# Governance as a Framework to Support Informatics

**T. Aaron Wachhaus**

School of Public Affairs
Penn State Harrisburg
Harrisburg, Pennsylvania, USA
taw203@psu.edu

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## ABSTRACT

The effective management of information is an increasingly critical task at all levels of government. Traditional institutional mechanisms for managing and distributing government resources are not appropriate to managing our systems of public information. Adopting a platform orientation to the management of public information may allow for more effective information management and facilitate meaningful civic participation in the co-creation of solutions to complex social problems. This article begins by introducing information management as a government problem and depicting how platforms function and respond to problems of information management. The impact of adopting a platform orientation to public governance is addressed, and several applications of platforms in the public sector are described.

***Key Words:*** governance, informatics, participation, information management, platform

At its heart, government is a machine for redistribution. Its most commonly recognized input is money, collected in the form of taxes and fees. However, government also collects the physical and mental labor of the public as well as information gleaned through a variety of means. These inputs are then redistributed according to a complex set of rules and guidelines to achieve social goals (e.g. equality, welfare, security). Our tax dollars are redistributed as education for our children, social support for those needing assistance, and the maintenance and development of our infrastructure. The labor of our police officers is distributed as domestic peace and lawfulness. Government also collects, processes, and redistributes information on a vast scale. Government is the largest generator and collector of data; keeping, organizing, and analyzing information on all aspects of social and economic activity (Economist, 2010). The state may be conceived of as a product of information management (Economist, 2010). As Tim O'Reilly notes, "information produced by and on behalf of its citizens is the lifeblood of the economy and the nation; government has a responsibility to treat that information as a national asset (2010: 12-13). Government information is "the raw material of innovation"; the management of our systems of information is no less important than that of our physical infrastructures, such as transportation or water and power systems (Malamud, 2009: 21).

Informatics, the "study and application of information technology...in organizations and society at large" (Indiana University, 2010), provides a wide range of methods for "acquiring, storing, processing, communicating and reasoning about information" (RAE 2008: 39) and for applying those methods to large and complex social problems. Policy informatics promotes interactive policy-making by involving the public as co-producers of solutions to public problems (Kim and Johnston, 2008). The promise of informatics is that complex social problems can be addressed through innovative collaboration across disciplines, sectors, technologies and approaches. I suggest here that a platform framework, grounded in principles of opensource development, distributed expertise, and collaborative co-creation will more successfully support the application of policy informatics to the complex social problems we face.

## Information Management

Traditionally, the governmental redistributive machine has used hierarchical controls to regulate the flow of value in the forms of money, labor, goods and services. We have assumed that the same mechanisms will work well for redistributing information as well. One consequence of the information age is that, for the first time, we are able to separate information from its physical medium. As Barlow points out,

> So far we have placed all of our intellectual protection on the containers and not on the contents. And one of the side effects of digital technology is that it makes those containers irrelevant. Books, CDs, filmstrips--whatever--don't need to exist anymore in order to get ideas out. So whereas we thought we had been in the wine business, suddenly we realized that all along we've been in the bottling business. (Barlow, quoted in Beardsley, 1994: 6)

Government is used to dealing with bottles – discrete, physical things – and have devised systems for producing, manipulating and distributing them. These systems are not appropriate to the management and distribution of information. Information is most effective when it is not contained – appropriate governance requires that we break the bottle and release the contents.

Hierarchical institutional arrangements have been characterized as consisting of one-way redistributive transfers (government is the active collector and distributor to a passive public) based on an asymmetrical relationship (centralized allocation agencies versus dispersed individual contributors and recipients) leading to an imbalance of benefits and obligations (Hegner, 1986: 416).

In contrast, platform governance emerges from the interaction of social systems (Karkatsoulis, 2010) and acknowledges the social dimensions of public policy processes (Halachmi & Boorsma, 1998). This is necessary in an environment of power shared among interdependent actors faced with wicked problems that "spill over organizational and institutional boundaries" (Bryson & Crosby, 1993: 323). When social problems (e.g. drug abuse, poverty, AIDS, etc.) spread across social boundaries, it is foolish to expect that the tools to solve these issues can be contained within institutional borders. Thus, the reliance on centralized authority for decision-making is being replaced with multi-level coordination that emphasizes a "whole-of-government approach" (Karkatsoulis, 2010: 469). More actors are getting involved with the activities of governing, often coming from outside the traditional boundaries of government. Importantly, this is a process initiated by government: institutions are actively inviting outsiders to enter in to the processes of governing (Kooiman, 2000: 142).

