Utility Asset Management Solutions

Improving Capital Project and Asset Management Success with ESRI Technology

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Abstract

Goleta Water District is implementing an end-to-end asset management solution to support its multi-million dollar water treatment system upgrade. The solution manages project and asset data during the capital improvement design and construction phases and supports long-term operations and maintenance requirements. The solution consists of ESRI ArcInfo and ESRI ArcIMS integrated with Goleta's Work and Maintenance Management and Integrated Content Management systems.

A key feature of Goleta's solution is the ability to capture and view documents, pictures, PDFs, and other unstructured content from within the GIS. Goleta can now leverage information such as operating procedures, maintenance manuals, commissioning reports and record drawings produced during the construction phase to support operations and maintenance activities once the assets are installed.

System development included conversion of Goleta's existing AutoCAD and MapGuide applications to an enterprise ESRI ArcInfo GIS and ArcIMS Web solution. This paper will discuss Goleta's project objectives, implementation process, and benefits achieved.

Goleta Water District Overview

- **Established November 17, 1944**

- **Mission is to supply quality water at the most reasonable cost to the present and future customers**

- **Serves south coast of Santa Barbara County to El Capitan**

- **Provides water to approximately 75,000 people through 230 miles of pipeline**

Project Overview

End-to-end asset management solution to support treatment plant upgrade

- **Manages asset data during design and construction**

- **Supports long-term operations & maintenance**

- **Integrates ESRI ArcInfo, ESRI ArcIMS, Work & Maintenance Mgt, Content Management**

- **Provides ability to capture and view documents, pictures, and other unstructured content from within the GIS**

Project Goals

Effectively manage $22M treatment plant upgrade project

- Design iteration drawings
- Project communication and coordination with contractors
- Transition as-built asset data to operations and maintenance functions

Implement a work and maintenance management system

- Manage the new treatment plant assets
- Manage existing transmission and distribution assets

Migrate GIS to ESRI platform and provide Web portal for asset information

- Manage GIS related asset data
- Easy Web accessibility to GIS asset data

Project Approach

- Strong executive sponsorship with clear business objectives

- Focus on end-to-end business process optimization
  - Three major processes required to enable business objectives
  - Model to-be business processes and roles
  - Defined required capabilities for the solution
  - Not a technology focus

- Design, configure, and implement integrated solutions to provide required capabilities
  - Used iterative design approach

# End-to-end Business Process Model

- **Based on utility industry best practices**

- **Distills knowledge of working utilities and SMEs**

- **Used as a reference and tailored to GWD's specific requirements**

Capital Projects	Oper-ations	Business Services	Public Relations	Legal	Water Resources	GIS	IT, HR & Finance
Respond to Unplanned System Events							
Perform Customer Work Requests							
Provide New Customer Service							
Perform System Operations							
Provide Adequate Long-Term System Capacity and Reliability							
Identify and Optimize System Lifecycle Improvements							
Perform Planned System Maintenance and Inspections							
Bill and Collect Revenue							
Ensure Regulatory Compliance							
Manage Business Performance							

Process Overview

Primary processes:

- **Major capital projects**

- **Planned system maintenance**

- **Manage developer/new customer projects**

- **Define business roles and map to people**

- **Define end-to-end processes and activities**
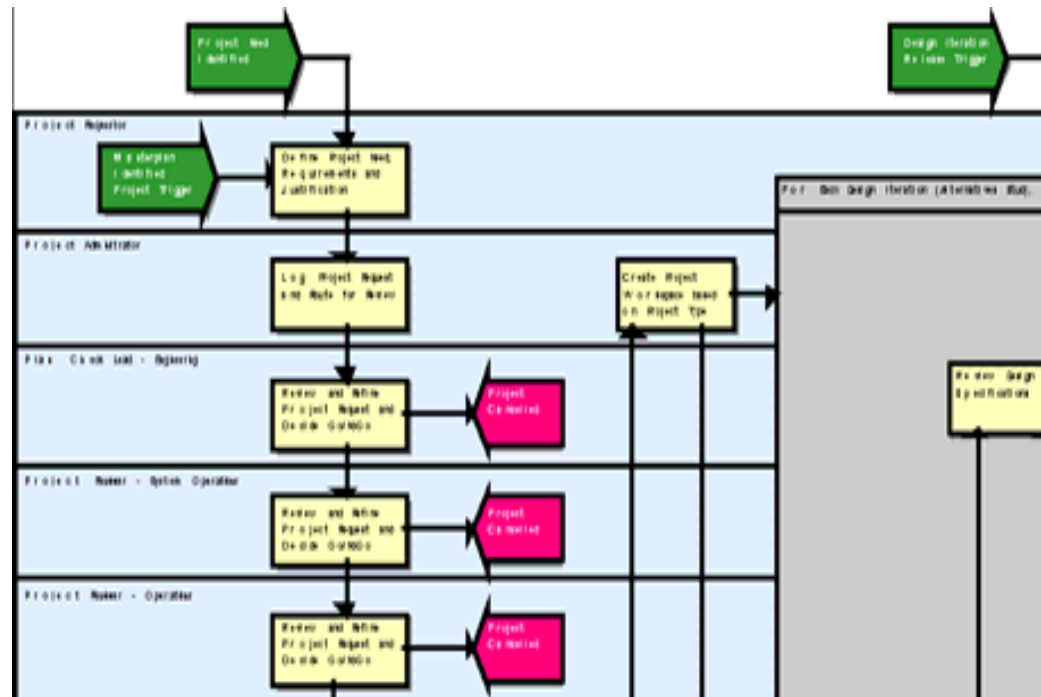
Technology Overview
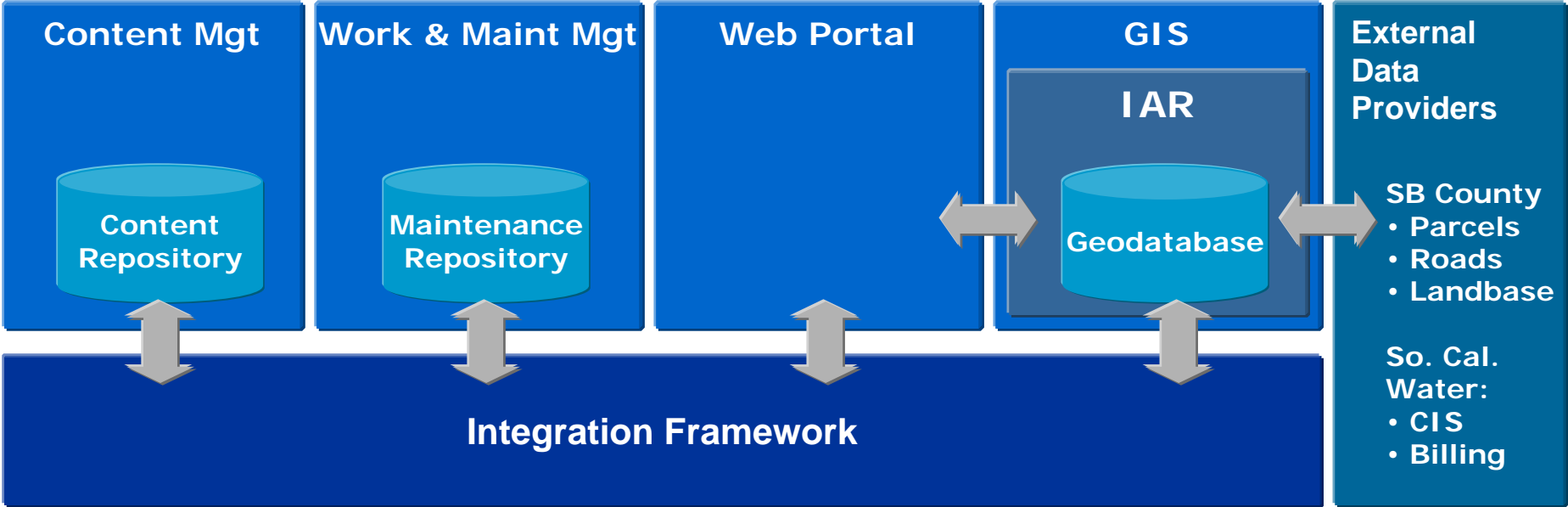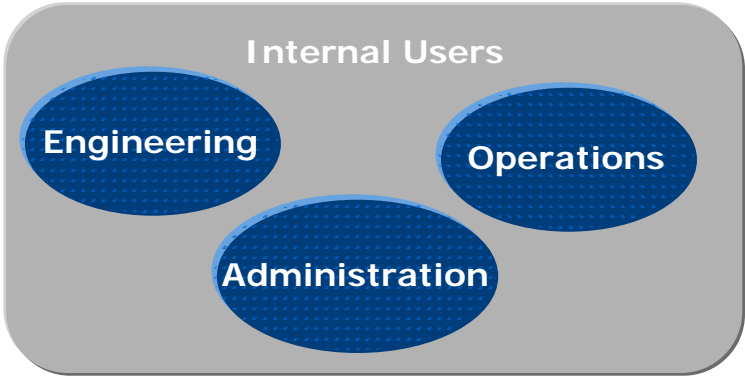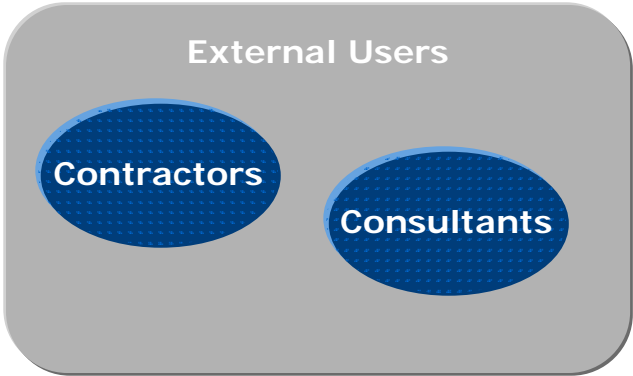
Content Management Solution

