



# NBIM Interoperability Testing Team

NBIM Executive Committee  
May 2006

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# NBIM Interoperability Testing Team, May 06

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- Role of NBIM Interoperability Testing Team
  - Working with NBIM Information Models
  - Prototyping services for access to distributed BIM specs
  - Running code before spec is approved
- Near-term NBIM Interoperability Testing
  - Requirement: “product” by the end of the year
  - BIM/IFC testing in OGC Interoperability Program
- Building an NBIM Interoperability Test Plan
  - Broader, multi-year effort
  - Grow a testing infrastructure



# Role of Interoperability Testing in NBIM

# \$15.8B Lost Annually due to Inadequate Interoperability



- “Interoperability - the ability to manage and communicate electronic product and project data between collaborating firms’ and within individual companies’ process systems.”
- “Need to increase connectivity between CAx, facilities management, and information databases, such as electronic document management (EDM) and enterprise resource planning (ERP) systems.

*Interoperability problems stem from highly fragmented industry, industry’s continued paper based business practices, lack of standardization, and inconsistent technology adoption*



**US Construction industry at \$374B → \$15.8B represents approximately 5% of total**



# National BIM Standard Definition

A Building Information Model (BIM) is a digital representation of physical and functional characteristics of a facility. As such it serves as a shared knowledge resource for information about a facility forming a reliable basis for decisions during its life-cycle from inception onward.

A basic premise of BIM is collaboration by different stakeholders at different phases of the life cycle of a facility to insert, extract, update or modify information in ***the BIM*** to support and reflect the roles of that stakeholder. The BIM is a shared digital representation founded on open standards for interoperability.

The US National BIM Standard promotes the business requirement that this model be interoperable based on open standards.

Approved March 1, 2006 – NBIMS Exec Comm.

