

EXHIBIT 21



Public Works Projects for the Internet

Federal Register 2.0

A much more visual, much more usable Federal Register is proposed, a 100-day project that will lay the groundwork for a fundamental change in how the United States distributes the Official Journals of Government and how citizens participate in the rulemaking process. The long-term goal is for all primary legal materials issued by all 3 branches of the U.S. Government to be readily available on the Internet, making America's Operating System open source.

The Federal Register Today

The Federal Register started publication on March 14, 1936 with a 16-page paper selling for a nickel, \$1/month or \$10/year for a subscription. President Roosevelt wrote the first "story," a piece about how Bull Island in South Carolina, pursuant to the Migratory Bird Conservation Act, would be reserved for the use of the Department of Agriculture. Fifteen thousand copies were printed, 4,000 for the government's use, the remainder for sale. By 1973, circulation had grown to 27,000 subscribers and in 2004 the Register had over 73,000 pages for the year.

The Register System consists of 11 different publications. In 1937, the daily gazette was supplemented with a Codification Board which issued the compiled Code of Federal Regulations. In 1946, agencies were required to use the Federal Register for all Notices of Proposed Rulemaking, turning the system from a mere register of rules enacted into an opportunity for comment by the public and making the Federal Register the official means of notification by the U.S. Government to the public.

Because print was the delivery mechanism, and because the volume of regulations and notices is so high, the Federal Register has a distinctively dense feel. While most have migrated to the Internet for their daily dose of regulations and announcements, the on-line interface presented by the Government Printing Office is primitive at best. Even the forthcoming "Federal System" from GPO, scheduled to enter beta in January 2009, does little to change how the Register looks and is accessed on the Internet. The system consists of typeset PDF pages (a single page per file) and raw text that lacks any formatting whatsoever.

What People See Today: Very dense PDF files or very poorly formatted text, none of which are suitable for reading on-line. Navigation is a primitive browse/search capability, and there are no notification or other mechanisms.

A 100-Day Change

The National Archives authors the Federal Register using a language called SGML, a predecessor to today's XML standards that are widely used for authorizing documents such as bills. In addition to presenting the Federal Register on-line as PDF pages and raw text, GPO makes these raw SGML/XML feeds available as products. Working with these raw feeds, there is the opportunity to leapfrog the current system and present substantial improvements quickly.

There are many things one could do to the Federal Register to make it more usable and more visual. A redesign would be created by leading usability experts and designers working in a small skunk works team, but a few changes that could be implemented are obvious:

- Proposed rules consist of nested lists. Freed from the narrow constraints of a 3-column print page and with some simple programming one could easily indent each successive sub-part, vastly increasing readability.

- In the print publication, all heads and introductory material look the same. By using style sheets, and some very simple graphics, one could make important information jump out much more readily.
- The current system provided by GPO has no navigation whatsoever. One should be able to easily go backwards and forwards in time, by agency, by code section, and by topic.
- The current search capabilities are primitive and do not take advantage of the substantial amount of metadata, such as an official thesaurus of index terms, that is available in the raw feeds.
- Much of the Federal Register is time-sensitive: announcements of proposed meetings, when rules will become effective, or deadlines for bidding. A calendar and newsfeed-based notification mechanism should be an integral part of the user interface.
- There are no permanent, human readable URLs that one can link to. Instead, one has to navigate by page number or search, making it impossible to build a blog entry that links to the Register. One should be able to easily build a link to a particular page or article.
- Documents should be signed, the web site should use a secure link with a valid certificate, and the Domain Names should be based on Secure DNS. People should be absolutely certain they are looking at an authentic government document.
- There should be links: when a section of the Federal Register references the U.S. Code, the Code of Federal Regulations, or other law, one should be able to click and see it.
- The Federal Register incorporates by reference a large number of technical standards. One should be able to read the incorporated documents as part of the Federal Register on the GPO web site.
- The HTML and PDF versions of the current Federal Register are not “search engine optimized.” Keywords, dates, authors, and other important information should be built into the headers of these files so that search engines can more easily categorize them.
- One should be able to easily see how a proposed regulation would change the existing Code of Federal Regulations, seeing a “redline” of current versus proposed.
- Law suits are often based on events in the past. The Code of Federal Regulations and all related compilations should be put into a Source Code Control system, enabling one to navigate forwards and backwards in time to see what regulations or laws were in effect.
- One should be able to easily flip between pages in HTML and the PDF print view of a document. Interfaces such as Google Books and the Internet Archive’s Open Library provide workable examples.
- There are a large number of advanced visualization techniques, from logic maps to tree diagrams, that could be used to sort through the mass of information.
- For each article, there should be a way to provide feedback, be it a link to the existing Regulations.Gov site, an agency-specific forum, or even a simple email address.

