacks clean drinking water.

Energy



In the near term we'll need to extract more oil and natural gas than ever before. Projections show energy consumption increasing by 50% in the next 25 years.

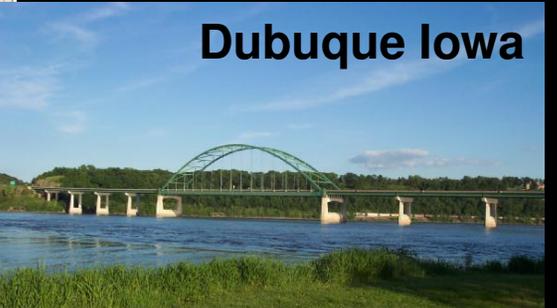
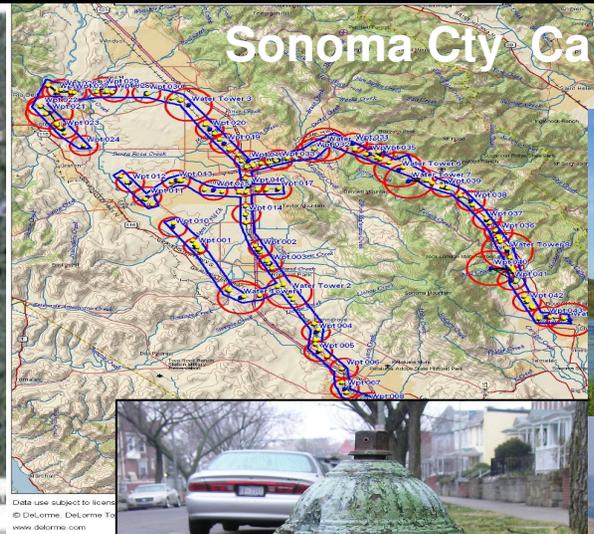
Food



820 million people around the world are undernourished. Yet 50% of the food we produce is wasted between field and fork.

Managing & monitoring water systems

By actively monitoring (and managing) built and “natural” systems, decision makers will have more knowledge of how their decisions will influence the environment & impact business.



Dubuque Iowa



DC Water



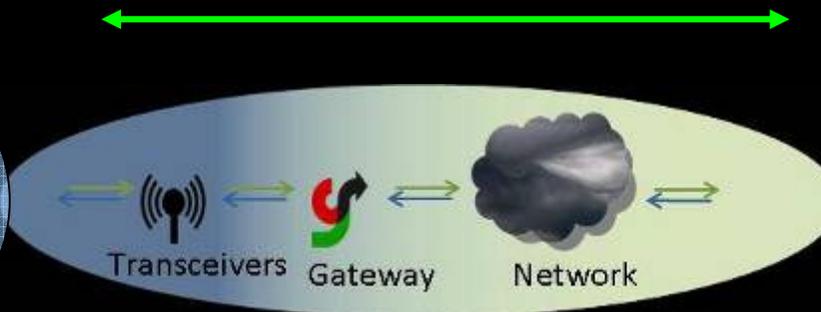
Managing & monitoring water systems

Linking physical-world assets, resources & infrastructure with the digital world of event processing, business analytics and optimization