As one of his first official acts, President Obama issued a memo on transparency and open governments. Focusing on the qualities of information as a national asset, the President directed his Chief Technology Officer to assist federal agencies in the establishment of "a system of transparency, public participation, and collaboration" (Obama, 2009). He explicitly asserted that the value of information increases as it is more widely distributed, and that government effectiveness rises with public participation. In short, the memo calls for informatics to assist institutions in the transformation to platforms.

Both institutions and platforms provide frameworks within which a range of activities can take place. However, the design and function of those frameworks are radically different and were developed to serve differing ends. Institutions are intended to control participants' behavior through rules and regulations, and to direct their actions towards goals determined by the

institution. Broadly, institutional rules, regulations and guidelines trump a participant's discretion, initiative or personal goals. This system was developed for managing and fairly distributing scarce resources; it may be less beneficial when the resource isn't scarce. When the resource is information, the scarcity equation is neatly reversed: the scarcity limiting the government's ability to efficiently analyze and distribute information is not the quantity of information, which is often overwhelming, but the quantity of experts available to process that information. The traditional strengths of institutions (e.g. specialized expertise, centralized control, etc.) have themselves become a liability. Consider the plight of Presidential libraries: The data archived in Presidential libraries has increased dramatically: The Roosevelt Library houses 17 million pages of documents; the Clinton Library houses more than 76 million (Hufbauer, 2007). However, the number of archivists has not grown accordingly. The Office of Presidential Libraries estimates that it will take 100 years to process the records now housed at recent presidential libraries (Hufbauer, 2007). This is not only clearly an impractical timeline, it fails to comply with Freedom of Information Act requests, putting the libraries at risk of lawsuit for failing to disclose information that they do not control and cannot access.

Other government agencies experience similar problems of information overload. Underlying the practical problems experienced by the Libraries, however, is the problem of institutional orientation towards information. The Freedom of Information Act presupposes that information is a resource that can be controlled by an institution. Thus, information is viewed as having several important characteristics. First, it is discrete (it can be separated from a larger context and body of information); second, it is containable (it can be appropriately housed in an agency's offices). As a consequence, government information is also secret by default as, through its separation and containment, it is inaccessible to the public (Eaves, 2010: 47). As presidential archivists are discovering, it is often inaccessible to anyone, as specific information cannot be discovered among the volume of housed data. Information is currently seen as a resource that can be hoarded and used at the direction of, and for the benefit of, its 'owner' (Eaves: 149). This approach misjudges the sheer volume of information that the government ingests and how that information is best used. Hierarchies are designed to filter and allocate resources; when applied to information, this leads to senior officials regularly functioning in the absence of potentially critical data (Eaves: 147). Such an approach also ignores the role of information as a driver of our economy. Information better realizes its potential to increase efficiency and effectiveness and to spark innovation when it is widely distributed and combined. Policy informatics harnesses the power of information to the solution of complex public problems.

However, while both the culture and mechanisms of governing may be changing, "institutions have an inertial life of their own" (Schon, 1971: 182). Active involvement in efforts to broaden the governing processes, increase civic participation, and develop two-way governance relationships is required. However, overcoming the inertia of institutions also requires that future systems be organized according to new patterns: Schon is explicit that these new systems be fluid in their connections – networks of collaboration rather than institutions of authority. This allows for the "continual redesign of organizational elements within the framework of broad functional systems" (183). The ability to redesign an organization and to refocus its goals and methods based on changes in the surrounding environment ultimately leads to a more effective (and stable) infrastructure than does the attempt to erect a structure that will withstand those changes. In other words, we need to adopt the perspective and design practices of platforms rather than institutions. Platforms provide a structured environment within which the public can collaboratively produce and innovate. Platforms provide open standards and access to

information – they ensure that all participants can get information, know the rules for using that information, and help participants understand how to use information. Platforms rely on distributed moderation and distributed expertise to collectively develop programs within this environment, leading to programs that are truly co-produced by the public, rather than developed by a closed system and then applied to the citizenry (O'Reilly, 2010).

