New Life for Legacy Web Apps

An ArcGIS Modernization Strategy

Esri Developer Summit
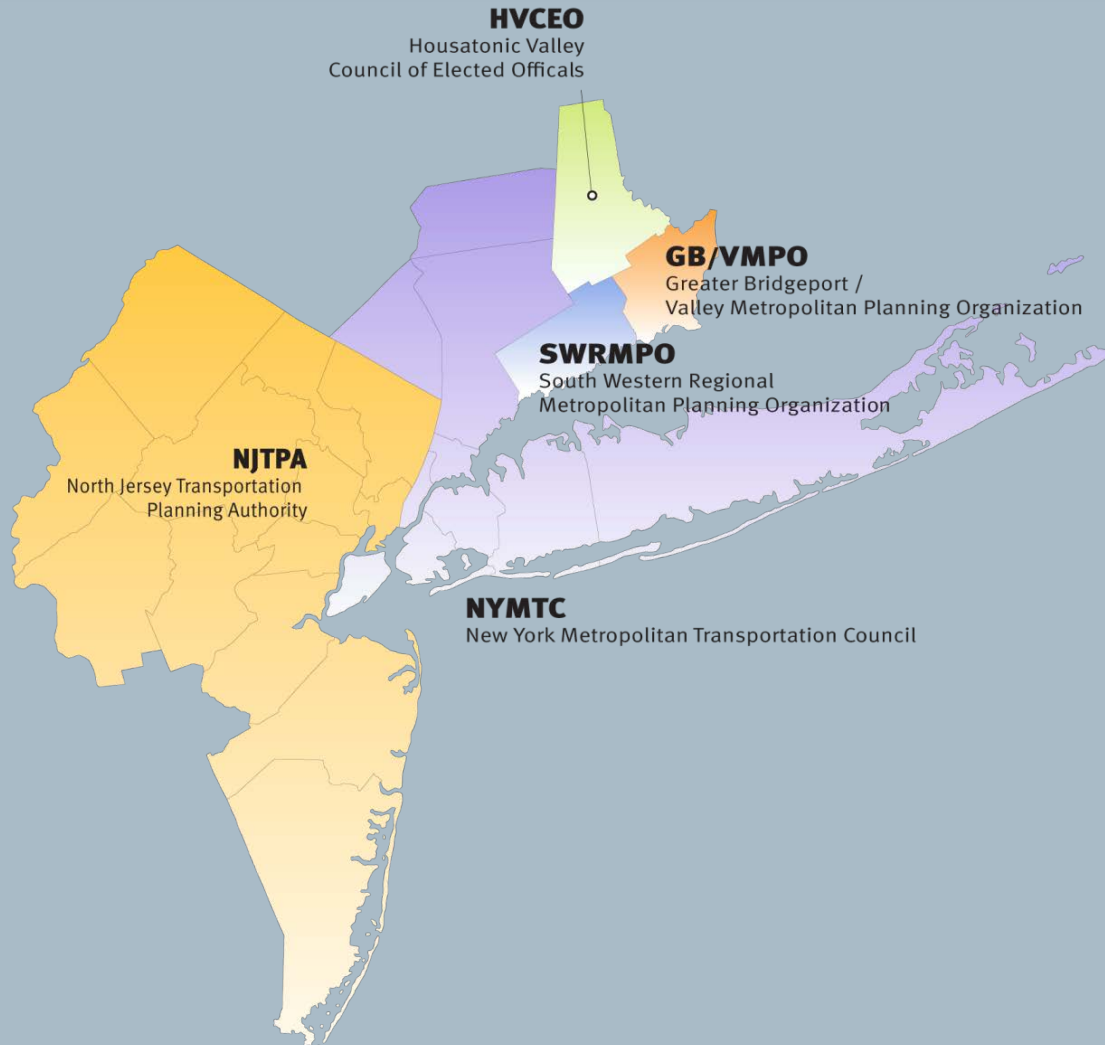**Washington, DC**

2/11/15

Kaitlynn Davis, Senior Planning Analyst
North Jersey Transportation Planning Authority