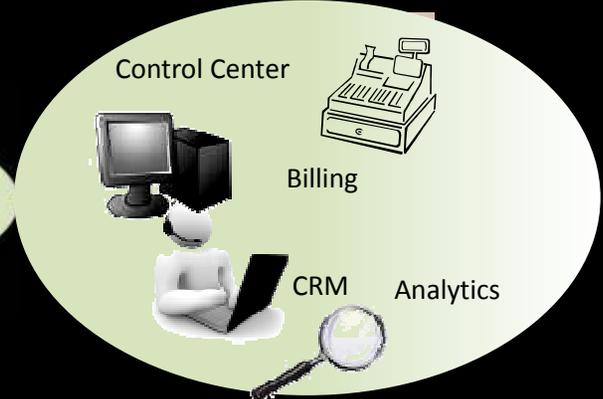
The Natural World



The Physical World

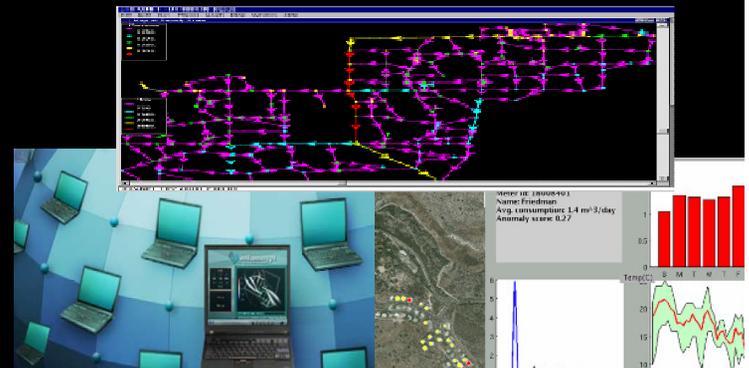


The Digital World



Grids

Asset Management
Systems-level View



SONOMA COUNTY WATER AGENCY

COLLABORATION PLATFORM

OPTIMIZATION
CONSERVATION INFORMATION
EFFICIENCY COLLABORATION

Geo-Spatial Mode | System Map Mode

Geo-Spatial Node Status for SCWA Area



Node Control

Alarm Conditions

- High pH
- Low Tank Level
- High Voltage
- AN Other

- SCWA
- Rohnert Park
- Santa Rosa
- USGS
- CDEC

Alerts and Events - Generic

Tag_Name	Event	Severity	Start_Time
S01_Magmeter	Low_Limit	High	03/07/2010;08:15
S30_Pump1_Flow	Low_Limit	High	02/07/2010;08:21
S30_Pump1_Flow	Low_Limit	High	02/07/2010;08:22
S14_Annadel_Level	High_Limit	Med	01/22/2010;15:42
and so on...			

Historical Data for S14_Annadel_Level - Last 30 days



SCWA | Santa Rosa | Rohnert Park | Cotati | Shared Resources

Bulletin Board

Select Bulletin Type:

Water Cycling Maintenance Activities (Default)

Bulletin Messages:

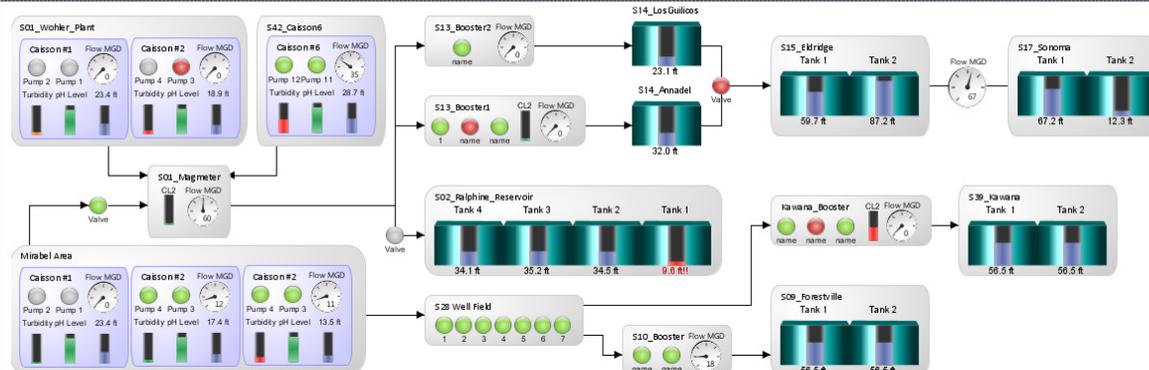
- * S01_Magmeter is to be cycled for 4 hours on 03/09/2010 commencing @ 2pm
- * Ralphine Reservoir is to be taken offline for 12 hours on 05/03/2010, commencing @ 10am
- The following tanks will be taken offline.
- *S02_Tank_01
- *S02_Tank_02
- *S02_Tank_03
- *S02_Tank_04

Geo-Spatial Mode | System Map Mode

System Map View

Map Controls:

Map Select: SCWA Overview



Galway Bay: natural water system management



SmartBay Portal



Marine Institute
Foras na Mara

Bulletin Board

News

[EU Shellfish Growers Visit the Marine Instit...](#)
mike · All

[Knowledge of the Oceans is Key to Understand...](#)
mike · All

[44 Student Placements on Offer at the Marine...](#)
mike · All

[Music Meets Marine Science for 'Songs of the...](#)
mike · All

Welcome To SmartBay

Water Temperature Trends

Report: Trend

Source: M1 Bouy

Period: MTD

Depository

Buoy Spatial Mapping

Report: Vessel A Legs

Search:

Period: MTD

Rain Fall Trends

Report: Trend

Source: M1 Bouy

Period: MTD

Marina Finder

Location:

Latitude:

Longitude:

VHF Band:

Search:

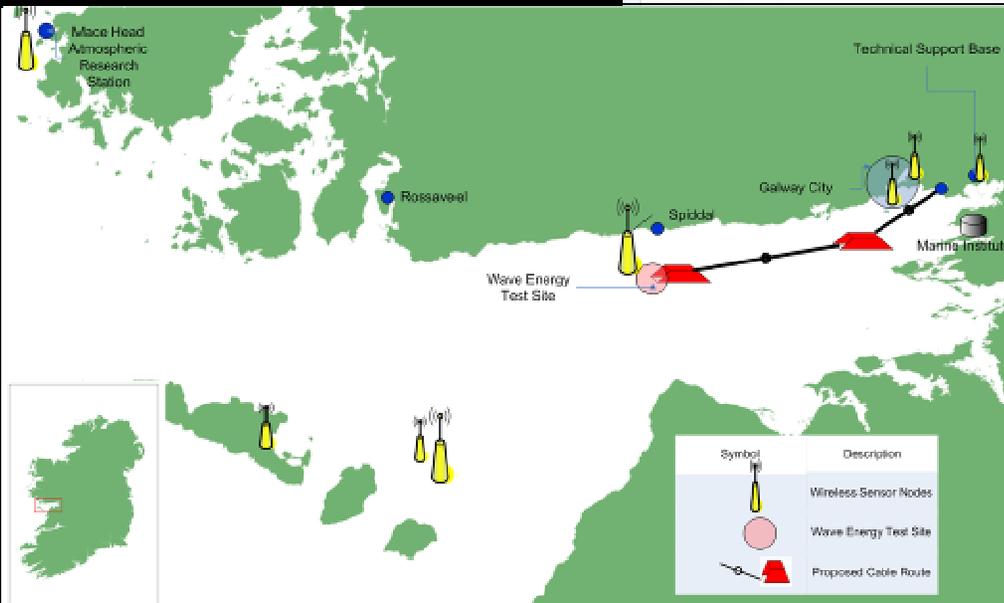
Location: Galway Bay SC

Data Projection, Traffic Light