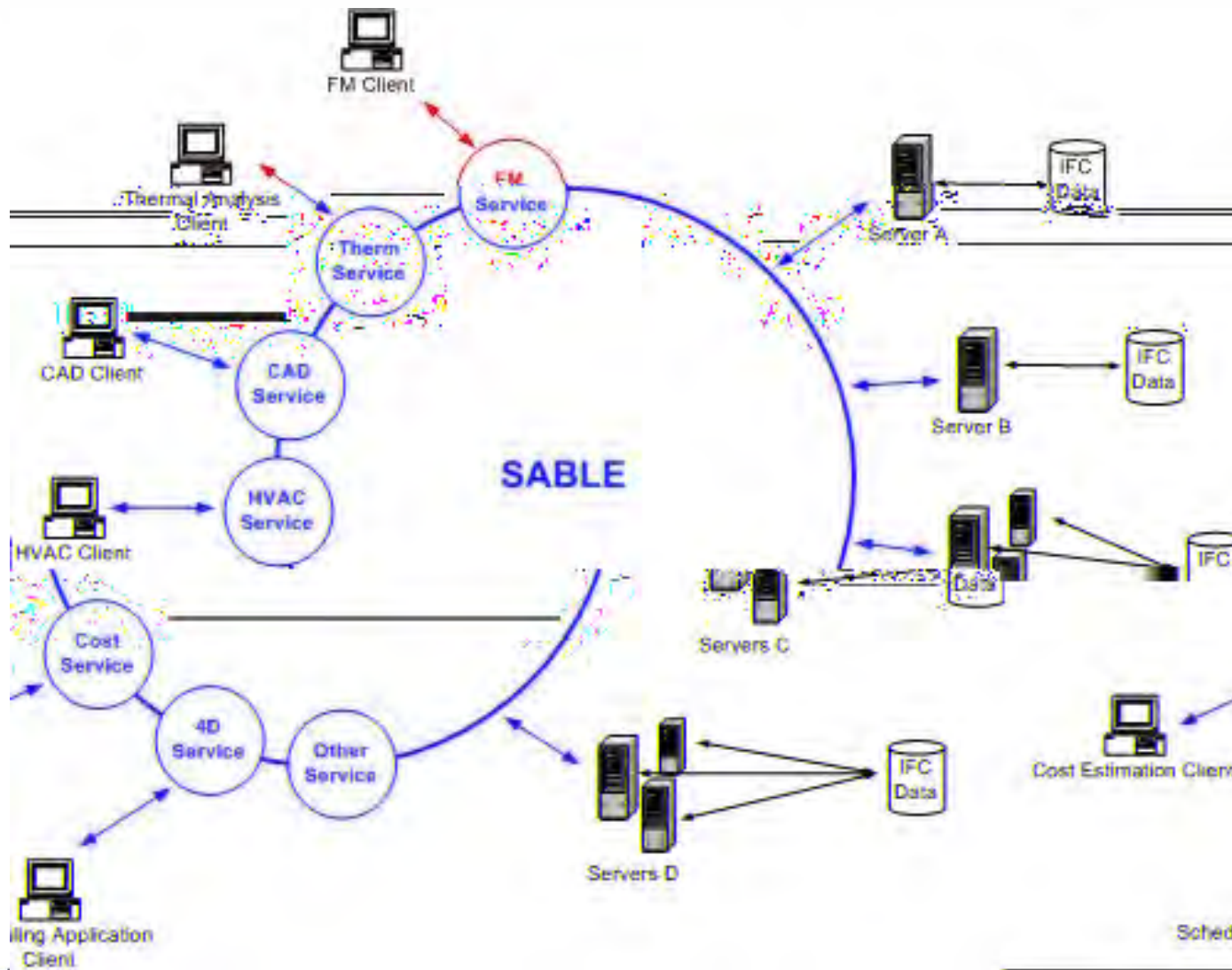


# NBIM as shared, distributed Knowledge Resource



- NBIM Operating environment
  - Multiple stakeholders with various information. BIM is a distributed information resource management challenge: user's desktop, the company's servers and, of course, the Internet.
  - Information cannot be centralized due to administrative responsibilities
- Distributed information technology progression
  - File-based workflow; access using ftp
  - “One DBMS for the BIM” - client/server access, e.g., SQL
    - DBMS's are excellent for managing a information in a common administrative doman.
  - Distributed Data and Services Architecture - client/network/web access
    - Information model designed independent of distribution. Must include ability for updates of information and retaining history