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MPOs in the Tri-State Metro Region

HVCEO
Housatonic Valley
Council of Elected Officals

GB/VMPO
Greater Bridgeport /
Valley Metropolitan Planning Organization

SWRMPO
South Western Regional
Metropolitan Planning Organization

NJTPA
North Jersey Transportation
Planning Authority

NYMTC
New York Metropolitan Transportation Council

NJTPA Region

Bergen

Essex

Hudson

Hunterdon

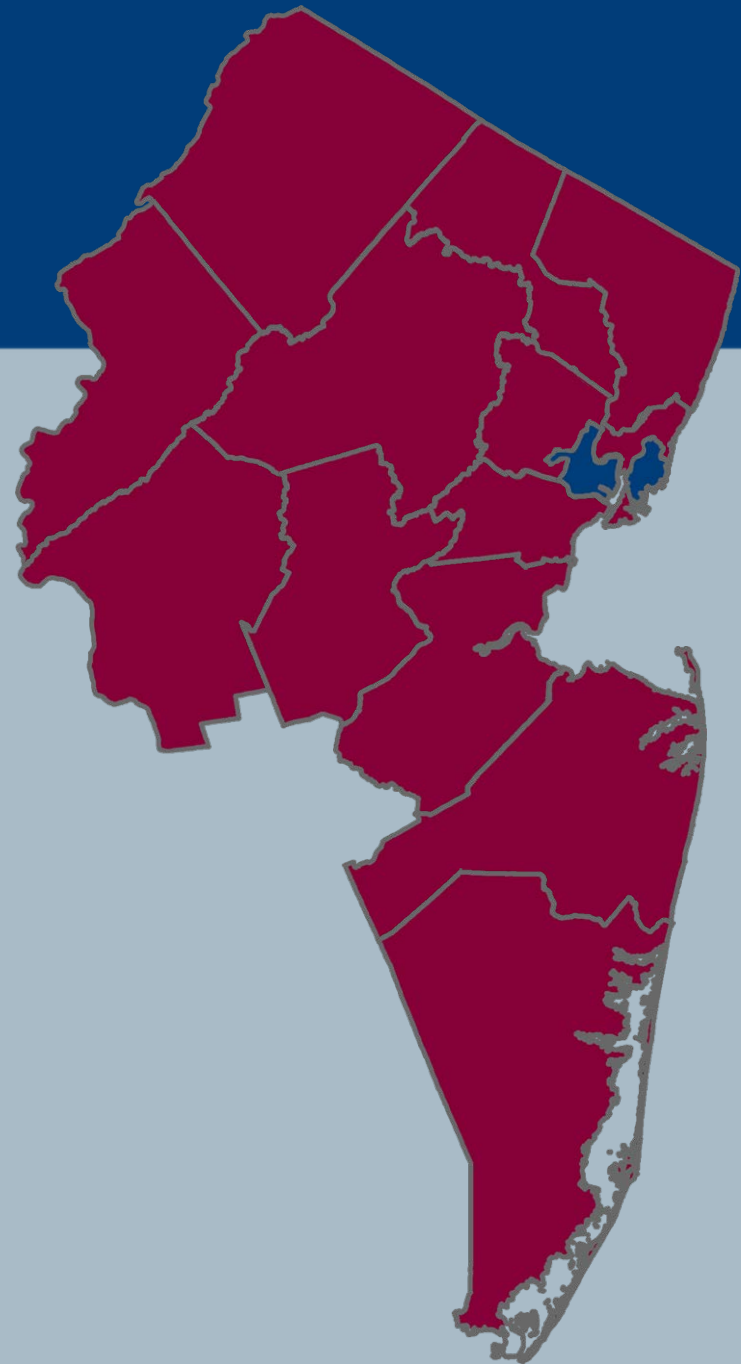Jersey City

Middlesex

Monmouth

Morris

Newark

Ocean

Passaic

Somerset

Sussex
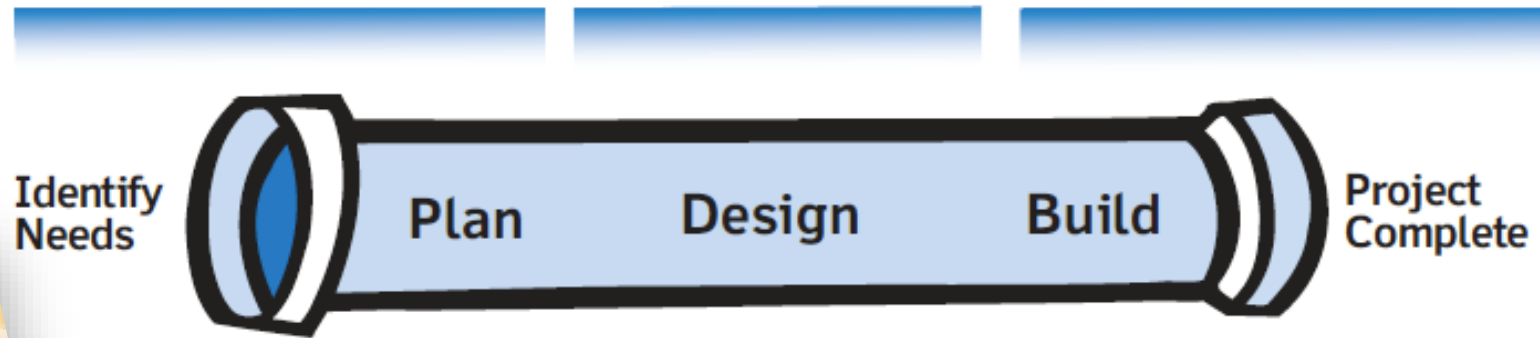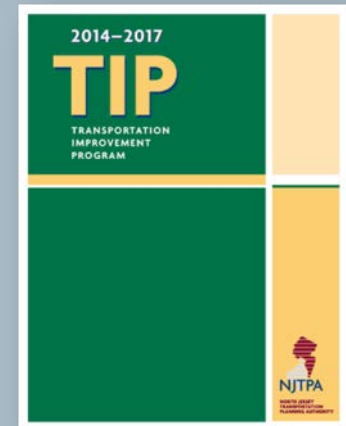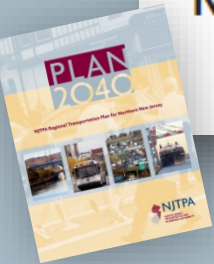
Union

Warren