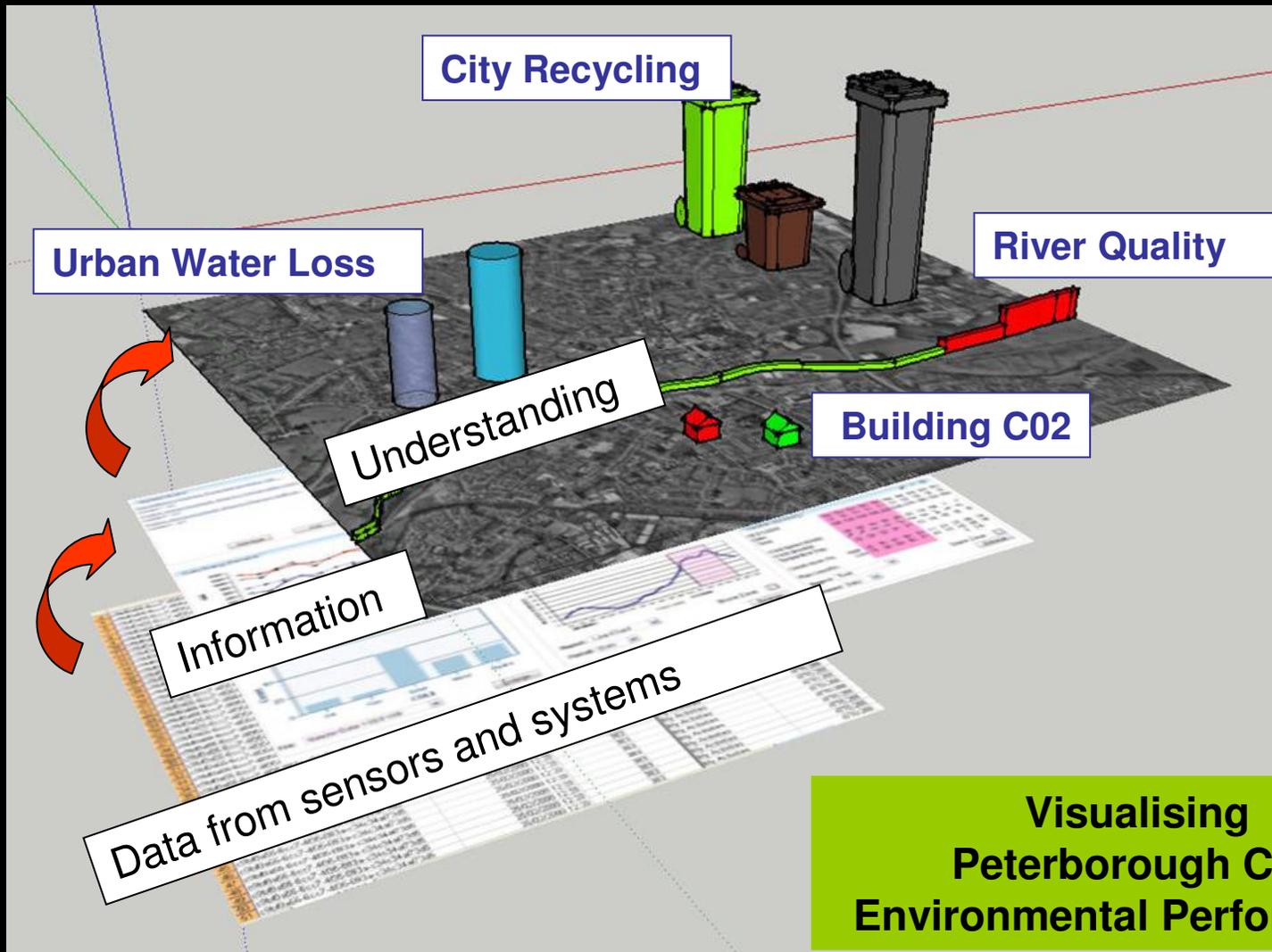
Serviceability Site	Status	Actual	Actual %
M1- Wave Temp	● ● ●	9	119
M2- Wave Temp	● ● ●	9	60
M3- Wave Temp	● ● ●	11	114
M4- Wave Temp	● ● ●	12	132
M5- Wave Temp	● ● ●	12	119

[<<MORE>>](#)

File:

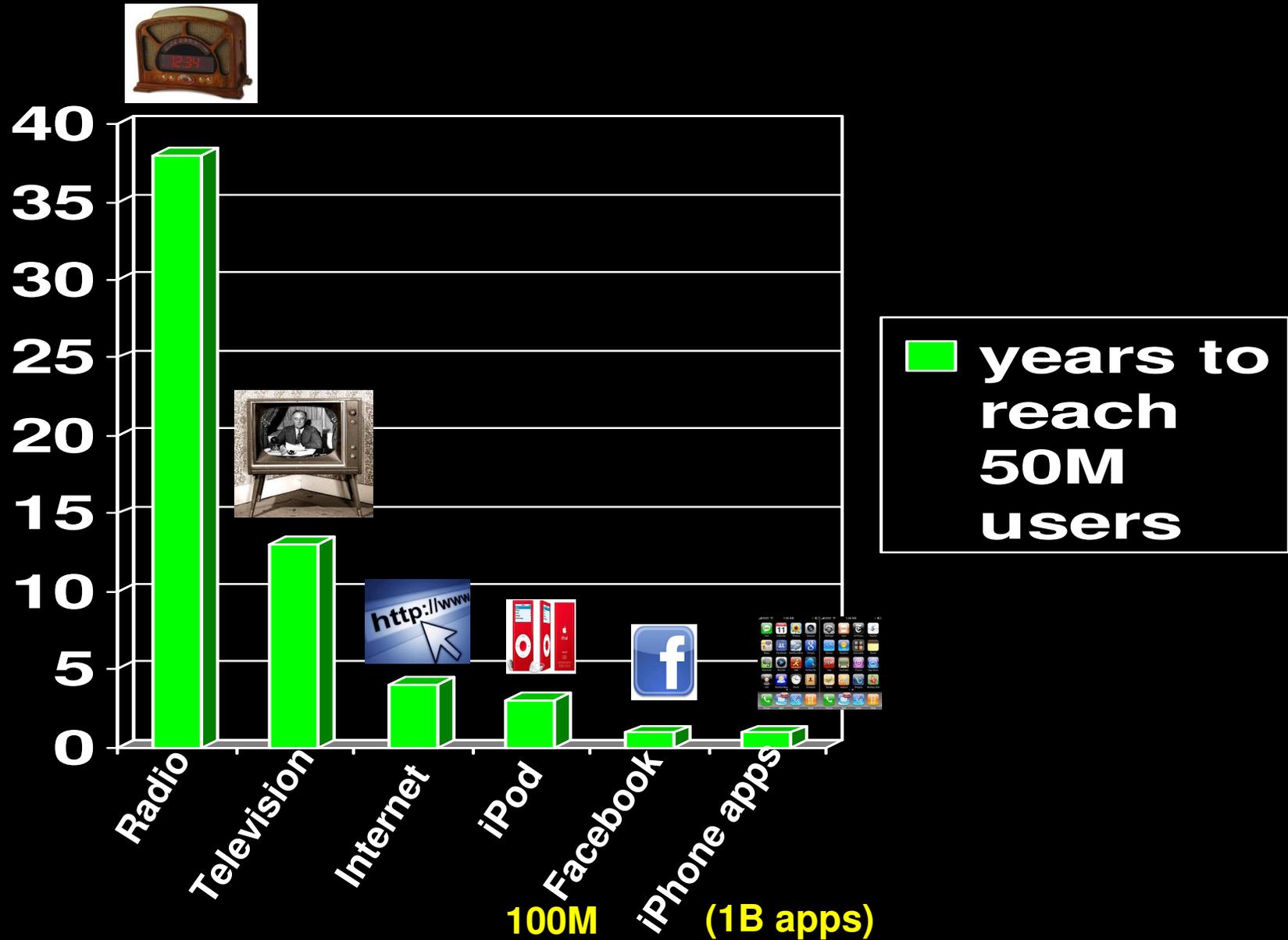


Visualization platform demonstrates value of sharing data

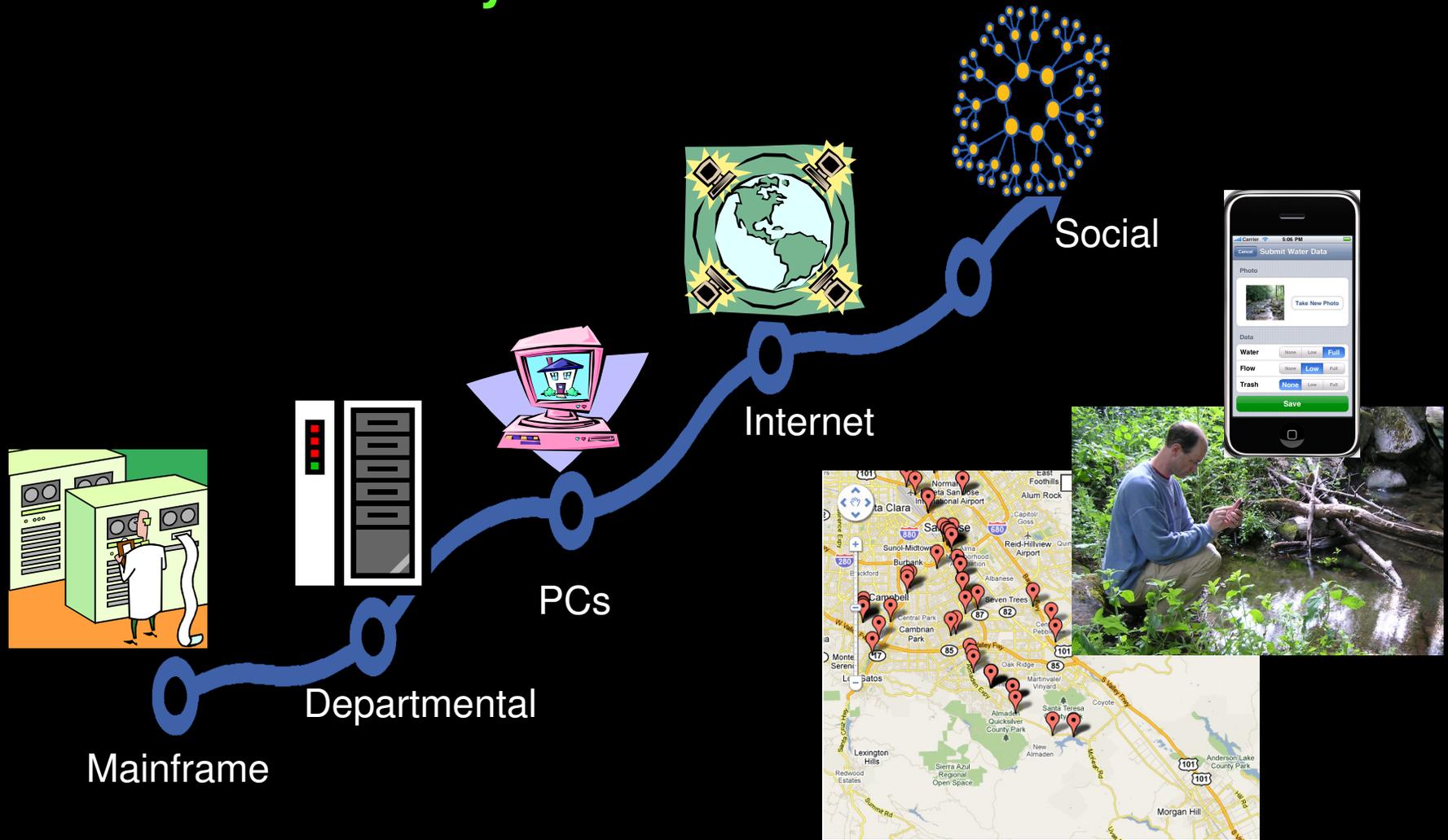


the changing role of technology.....

Pace of Technology Change.....



What role will technology play in accelerating change in the water industry?