    - Services model provides for discovery and access of distributed information, held by authoritative source
    - “Separation of concerns” - architecting principle of E. Rehtin

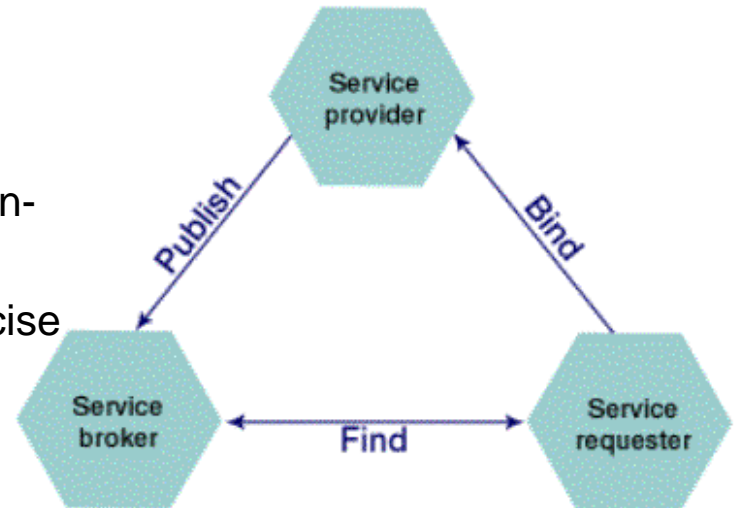
# IAI Sable Services Architecture



# OGC Services Architecture



- OGC standards are part of a web services architecture / platform:
  - Resource providers can advertise their resources (**publish**)
  - End users can discover resources that they need at run-time (**find**)
  - End users and their applications can access and exercise resources at run-time (**bind**)
- This requires:
  - A forum where resources can advertise their capabilities and users can find the resources they need.
  - Self describing resources so applications can **bind at run-time** to the information resources that they have found.