## The Structure and Possibilities of Platforms

Broadly, a platform is simply "any base of technologies on which other technologies or processes are built" (Server Virtualization). A platform provides the framework within which applications operate (PCMag). Microsoft and Apple each sell well-known personal computing platforms. The key feature of a platform is that it provides a structured environment within which development can occur. This may take the shape of the formal rules of a computing language as well as the moral guidelines specifying what sorts of applications may be developed. However, the platform itself does not attempt to construct those applications. Rather, all participants are allowed to develop within the platform; the provider's role is one of regulation. Apple's app store in iTunes is perhaps the best-known example of a platform. Apple constructed the platform on which applications for its portable devices could be developed. This includes both technical as well as moral guidelines – Apple has published the standards by which applications will be evaluated (App Store Guidelines). Beyond this review, Apple does not determine the content of its app store, allowing market forces to determine success in the store.

Several government systems function as platforms. The national highway system is an example of a platform (O'Reilly, 2010). The government developed the framework of our highway system, identified and continues to regulate several operating parameters (e.g. speed limits, fuel taxes, and determining safe operating capacities for bridges, roads and tunnels, as well as fees and limits on heavy vehicles). However, beyond this level of system development, the government generally does not determine how that system is used. It doesn't manage the businesses that use highways; it doesn't specify for what ends people must utilize highways; and it doesn't operate the service stations that support highway travel or specify how they operate or what services they provide. These decisions are left up to the users of the platform. Again, the key feature of a platform is that it provides a structured environment, *but invites outside participants to undertake development within that environment*. The strength of a platform is closely aligned with the NPM admonition that government should steer, not row. Platforms demonstrate the power that can be generated by having many, many small oars in the water at once. The hope is that the adoption of a platform orientation to governance will increase active civic participation and allow more citizens to be "participators in the government of affairs, not merely at an election one day in the year, but every day" (Jefferson, 1816).

"Political philosophers from Aristotle to Rousseau to Rawls have suggested that when groups engage in the public exchange of reason, they produce better ideas" (Noveck, 2008: 33). However, increasing the level of public participation does not always lead to more effective or efficient participation. Rather, we have traditionally sought to increase the level of participation by increasing the quality of participants. A variety of mechanisms exist to identify and recruit experts to participate in their areas of expertise. Academic peer review functions in this manner. The intent behind peer review is that a body of experts can provide oversight and quality control of scholarly work. The implication is that experts are exchangeable – that any set of reviewers

should reach the same conclusions about any given manuscript. However, the review process often relies on a small panel of experts; it relies further on the judgment and discretion of an editor in assigning manuscripts to be reviewed. Thus, review boards are relatively closed platforms. That is to say, few people participate and the barriers to participation are high: members are nominated from the inside. Consequently, the opportunities for innovation and unexpected development are low. In contrast, open platforms encourage much higher levels of participation and un-designed-for development. Technology has lowered transaction costs and times sufficiently to allow for much greater exchange of information while simultaneously facilitating the aggregation and refining of distributed, non-institutional knowledge (Noveck, 2008: 36). In other words, we have developed ways to generate useful expertise without relying on a preselected expert (see Benkler & Nissenbaum, 2006: 400ff). Opensource production allows participants to self-select for tasks, more efficiently harnessing human capital (Benkler & Nissenbaum, 2006: 402). For example, Slashdot.org provides a platform for aggregating and reading technology news stories. It depends on reader participation and co-production: readers submit and comment on stories. To assess the quality of submitted stories, Slashdot utilizes a distributed moderation system – rather than hiring a small body of experts to read every story, Slashdot allows readers to evaluate and categorize the stories they read. By doing so, they filter submitted material for quality and content (Benkler & Nissenbaum, 2006: 398-399; Johnston, forthcoming). The key to this system is that it is neither purely mechanical nor dependent on professional experts. Rather, its success is due to the integration of people with technology.

Academic journals are beginning to experiment with systems of distributed moderation. *Shakespeare Quarterly* recently posted submitted manuscripts for open comment and review before publication, and is repeating the open process. One participating author found the resulting open review comments to be more extensive and insightful than he would have received through blind peer review (NY Times, 2010).[1] This outcome is precisely what the journal anticipated – that an open process would attract a wider range of expertise by attracting a wider pool of readers (Shakespeare Quarterly). Dan Cohen, director of George Mason's Center for History and New Media, regularly posts his work online for open comments. He feels "an ethical imperative to share information" but also notes that academia is caught in the middle of the closed world of specialized expert scholarship and the open exchange of information on the internet (NY Times). For proponents of open exchange, the "hope is that internet technologies will allow us to rebuild the kind of participatory government envisioned by our nation's founders" (O'Reilly, 2010, p.12); further, that the electronic communications technologies will spark the development of entirely new kinds of societal interactions (Kooiman, 2003: 79). As Noveck notes,

> There are plenty of people with expertise to share if their knowledge can successfully be connected to those decision-makers who need it. It is not necessary to pre-select authenticated and known professionals when structures can be put in place to ensure that informational inputs are discernable, specific, well-labeled, and easy to search, sort, and use (Noveck, 2008: 37).