Digital data is growing ~2x/year

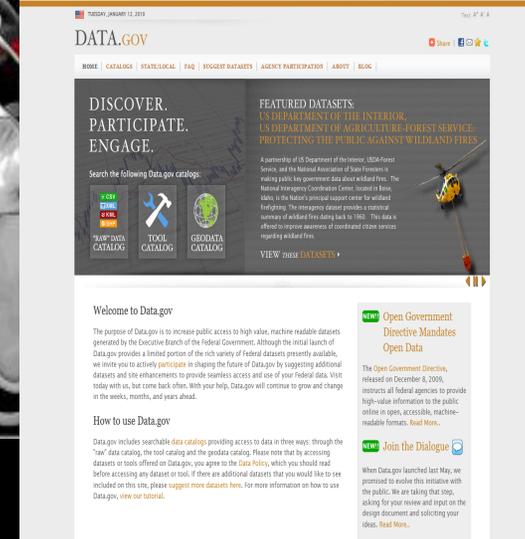
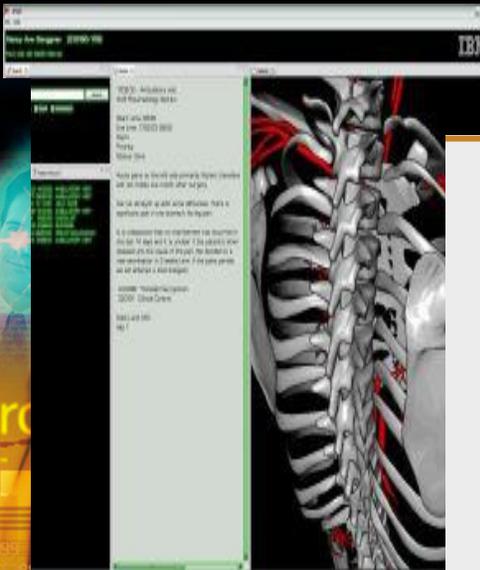
Technology has transformed consumer power through access to information.

Banking

Retail

Medical

Government



How will environmental markets/industries respond to this opportunity?

