



## Office of Technology Strategies (TS) Architecture, Strategy & Design (ASD)

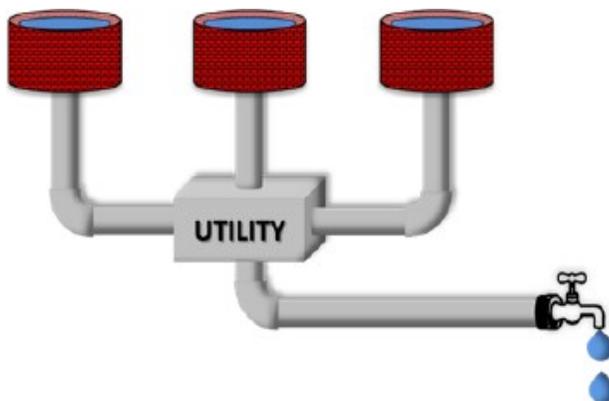
### A VA Executive's Guide to Web Service Layers

#### INTRODUCTION

In this issue, we discuss the business value of treating all information as an enterprise asset and using modern Web Services to connect applications to data, ensuring information is discoverable, accessible, and usable by the rest of the enterprise (and not just the application you are using).

#### WHAT IS A WEB SERVICE?

It might help to think of Web Services in terms of your water supply. You don't generate your own water, you just turn on the faucet and water is provided in agreed standard units and cost. Your utility provider may have multiple sources for that water, but you always get the re-source you need without having to determine which source supplied it. Web Services are like this layer between data and the applications that use it, allowing a user of a Web Service to access existing applications and data via the Internet.



Your utility provider may get water from many different sources, but you just care about what comes out of the faucet.

#### WHY USE WEB SERVICES?

Web Services allow IT organizations to reuse existing applications and functionality to solve business problems rather than taking the time to build in-house applications. Not only will this save an organization time and money, but Web Service-enabled applications also improve information security and enhance information agility across internal and external business units.

#### YOUR WATER SUPPLY IN TERMS OF WEB SERVICES

##### Decreased Time and Cost

Traditionally-built applications use programming languages that require a full increment of development to make even minor changes to functionality. Each modification adds time and cost to an IT program's project plan. Modern applications are built using "scripting languages" that were specifically designed to build Web-based applications for computers, tablets, and smart phones and leverage Web Services to further simplify development processes. A developer simply connects new or modified Web pages to Web Services to access user-required functionality. The necessary functionality would be provided by existing applications and not require developing all-new capabilities from scratch.

##### Enables Information Agility

Accelerated information sharing, which relies on Web Service capabilities, allows

This newly established office within OIT's Architecture, Strategy & Design (ASD) interacts not only with the ASD pillar offices, but also with multiple stakeholders within OIT and with strategic offices across the enterprise. TS works closely with IT and business owners to capture business rules and provide technical guidance as it relates to Data Sharing across the enterprise, specifically for inter-agency operability.

the enterprise to take advantage of the broader set of available information. Web Services can provide interoperability between systems without the time and expense of project-specific interfaces. Adoption of these standards-based technologies will allow efficient communications and lower the cost of maintaining the current communications infrastructure.

##### Improved Security

Advancements in the areas of Web Services security are particularly important when safeguarding Veterans' personally identifiable information (PII) and personal health information (PHI). Web Service security protocols specify how integrity and confidentiality can be enforced on messages and allow for end-to-end security via communication between different security token formats. These end-to-end security capabilities include processes for signing, encrypting, and attaching security tokens to ascertain sender and recipient identity.

