AASHTOWare Bridge Design and Rating

Modernization Update

User Group Training Meeting
Chicago – August 2016

Modernization Update

*The modernization proposes to create **more powerful**, **easier to use** tools to assist agencies in designing and load rating their inventory in a **more cost-effective** manner.*

Modernization Update

Why Modernize?

- Software development began in the mid-90s
- Recent addition of 3D analysis pushes the computational limits of the current system
- Software tools for development have significantly improved
- User expectations have matured
- Hardware has improved, need to take full advantage of new hardware capabilities (e.g. multi-threading)

Modernization Update

Benefits

It is time to migrate to a new architecture using the latest development tools.

- Significantly upgrade the core technology to a modern software architecture that better utilizes current and future hardware, and the latest software development technologies
- Improve analysis performance by taking advantage of multi-threading (running multiple tasks simultaneously) capabilities of the latest hardware

Modernization Update

Progress – Software Design:

- Worked with Professor Anthony Lattanze from the Software Research Institute at Carnegie Mellon University - August 2013

- Conducted a workshop with stakeholders to identify the requirements that drive the architecture design

  - Performance – reduce analysis time, improve load time for opening a bridge
  - Usability – modern UI, better feedback, improved reporting
  - Extensibility – easy to add new functionality, support for 3rd party developers
  - Modifiability– can be easily modified

Modernization Update

Progress – Software Design

Use cases were identified such as the following

- Legacy Use Cases
  - Bridge Load Rating
  - Specification Checking
- New Use Cases
  - Permit Analysis
  - Design Analysis
  - New Report Capability
  - Web and Mobile Support

Modernization Update

Progress – Software Design

Architecture Workshop conducted March 2014 - architecture design initiated

- Discussed options
- Identified architectures to explore
- Compared architectures to the Quality Attribute requirements

Modernization Update

Progress – Software Design

Architecture Workshop conducted March 2014 - architecture design initiated

- Identified experiments for evaluation options
  - Data Access
    - Pure ADO.Net
    - ADO.Net – Strongly Typed
    - Entity Framework
  - Payload Serialization (Bridge Objects, Library Objects, etc.)
  - RESTful Web Services
  - User Interface
    - WPF / MVVM
    - 3rd Party User Controls

Modernization Update

Progress – Software Design:

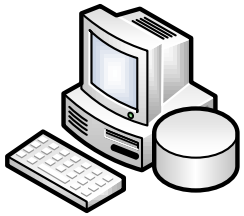
- Completed an architecture design to satisfy those requirements.
- Began the task of preparing conceptual mockups of the new user interface
- Continue the software design of the analysis engine based on the P/S Design Tool engine design

Modernization Update

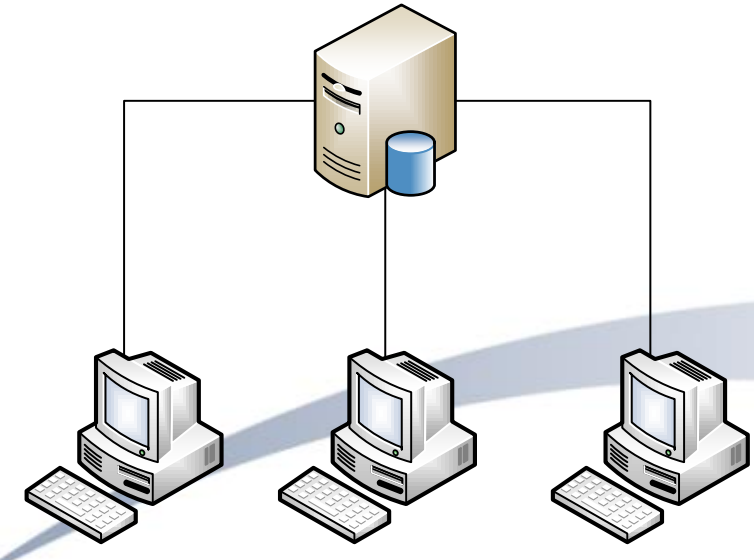
Progress – Software Design:

Proposed Architecture

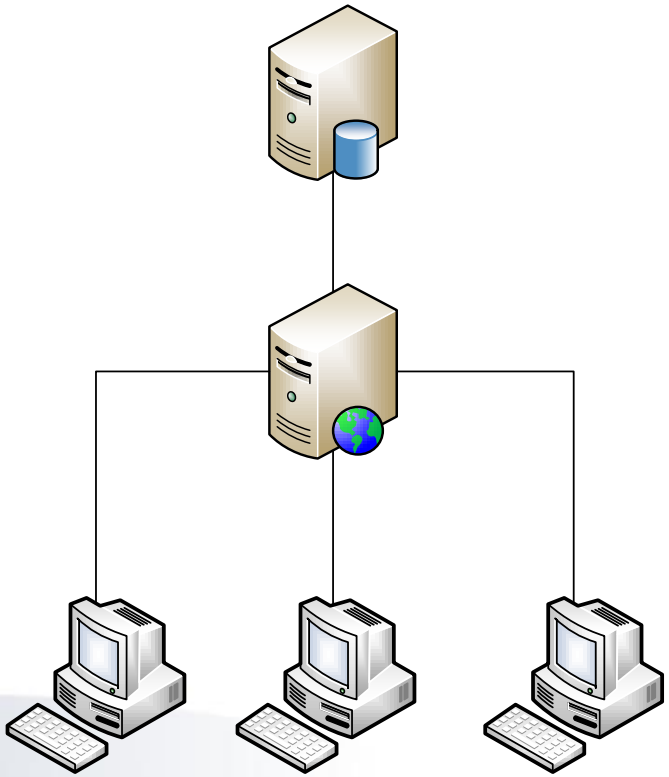
Client-Server with Local Database



Client-Server Architecture with Shared Database



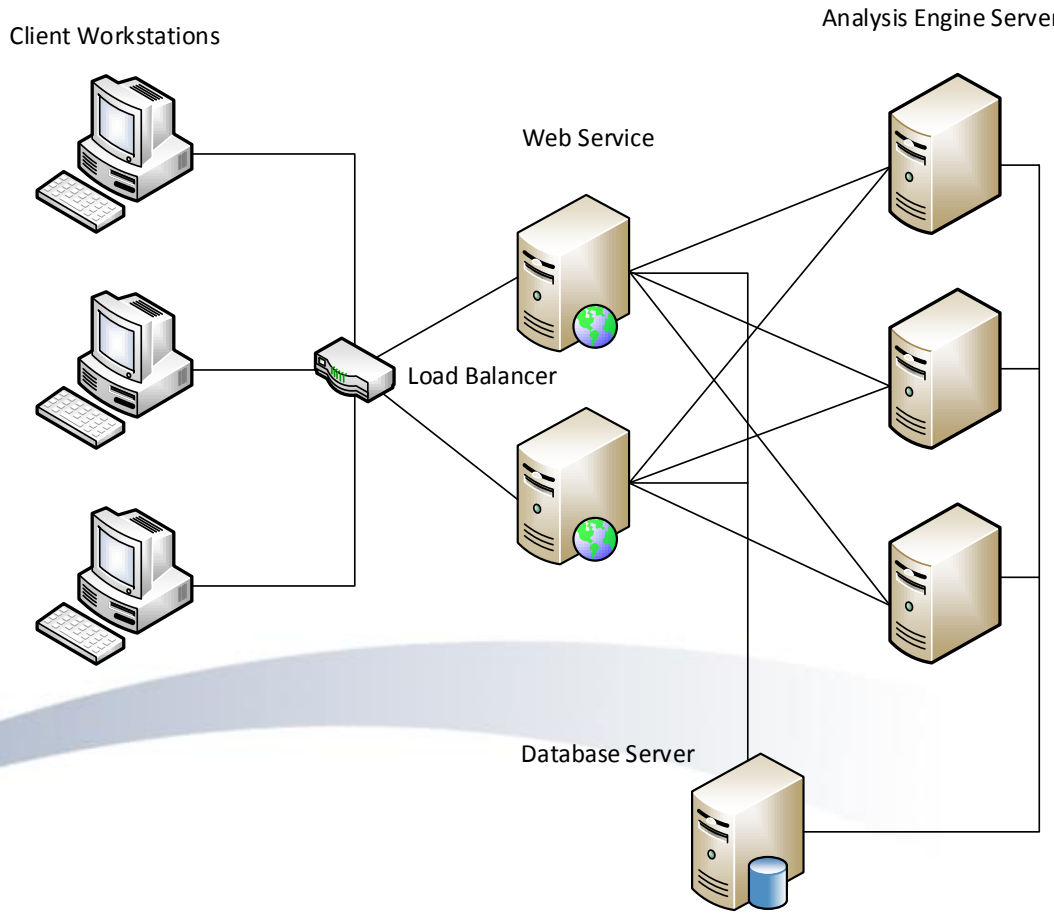
Service Oriented Architecture



Modernization Update

Progress – Software Design:

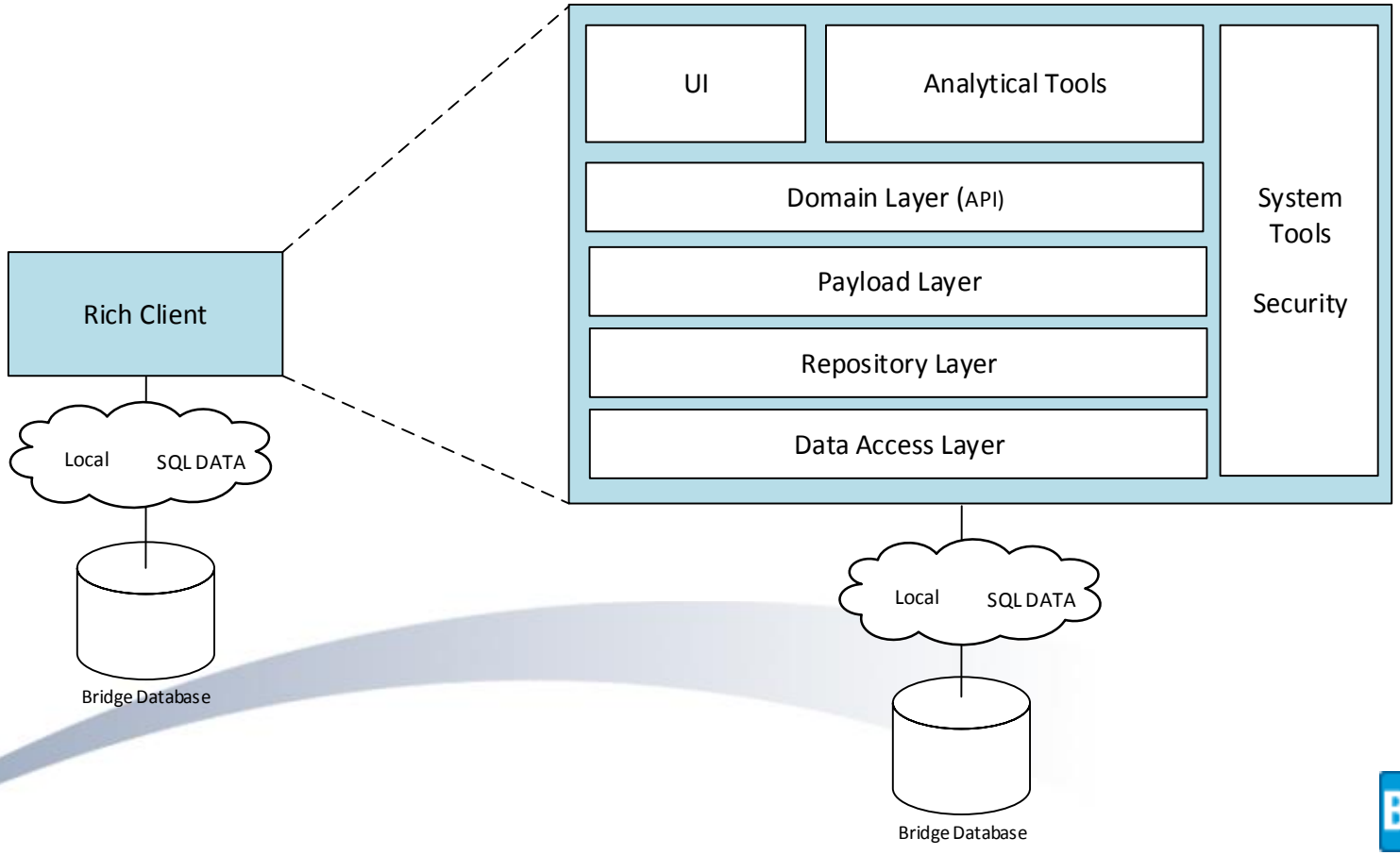
Proposed Architecture can be enhanced to support server side analysis



Modernization Update

Progress – Software Design:

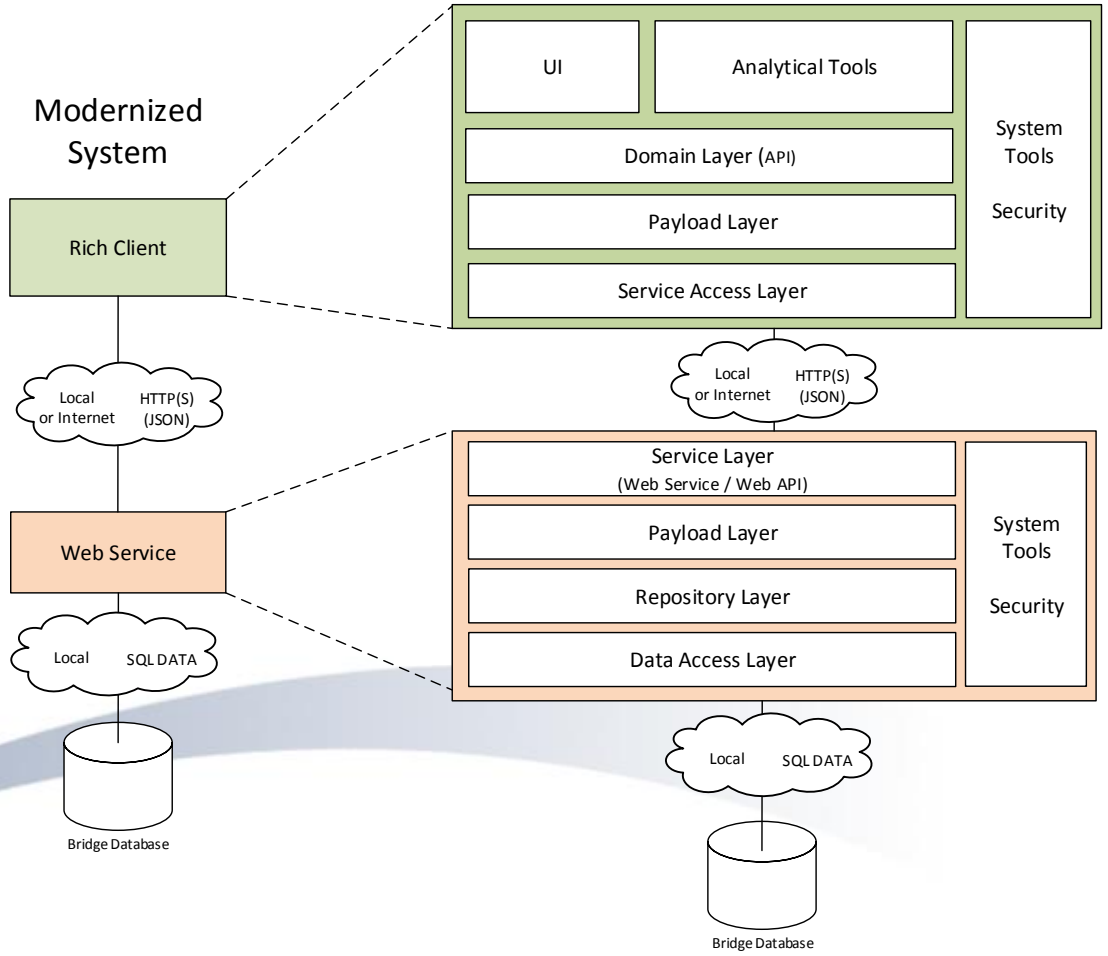
Proposed Architecture - Layered Views



Modernization Update

Progress – Software Design:

Proposed Architecture - Layered Views



Modernization Update

Progress:

- Finished the modernization of the finite element engine
- Solicitation for funding - Fall of 2015
- Began software development of the modernized user interface – Spring 2016

Modernization Update

Release Schedule:

- Phase 1 – Modernize the analytical modules
  - Release June 2018
  - Includes Legacy maintenance release
  - Existing user interface with the modernized analysis engine
  - Both the modernized engine and the legacy engine will be available for use

(At this point, since no enhancements have been implemented, the analysis results of the modernized engine should closely match the legacy engine analysis results)

Modernization Update

Release Schedule:

- Phase 2 – Modernize the user interface and the rest of the system
  - Release June 2019
  - Includes last Legacy maintenance release
  - The modernized user interface and access to the database with the modernized engine – i.e. ***the fully modernized system***

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Release Schedule:

- Phase 3 – Implement selected user-requested enhancements
  - Release June 2020
  - The fully modernized system with selected user-requested enhancements

Modernization Update

Progress – Solicitation Status:

Agency	Contribution
Alabama	$ 740,000
California	TBD
Idaho	$ 740,000
Illinois	$ 740,000
Iowa	TBD
Kansas	$ 740,000
Michigan	$ 740,000
Minnesota	TBD
Mississippi	$ 740,000
Montana	$ 740,000
New Mexico	$ 90,000
New York	$ 740,000
Ohio	$ 740,000
Oregon	TBD
South Dakota	$ 369,000
Tennessee	TBD
Wisconsin	$ 300,000
12 States	**$ 7,419,000**

Modernization Update

In conclusion…

Improve efficiency *for more than 500 consultants and 40 agencies.*

"It's all about the data!" *Licensing agencies have an enormous investment in their bridge data.* ***The data and your investment will be preserved.***

Thank you