

Quality by Design:

Using Metadata Registries to Manage Information Quality

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The ultimate destination of Enterprise Architecture (EA) is the successful use of EA principles to deliver results that align business and IT functions, eliminate duplication, leverage IT investments, accelerate delivery of electronic government, and support information sharing.

Electronic government – whether driven by the President’s Management Agenda, external industry trends, or internal mission imperatives – has arguably shaped the transformation of federal information technology more than any other single factor in the last ten years. In relatively short order, federal processes have transitioned from being largely agency-centric to citizen-centric and results-oriented. Getting there, of course, required significant investments in secure networks and computing infrastructure.

Just as significant, albeit talked about less, have been changes in the ways that agencies have worked together to redesign business processes and their information products, especially information exchanges. Agencies routinely collaborate to solve problems that would not have been defined as common problems ten years ago. Regular inter-agency collaboration and coordination, which has become the hallmark of the electronic government era, has come into existence because electronic government is connected government – designed so that the right information gets to (only) the right person, whenever it is required. That is, electronic government provides its stakeholders with quality information, by design.

Quality by design is a fundamental principle of quality management and is by no means confined to information quality. All other things being equal, building quality management into processes so that products will fulfill pre-defined quality specifications has proven to be more cost effective than bolting on quality correction processes after data has turned out to be too defective to be used to support downstream processes.

In a nutshell, what we know about quality information design today is that it begins with a scope – that is, a definition of an end-to-end value chain that consumes and/or produces information. Stakeholders in the planned value chain collaborate to define their information requirements, including their tolerance for imperfections in value chain data. For some purposes, for example, data does not need to be updated in real time. If it is to be used primarily for analytics and trends cannot usefully be observed in near real time, data that is a day old or even a week old may still be fully useful.

Because it is connection-oriented, electronic government is information exchange-oriented. Successful information exchanges require standardized data. Ten years ago, the focus was data standardization, and a key achievement was use of the 4-character year, in underlying formats, if not always in display formats. Today, the focus is standardized data: it’s not just about date as a data type, it’s what is the date of a particular event, and the full semantics of each particular date data element are included in an XML schema definition.

Information requirements for discovery and management in the electronic government era have driven the development of new data management practices and new uses for existing data management tools – most notably the metadata registry. Metadata registries have evolved to cross-walk relationships between data at rest (databases) and data in motion (information exchanges). They also now capture the source-to-target relationships between databases and information exchanges across a defined value chain. The number of data points at issue is too large to be managed successfully without machine-enabled, rigorous analytical techniques.

HUD's competitive grants application forms inventory, for example, annually includes some 5,000-7,000 data attributes collected in some 60 or 70 forms. Yet, in less than six months, HUD successfully used a metadata registry to:

- Develop a target logical data model that integrated the existing forms inventory
- Map the entire forms inventory to the logical data model
- Identify the forms that were best candidates to provide as XML-enabled forms for the initial grants.gov conversion
- Reuse the logical data model in the creation of the specifications for XML conversion

Included in the specifications were the requirements for system edits to ensure that key data met the requirements of downstream processes.

Metadata registries have an excellent fit with the new information management challenges posed by the electronic government era. Electronic government needs to provide quality information by design, in quantity, and metadata registries support the collaborative design and development of databases and information exchanges at the scale and scope required.

Beverly Hacker joined Citizant in 2008 following more than 30 years of government service. In September 2008, Hacker was one of two inaugural inductees into the EA Hall of Fame. She previously served as Chief Architect at the U.S. Departments of Treasury and Housing and Urban Development. In her work at Citizant, Hacker supports the Department of Interior's (DOI) strategy to promote enterprise-wide data sharing and exchange by focusing on the areas of data architecture and authoritative data sources. She is also collaborating with Citizant and DOI as part of the Federal Segment Architecture Working Group, as that group seeks to establish a consistent approach to developing and using segment architecture that is applicable government-wide.

Citizant partners with government organizations to develop forward-thinking business and technology solutions that create a better future for all citizens. Citizant specializes in enterprise architecture, custom application development and program management support. Citizant is ISO 9001:2000 certified and has been independently appraised at SEI CMMI Maturity Level 3. Citizant is a fast-growing, woman-owned 8(a) business headquartered in Chantilly, Va., with an office in Washington, D.C. More information about the company is available at www.citizant.com.