- **Interwoven WorkSite MP - easy-to-use, secure web-based interface**

- **Manages maintenance manuals, reference manuals, legal documents**

- **Powerful content categorization and search capabilities**

- **Manages and controls versions and access to unstructured content**

- **Auditing features decrease risk and increase regulatory compliance**

- **Collaborative project workspaces allow consultants and contractors to interface with the utility**

- **Submittals, designs, invoices, etc. can be uploaded for review and redline via approval workflow process**
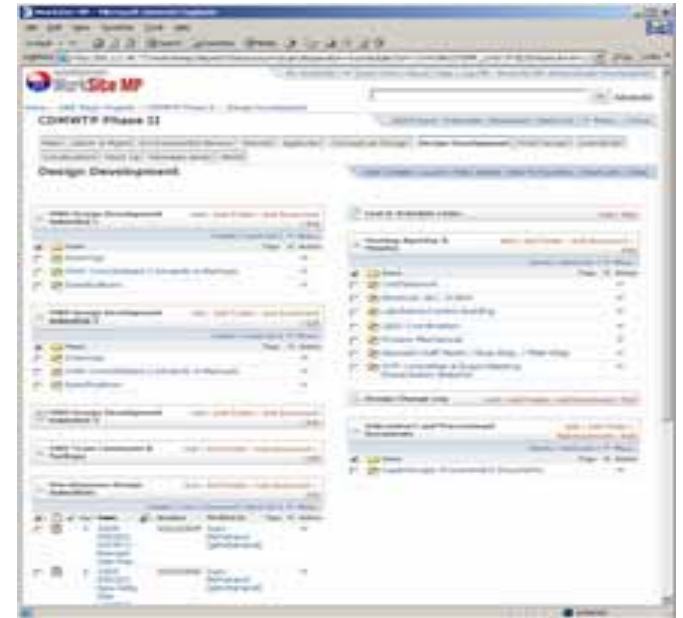
GIS Solution

- **AutoCAD MapGuide converted to ESRI**

- **ArcSDE Geodatabase**

- **Web GIS portal**
  - **Integrated with Content Management and Work & Maintenance Management**
  - **Provides easy access to spatial and non-spatial asset data**