# Near-term NBIM Interoperability Testing

## OGC Web Services, Phase 4 (OWS-4)

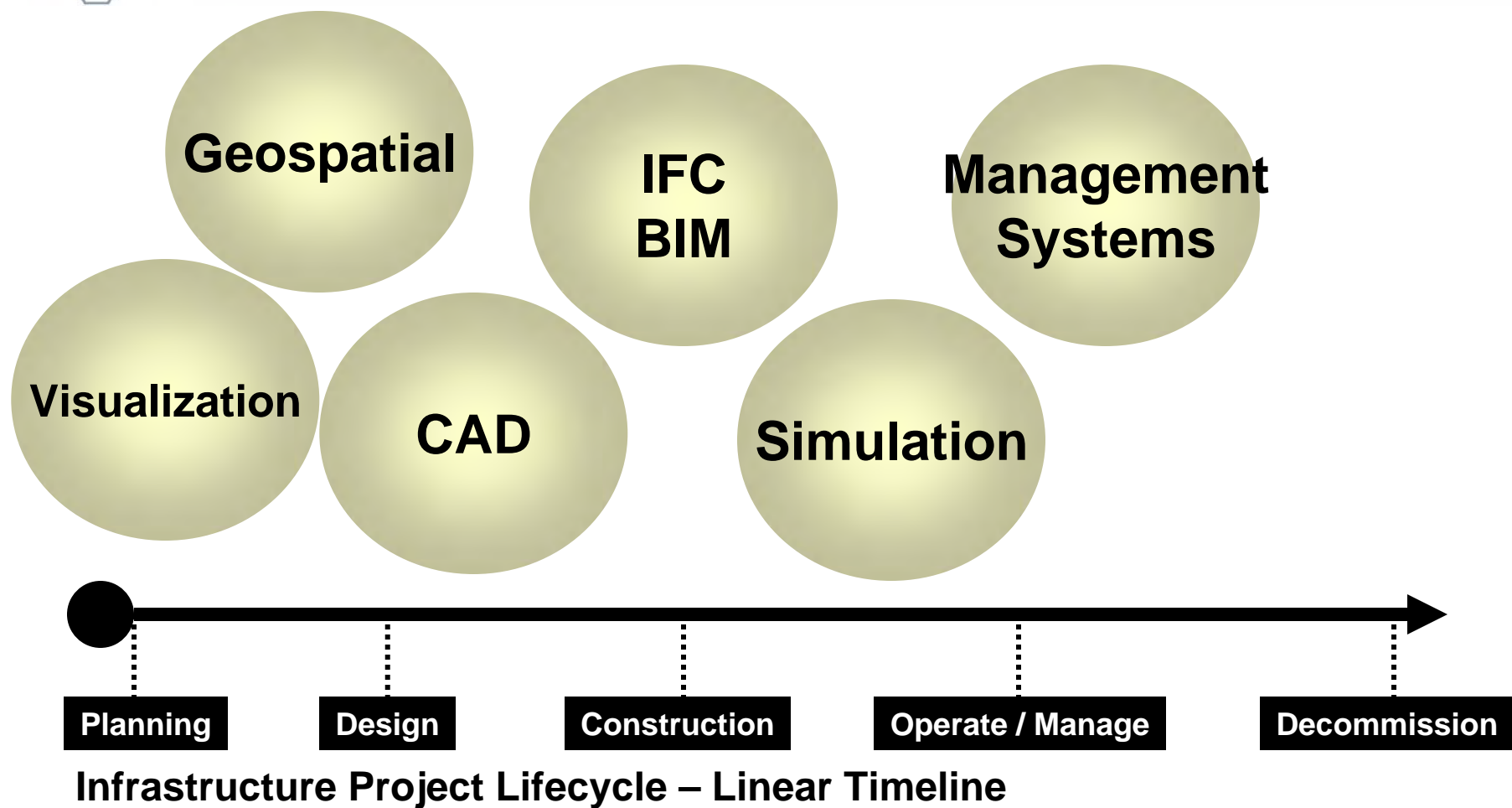


# The OGC Interoperability Program

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- Global, innovative, collaborative, hands-on engineering and testing program to draft and test specifications for consideration by OGC Technical Committee
  - “Technology Incubator”*
- Results
  - Industrial experience base established
    - Web Mapping Testbed, 1999
    - OGC Web Services testbeds
    - Several Pilot projects
    - Interoperability Experiments
  - Surge in OGC Specification Program developments and Outreach Program based on Interoperability Program
  - Business proposition: ~3 to 1 ROI on sponsor investment

# CAD/GIS Interoperability



OGC CAD/GIS Working Group, Nov 2005





## OWS-4 CAD/GIS/BIM thread

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- Develop and demonstrate a framework of interoperability across the lifecycle of building and infrastructure investment involving design, construction, and operation and decommissioning.
  - Sponsored by GSA, NGA (Seeking additional sponsors)
  - Build on work of OGC CAD/GIS WG, IAI and NBIM
- Three focus areas
  - Information Models and Encodings
  - Services-based Interoperability
  - Applications and Demonstrations
- OWS-4 RFQ
  - Released 11 April 2006
  - <http://www.opengeospatial.org/initiatives/?iid=199>



# CAD/GIS/BIM thread in OWS-4 RFQ

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- Information models and encodings
  - CityGML: GML3 Application Profile for virtual 3D Urban Models
  - Industry Foundation Classes (IFC)
  - TransXML: schemas for exchange of transportation data
  - Use OGC GML Application Schema tools for XML encodings.
  - Levels of Detail
- Services based interoperability
  - Service oriented architecture for CAD/GIS/BIM
  - CAD/GIS Client access to BIM views from a CAD Model Server (CMS) and GIS Features from a WFS.
- Functional applications and demonstrations
  - CAD space assessment
  - Access to objects over the construction life-cycle (4-D)
  - Co-location of GIS features and CAD objects in several CRSs
  - 3-D visualization of GIS and CAD data