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### A VA Executive's Guide to Web Service Layers, cont'd

#### TYPES OF SERVICES

Based on industry standards and usage within the agency, VA has agreed to the following definitions:

Application Services:

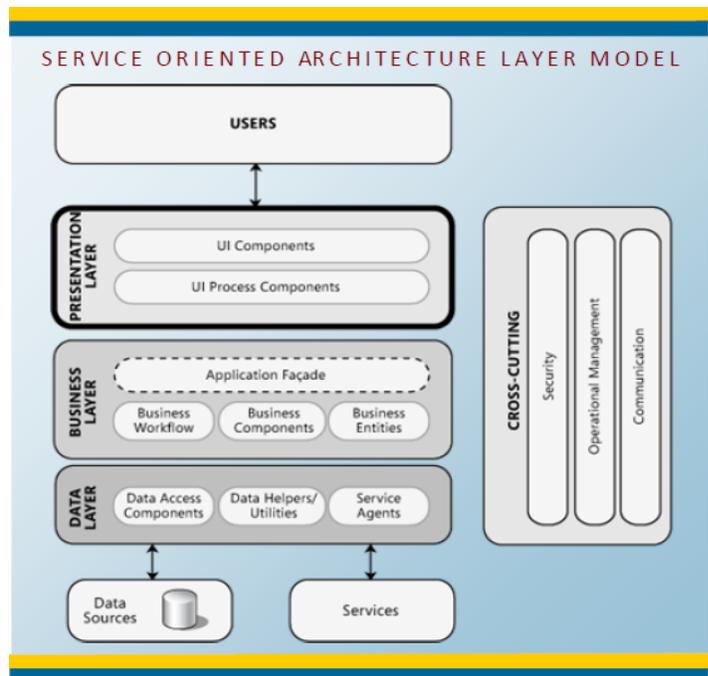
- Create, Read, Update, and Delete (CRUD) services; and
- Composite services to aggregate or manipulate data
- Infrastructure Services:
  - Enterprise Service Bus (ESB) services include messaging, service registries (e.g., Universal Description Discovery and Integration—UDDI), and schema repositories (e.g., Web Services Description Language—WSDL). VA also uses request routing/re-routing.
  - Other infrastructure services include everything from authentication and authorization to application monitoring, Continuity of Operations Planning (COOP), and hosting.

#### THE WEB SERVICE STACK

Web Services exist as “stacks” with multiple layers. In general, there are three layers: Presentation, Services (or Application), and Data. The interactions between the layers that make up the Web Service allow users to access, use, and store the data they need to perform their business functions.

**Presentation Layer:** The Presentation Layer contains the components that implement and display the user interface and manage user interaction. This layer includes controls for user input and display, in addition to components that organize user interaction. The Presentation Layer will usually include both user interface components – the application’s visual components to display information to the user – and presentation logic components, which define the logical behavior and structure of the application in a way that is independent of any specific user interface implementation. Modern applications are dynamic websites, with the Presentation Layer being a set of Web pages that users see and utilize to interact with the application. Well-designed Presentation Layers talk to “Action Pages” in the Services (or Application) Layer using a set of technologies called AJAX and REST.

**Services (or Application) Layer:** The Services (or Application) Layer is a set of “Action Pages” that interact with one or more databases and manipulate or change data based on user input. This layer incorporates business logic components critical to



Graphic from IBM, Web Services Overview. This model separates an application’s architecture into presentation, business, and data layers with different capabilities. These layers work with cross-cutting functions (security, operational management, and communication), data sources, and external services to provide functionality to users.

the retrieval, processing, transformation, and management of application data; application of business rules and policies; and assurance of data consistency and validity for all users.

**Data Layer:** The Data Layer is the database service where applications store data. Data access components abstract the logic required to access underlying data stores and centralize data access functionality in order to make the application easier to configure and maintain. Additionally, the Data Layer may utilize service agents when a business component must access data provided by an external service. It is important to understand that well-designed user interfaces (whether on a PC, tablet, or smart phone) should never interact directly with a database.

If you have any questions about Web Services, don’t hesitate to ask CTS (askCTS@va.gov) for assistance or more information.

Check out earlier CTS Note editions [here](http://vavw.blog.va.gov/oit360) (vavw.blog.va.gov/oit360).