- **Integrated Asset Register**
  - **Built on the ArcGIS platform**
  - **Provides standard hierarchical structure for assets**
 - **Integrates hierarchy with non-spatial asset systems**
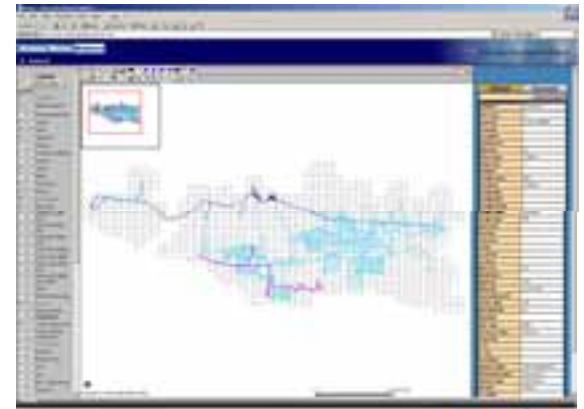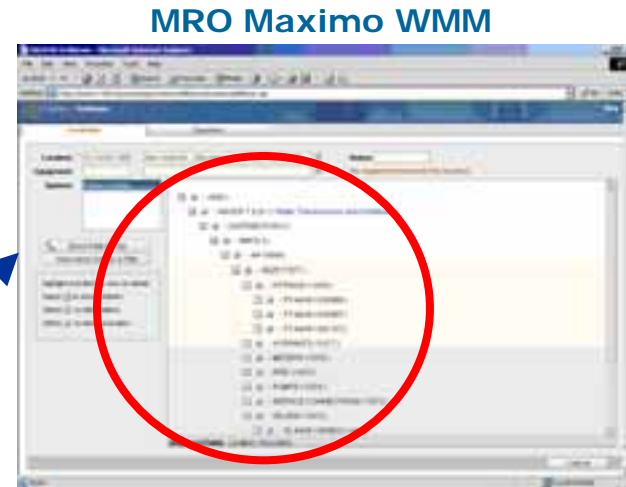

Web GIS Portal
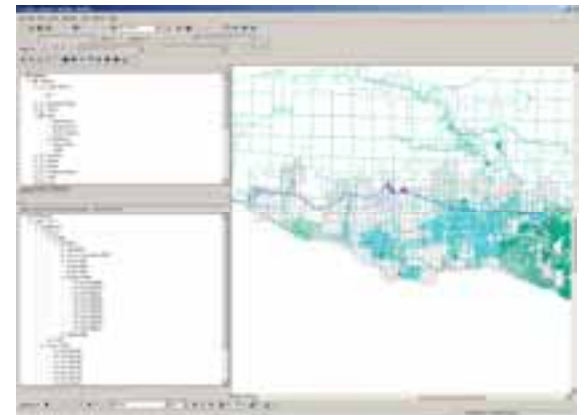
Integrated Asset Register

Asset Hierarchy

- **Provides common way to organize and locate assets**

- **GIS integration synchronizes spatial assets and asset hierarchies with non-spatial systems**

- **Spatial and attribute-based business rules allow system to automatically place assets within the asset hierarchy**
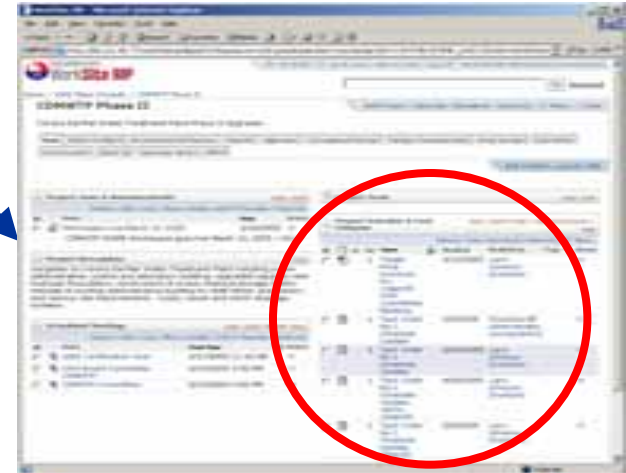
MRO Maximo WMM