Creek Watch: Smarter Water through *citizen science*

- Using mobile devices to capture data
 - participatory data gathering with many users
 - data provides new opportunities for analysis



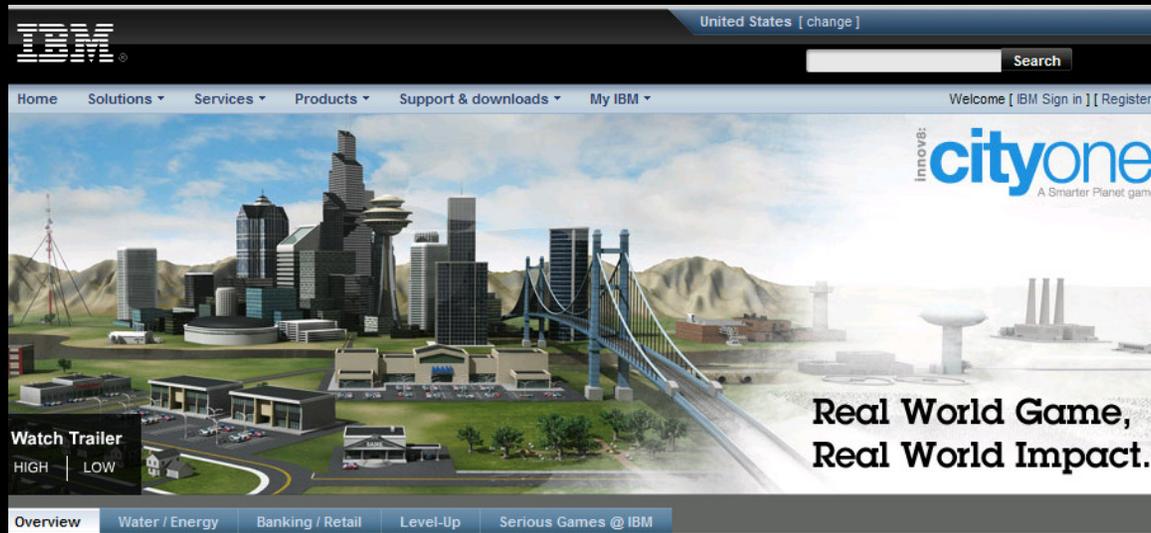
Collect simple environmental data about waterways

Capture “citizen science” data / photos

- Location (GPS) and time - stamped
- Water level, water flow, trash
- IBM Research developing app in consultation with the California Water Board and volunteer watershed groups

http://www.youtube.com/watch?v=__-6KAptDL4

Not just apps, but games and competitions....



WATERHACKATHON

Tapping Innovation in Water and Sanitation

www.waterhackathon.org

Calling all hackers, programmers, water specialists and global problem solvers. Join us on October 21 and 22 for a mad 30-hour rush to solve the world's water problems by bringing people, water problems and data together. We'll be connected to 10 other sites around the world running the same event – we'll be representing Europe. This is an official Random Hacks of Kindness www.rhok.org event (NASA, WB, Google, Microsoft, ...).



Education, training, awareness?

Grand Challenges



“Natural” vs “built” environment

City vs rural
Developed vs developing GEOs



“GLOCAL”



Think globally, act locally

“GLOCAL”



Think globally, act locally

Will citizens act locally without a “crisis” to catalyze action???

Act Locally

- Jobs – are rural locations an advantage or a disadvantage?
- Use of cyberinfrastructure for education, training – especially in rural areas where water becomes more and more important
 - Train-and-stay or train-and-leave?
 - Use of games to educate (train?) starting at early age
 - Singapore starts water education (and marketing) before school age
- Economic development
 - Should we talk about economic scarcity vs just scarcity?
 - Energy-water nexus
- Energy-water-environment-food-business (and policy)
 - How do we make this “personal”? (WIN-FM)

Critical Success Factors

- Water leaders need to....
 - view water systems on system-level not as multiple, independent entities
 - enable rapid decision-making, recognizing the complex, dynamic behaviour of water systems; optimize system to get to end-result (no perfect answer)
 - routinely capture information required to manage water resources, and rely less on “one-of” exercises or studies
 - create a “single version of the truth” for a given water resource (aquifer, watershed, delta, estuary, etc)
 - use information to build trust, and serve as the foundation for collaboration, between agencies
 - enable rational water management decisions based on shared data
 - engage citizens as advocates and “researchers”
- Modeling and simulation of water systems enables better understanding of scenarios and potential outcomes based on policy and technical decisions.

Our mandate.....

- Bringing innovation into the water industry
- Leveraging IT to drive efficiency and to enable collaboration & decision making across domains
- Working smarter with fewer resources – leverage Scientific and Industry Consortia
- Bringing scientific knowledge and insight into the decision-making process
- Making water a “must have” for the current and next generation (aging workforce is a concern)
- Communication and “marketing” ---educate our communities, political leaders and business leaders
- Be visible and active in our local water community

Think globally, act locally



Thank you!

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