Transportation Improvement Program (TIP) and Project Pipeline

The Project Pipeline

Identify Needs → Plan → Design → Build → Project Complete

- **Projects must be in TIP to receive federal funding**
- **Roads, bridges, public transit, pedestrian and other projects**

2014–2017 **TIP** TRANSPORTATION IMPROVEMENT PROGRAM

NJTPA Online Transportation Information System (NOTIS)

- Web application to share the location and details of transportation projects with the general public

- Developed as in-house effort in 2004

- Contains a map viewer and query capabilities

Legacy NOTIS Architecture

Presentation Tier

User Interaction Components

Business Tier
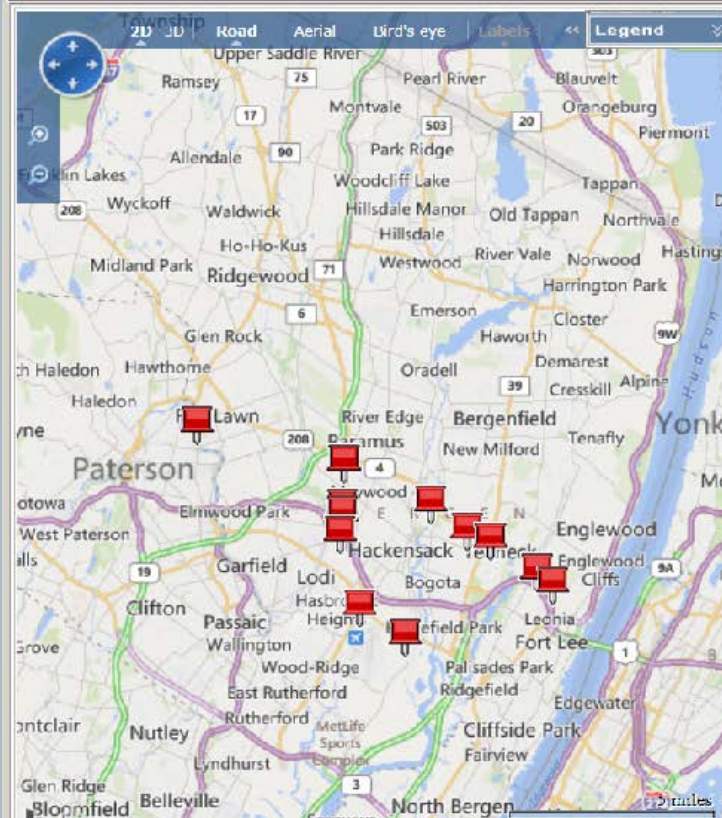
.NET Web Forms (Visual Basic)