Systems Integration
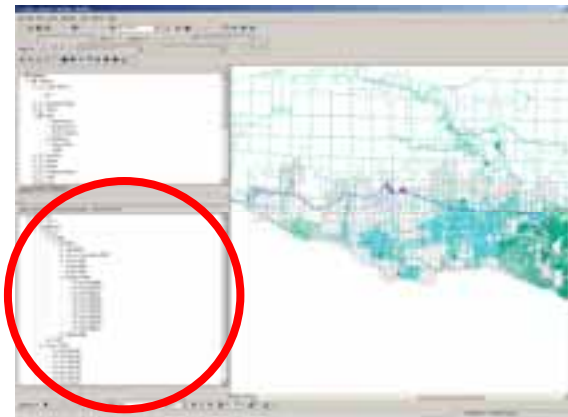
Integrated Asset Register/GIS

Interwoven Worksite MP CM

Web Portal

Standard Grid Maps
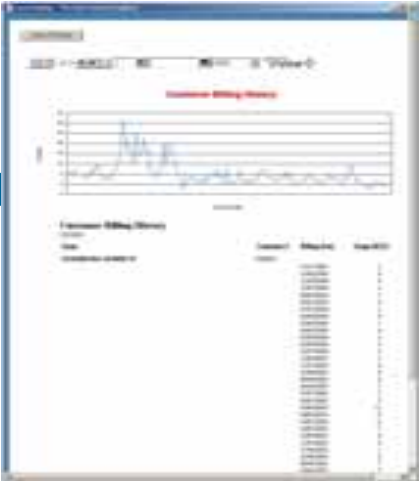
Drawings, Designs, Images, etc.
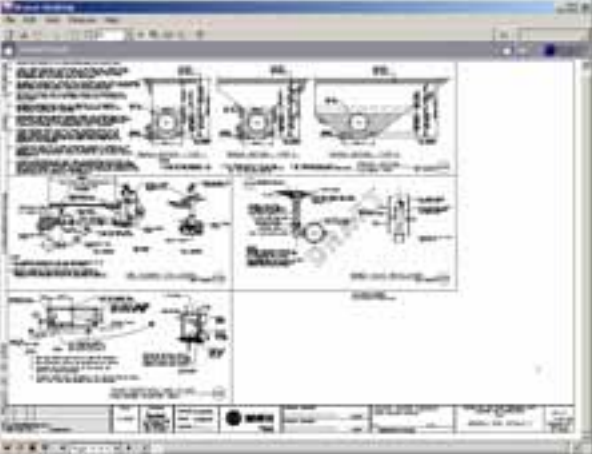
Web GIS Portal