3 Levels of Access

All of these examples have to do with usability and navigation of the site hosting the Federal Register, as well as the visual appearance of the Register itself. However, a large number of private groups digest these Official Journals and build systems that certainly supplement what the government does, and in many cases are much better. As such, Federal Register 2.0 needs to provide access at 3 levels:

- At the lowest level, bulk data in the original SGML, as well as PDF and HTML versions should be available as signed zip files and at no charge. The current \$17,000 price tag has a huge chilling effect on innovation and is not appropriate for works of government.

- An API should allow any blogger to embed a document, a part of a document, or a document stream into their own site, much as they embed a YouTube video or playlist.
- The same API outside developers use can then be used by the government to build a better web site, Federal Register 2.0.

Providing an API and bulk data is a way to hedge our bets. Even if the government can't build a better web site, we can count on the public doing so. As a public printer, there is no justification for the U.S. government withholding raw feeds of public domain data.

What Users Will See in 100 Days: A much better visual presentation of the Federal Register with navigation vastly improved.

What Agencies Will See in 100 Days: Agencies will see a much more straightforward mechanism for incorporating Federal Register articles into their own web sites.

The 1-Year Goal: Supporting the Future of Federal e-Rulemaking

A dramatic change in the look and feel of the current Federal Register can be accomplished in 100 days by “forking” the current system. One would leave the document creation and authoring system as is, but put in parallel systems for document distribution. The Federal Register 2.0 system could enter a beta testing state in 3 months as follows:

- Assemble a very small “skunk works” team of design, usability, XML parsing, and server admin experts. These should be “alpha geeks,” people known for going quickly from concept to operational systems that meet all best current practices.
- Assemble a team of outside advisors to work with the skunk works team. For example, a team of security experts such as Ed Felten, Bruce Schneier, and Paul Vixie could ensure that the digital signatures and signed domain names are properly implemented.
- Use the existing SGML product so that there is no impact on the current FDSYS or NARA systems. Build the new system using state-of-the-art open source tools on a modern cluster of UNIX-based servers.
- Bring in a team of outside developers to work alongside the development team so that when the system goes public, there are a series of sample “widgets” and an active developer program.
- When the system goes into public beta, announce a contest with a reasonable prize (e.g., \$25,000) to get people to apply new designs to the style sheets or new widgets that access information.

While the look and feel will dramatically change with such an approach, there is a more fundamental challenge, which is to address the issues so carefully framed by the [Committee on the Status and Future of Federal e-Rulemaking](#), which outlines a path towards a system that “encourages the sustained engagement of individuals, business, non-governmental organizations, and state and local governments with rulemaking agencies.”

Meeting such a challenge will require the participation of all 170 rulemaking entities and leadership from the executive branch. A reformulated Federal Register will provide an important foundation for such an exercise, giving policy makers new tools and a new platform to support citizen participation. For example, the API could be used in a new docket management system to automatically incorporate new Federal Register articles.

What Users Will See in 1 Year: Bulk access to data will lead to many different kinds of services—run by agencies, commercial services, and public sites—incorporating the Official Journals into their systems, leading to a much better integration of publication, as well as a feedback channel, into the official publication process of the U.S. Government.

The 4-Year Goal: America's Operating System

The Federal Register system of publications represents many of the official publications of the executive branch. A large stream of other documents come from the legislative branch and judiciary, forming a collection of primary legal materials that make up "America's Operating System," the rules that govern our society. A goal of the new administration should be to make America's Operating System open source, guaranteeing that a complete and current archive of all primary legal materials in the United States are freely available on the Internet.

This goal is partly about democracy, allowing citizens to see the rules that govern our society, but America's Operating System is also about innovation, guaranteeing that any scholar or entrepreneur can download our legal materials and develop new and more effective ways of presenting, practicing, communicating, and learning about the law.

What We Will See in 4 Years: Making all primary legal materials available will change the way the law is practiced in the United States, making the rules of our society available to citizens in all walks of life. Reaching beyond the beltway to incorporate feedback into the rulemaking, legislative, and judicial processes will make government more transparent, relevant, and timely.

Rebooting .Gov

This proposal to open source America's Operating System starting with the Federal Register is part of a broader vision for transforming GPO and changing how citizens interact with their government. More details on this broader vision are at <http://public.resource.org/change.gov>.



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