Data Tier

Access Database

Data Access Classes

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Legacy NOTIS Map Search

NOTIS Challenges

- Little documentation from original developers

- Inconsistent browser support

- More interactivity desired

- Did not fully utilize our current technology infrastructure

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Why is Modernization Important?

- Maintain a quality user experience
  - Users expect rich interactivity

- Minimize security vulnerabilities
  - Best practices change regularly

- Capitalize on gains in efficiency
  - New frameworks and tooling designed to reduce development costs

Applications that receive infrequent updates can become increasingly expensive to support

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Modernizing with ArcGIS

- Provides many tools within a single ecosystem

- Flexible to a variety of workflows

- Can incorporate non-developers to reduce development costs

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The NOTIS Update Process

- Define problems and goals

- Evaluate the NOTIS workflow

- Choose a development strategy

- Refine the system architecture

Step 1: Defining Problems and Goals

Problems:

- Static interface

- Difficulty maintaining updates

- Utilization of obsolete technology

Goals:

- Increased interactivity

- Quick and efficient updates

- Greatest return on technology investments

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Step 2: Evaluate Workflow

NOTIS Workflow Evaluation Principles

- ### Requirements
  - The components required to satisfy the business workflow that is expected of NOTIS

- ### Risk Assessment
  - Planning for unexpected events with tools and procedures

- ### Resources
  - Inventory of who/what is available to build and maintain the application

NOTIS Workflow

Basic Workflow

New projects are received and old ones are archived	Projects are reviewed in a map software and published to the web	A web app consumes the services and provides interactivity	The web application is configured and hosted