CIS/ Billing Info

Operations Reports

Work & Maintenance Management

- **MRO Maximo**

- **Organizes and schedules preventative maintenance work plans**

- **Implements workflow and key performance indicators for major WMM processes**

- **Integrated with the Asset Register/GIS**

- **Automatically synchronizes GIS asset hierarchies in Work & Maintenance Management and Content Management**
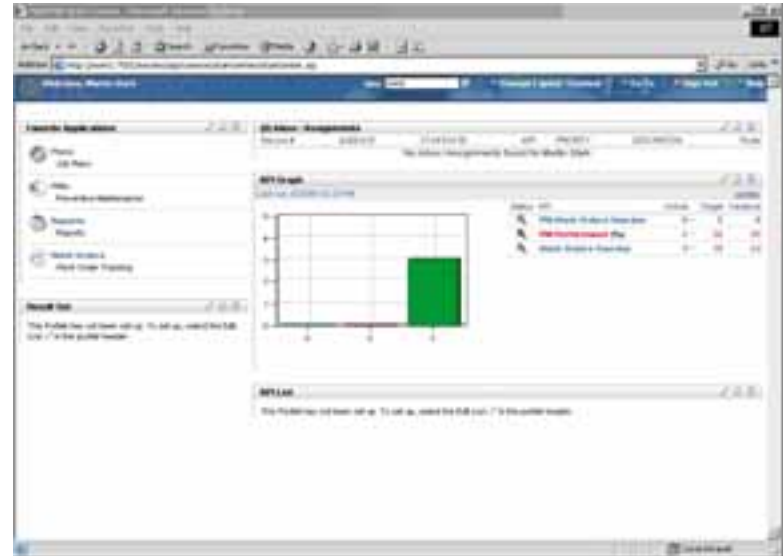
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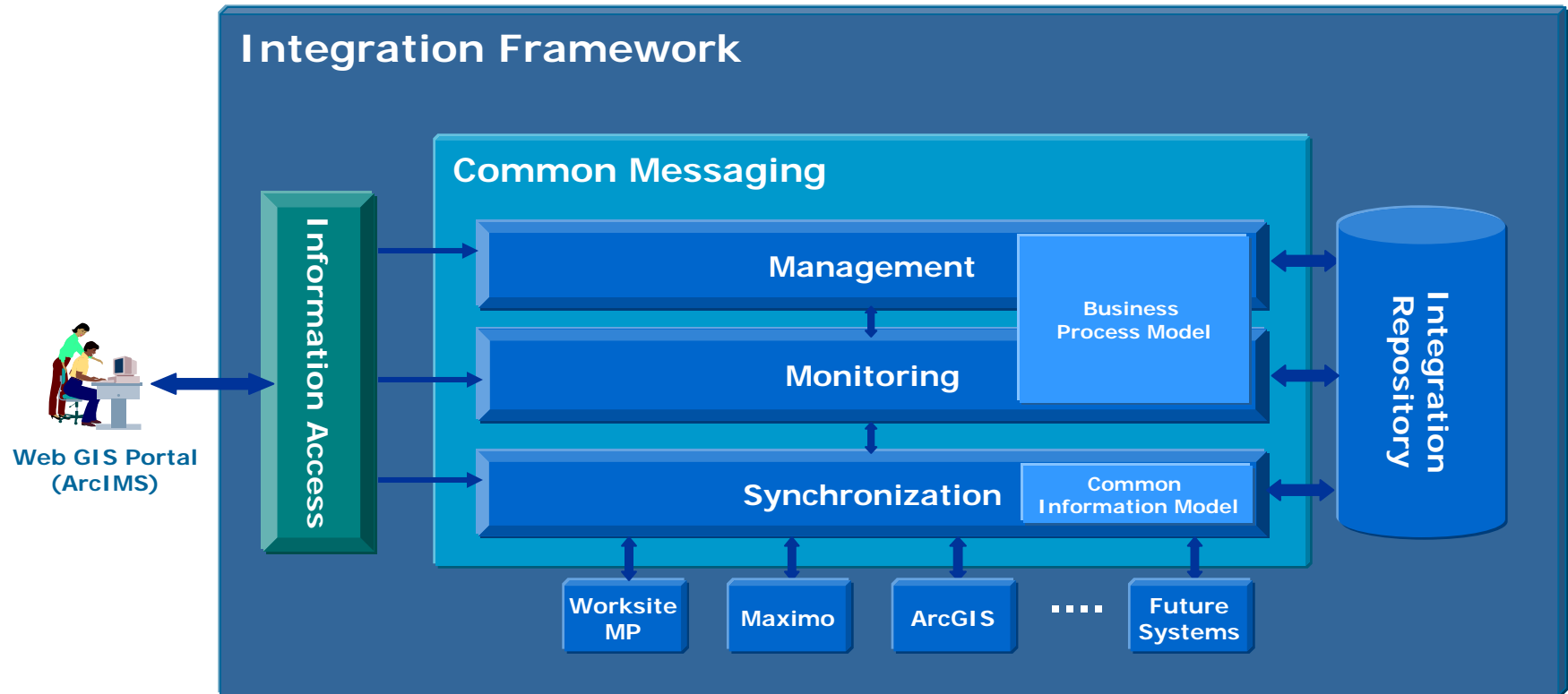
A Platform for Future Integration

- Integration framework allows solution to be easily extended to encompass future integration requirements

- Enhance Web GIS
  - Access and display asset work related data (work history, asset failure data, asset maintenance costs)
  - Tighter integration with customer billing/CIS systems

- Mobile GIS for viewing and collecting asset related data in the field

Summary of Benefits

- Improves communication and coordination between contractors and GWD staff during design and construction

- Contractors/consultants directly upload documents into the system, reducing the effort required by GWD staff

- Provides seamless transition of content from *project-centric* design/build to *asset-centric* operations/ maintenance functions

- Provides a consistent asset organizational structure (asset hierarchy) across systems and workgroups

- Synchronizes data between core asset data systems (GIS, Work & Maintenance Management, and Content Management)

- Provides easy, integrated access to asset data via GIS-enabled information portal

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