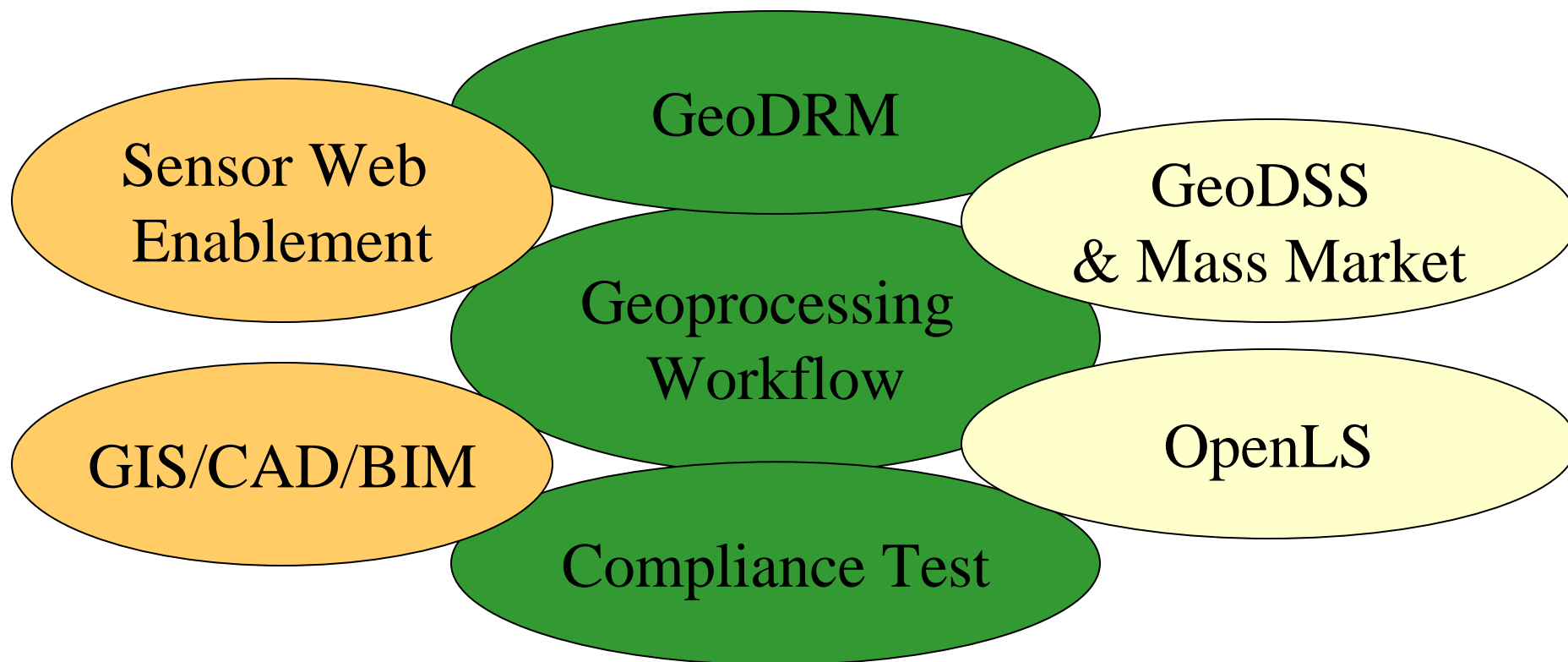
# OWS-4 CAD/GIS/BIM Distributed Components

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QuickTime™ and a  
TIFF (Uncompressed) decompressor  
are needed to see this picture.

# OWS-4 Threads



SOURCE

INFRASTRUCTURE

USERS

# OWS-4 Schedule

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11 April	Release RFQ
05 May	Proposals due
13-16 Jun	Kickoff Meeting; Reston, VA
Six Month development cycle	
11-15 Dec	Demo

*Meets NBIM Requirement: “product” by the end of the year*  
– *Product defined to be: testing complete; reports complete*