Requirements

- A spatial database
- Mapping Software
- Web app
- GIS Server
- Web Server

Risk Assessment

- Testing for support of new features
- Decentralized maintenance
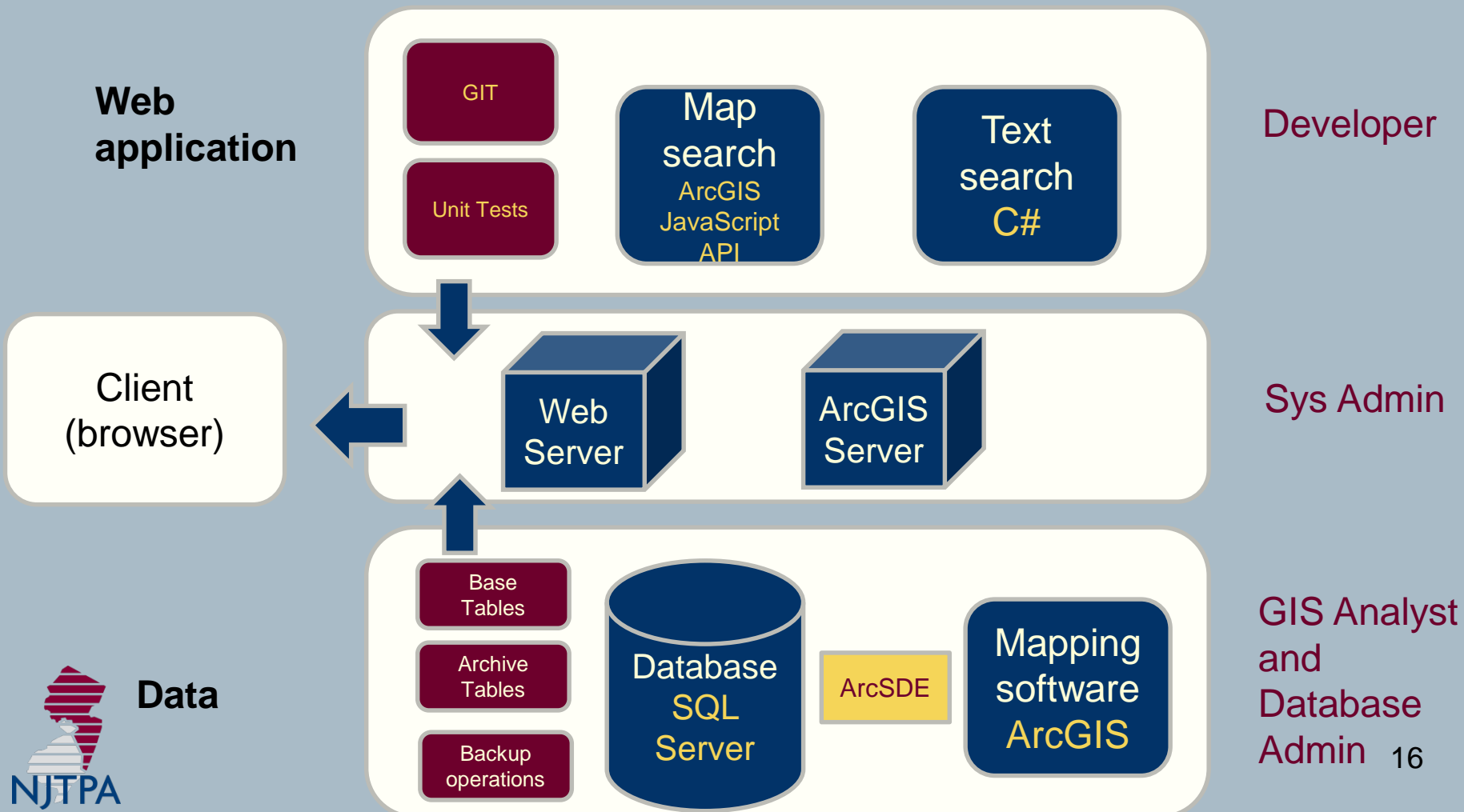- Backup/recovery tools for data and source code

Resources

- ArcGIS/ArcGIS Server
- Available Staff
  - GIS Analyst
  - Database admin
  - Developer
  - Sys Admin

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Step 3: Choose Development Strategy

Phased Process

- Phase 1 – Acclimate to the ArcGIS environment
  - Become accustomed with intake of new GIS data and publishing it to ArcGIS Server
  - Build web app to consume map services
- Phase 2 – Update business logic in the web app
  - Update queries for the text-based search and reporting feature
  - Convert VB code to C#
- Phase 3 – Migrate legacy data to new database
  - Migrate legacy TIP databases to SQL Server
  - Convert old spatial data to ArcGIS shapefiles

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Step 4: Refine Architecture

Web application

GIT

Unit Tests

Map search
ArcGIS JavaScript API

Text search
C#

Developer

Client (browser)

Web Server

ArcGIS Server

Sys Admin

Data

Base Tables

Archive Tables

Backup operations

Database SQL Server

ArcSDE

Mapping software ArcGIS

GIS Analyst and Database Admin

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Revitalized NOTIS Map Search

Concluding Thoughts

- Different solutions apply to different modernization efforts
  - Requirements, Risks, and Resources are unique to the task at hand
- Strive for simplification
  - What can be reduced or eliminated?
- Keep up with GIS developments
  - Read blogs and revisit documentation to maintain an optimal application architecture

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Thank You

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Defining the Vision. Shaping the Future.

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