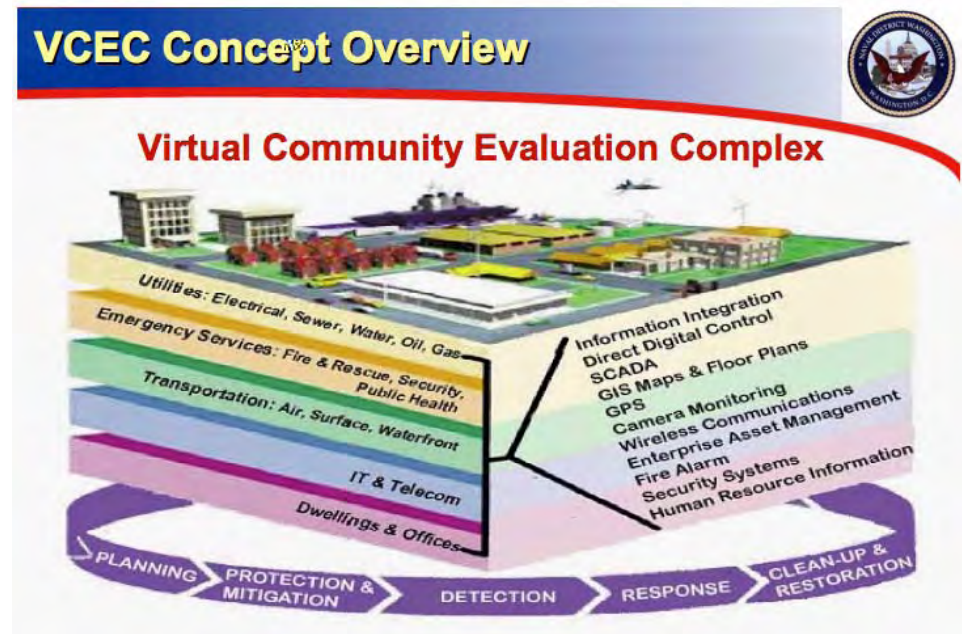


# OWS-4 Demo: Temporary field hospital

Candidate test sites at Dahlgren and PA NY/NJ

## Demonstration Scenario:

- Site a temporary field hospital at abandoned building at an airport
- Collaboration for construction and security analysis
- Disseminate plans to stakeholders
- After construction, perimeter intrusion event/alert
- Fusion of live sensor measurements and processing
- Emergency response decision makers: EOC and mobile



- BIM for buildings and seweres
- IEEE 1451 sensors
- Aeronautical information
- Wireless communications
- Geospatial information around the building

*Helping the World to Communicate Geographically*



# OGC<sup>®</sup>

Open Geospatial Consortium, Inc.

## OGC WEB SERVICES-PHASE 3 DEMONSTRATION

The Open Geospatial Consortium (OGC) Interoperability Program (IP) is a global, hands-on and collaborative prototyping program for rapid development of proven candidate specifications for consideration for consensus adoption and public release by the OGC Specification Program.

### PLAY VIDEO

(available in Windows Media, Real Player, and Quicktime formats)

### START INTERACTIVE DEMONSTRATION

(requires the free [Flash Player](#))



### ABOUT OWS-3

OGC Web Services, Phase 3 (OWS-3) was an Interoperability Initiative that advanced OGC technology in the following areas:

- Common Architecture
- OGC Location Services (OpenLS)
- Sensor Web Enablement (SWE)
- Geo-Decision Support Services (GeoDSS)
- Geo-Digital Rights Management (GeoDRM)
- The IEEE 1451™ and OASIS Common alerting Protocol (CAP) standards were used in OWS-3

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# NBIM Interoperability Test Plan Development



# NBIM Interoperability Test Planning

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- Testing is critical to the success of standards development efforts
  - Must have products implemented by multiple vendors
  - Demonstrate to potential users that the standard is sound
- Testing team tasks includes the following
  - Testing Process Guide - procedures for the testbed
  - Vendor Awareness - selection and seed funding for vendors
  - Identify Tests - specification refinement, demonstration scenario
  - Conduct Tests - client/server and demo integration testing
- Build on existing standards testing effort of NBIM participating organizations



# Approaches to interoperability testing

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- Multi-organization test planning; processes, policies, tools
  - FIATECH - Ric Jackson
    - Will provide FIATECH process
  - OSCRE - (Andy Fuhrman)
  - IAI - Christopher Groome, Jeff Wix
    - Participant in OWS-4
    - Need to discuss future BuildingSmart demo
  - OGC Interoperability Program (IP) policies and procedures
    - <http://www.opengeospatial.org/about/?page=ipp>
- Industry involvement to provide infrastructure and deployment



# Current Test Team membership

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- Percivall, George - OGC - Chair [gpercivall@opengeospatial.org](mailto:gpercivall@opengeospatial.org)
- Reed, Kent - NIST - Co-chair [kent.reed@nist.gov](mailto:kent.reed@nist.gov)
- Akin, Omer - CMU [oa04@andrew.cmu.edu](mailto:oa04@andrew.cmu.edu)
- Kimbrell, Bill - Woolpert [bill.kimbrell@woolpert.com](mailto:bill.kimbrell@woolpert.com)
- Marston, Hunter - AutoDesk [hunter.marston@autodesk.com](mailto:hunter.marston@autodesk.com)
- Ulrich, Tim - HOK [tim.ulrich@hok.com](mailto:tim.ulrich@hok.com)
- Jackson, Ric (need to add) [jackson@fiatech.org](mailto:jackson@fiatech.org)

Need to increase membership and begin regular activity



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