[1] A full discussion of the Shakespeare Quarterly's experience with open review, including the published issue and archived review comments, may be found at:
http://mediacommons.futureofthebook.org/mcpress/ShakespeareQuarterly_NewMedia/

## Implications for Governance

Institutions act as gatekeepers – institutional boundaries delineate the institution from the external environment and often determine who can take part in institutional activities. Similarly, curated platforms act as gatekeepers as well; *Shakespeare Quarterly* required reviewers to log in and provide their qualifications before commenting on manuscripts. Apple publishes the review guidelines by which it determines what applications will be allowed in the app store marketplace (App Store).

A platform approach to governance offers a framework for supporting policy informatics and confronting these information issues. First, technology can replace structure as a means of control (Lessig, 2006; Milward & Snyder, 1996). We can employ technological rather than bureaucratic gatekeepers. Indeed, much of the private sector conducts business in this fashion; the entirety of online commerce, banking, and trade is founded on technological means of regulating the flow of information. The move from actor-centered, geographically bound transactions to tech-centered transactions in cyberspace has transformed nearly every aspect of business. It's time for government to upgrade as well. Platform governance also has the capacity to increase the flexibility and responsiveness of bureaucracies (Milward & Snyder, 1996). On one level, government will operate faster due to the increases in response, retrieval and processing speeds that computers enable. However, platform governance will increase government speed and responsiveness in more fundamental ways as well. Because platforms are more open than institutions and allow a wider range of participation, citizens will be able to interact more directly with government. Instead of relying on a small cadre of permanent professional government experts, platform government could "articulate a problem and then work with the public to coordinate a solution among and across government institutions and with nonprofit organizations, businesses, and individuals" (Noveck, 2009: xiii).

It is worth repeating that a platform provides a structured environment within which activity can occur, and that platforms can serve gatekeeper functions. A platform does not necessarily release information out of the structured environment; rather it invites the public *in* to work with collaboratively within the platform. Apple supports both totally open as well as curated platforms. The HTML 5 web platform is a completely open platform supported by Apple as well as other businesses (Jobs, 2010).The app store, on the other hand, is a curated platform (CNET News). Apple has proprietary control of the operating systems for its devices – the platform on which apps run. Apple also provides guidelines regulating what can be developed on that platform (App Store). Beyond specifying what activities will not be allowed, Apple provides no input or constraints on the development process. Anyone is free to teach herself the rules of the platform and submit an application for approval. This system marked a radical departure from previous mobile device applications, which had largely been produced in-house – within the institutional boundaries of the firms that operated the platform and the devices. At the time, the app store platform was seen as a revolutionary way of doing business. One testament of the tendency of information to want to be open, and of people's desire to participate, is the current criticism of Apple's app store: Some claim that in exercising the power to regulate content on the platform in any way, Apple is acting in an unnecessarily monopolistic and controlling manner (Coursey, 2009).

## Applications: Platform Governance in Action

A growing number of institutions and agencies are experimenting with wikis as a means of collaboratively creating and disseminating information and harnessing the power of distributed expertise. A wiki is a web-based application that facilitates collaboration among individuals by allowing individual participants to post new content as well as comment on and edit content posted by others (IOG Task Group, 2007: 6). Wikis provide an easy way for posting and synchronizing information among large groups; they also provide a framework for retaining and organizing ideas, records and communications across group members as well as fostering accountability by recording changes (8). In the US, a number of large agencies have established wikis for use within that agency. Sixteen agencies under the Director of National Intelligence have access to Intellipedia; the Department of State hosts Diplopedia; DoDTechipedia is run by and for the Department of Defense; and, the OMB MAX Federal Community is open to federal agencies. Similar wikis exist throughout the world for a variety of government agencies. Wikis can also be used across agencies. Natural Resources Canada has begun conducting briefing notes at the deputy minister level through wikis (Eaves, 2010: 147). Canada has also launched GCPEDIA, a wiki open to all Canadian federal public servants and where all can post or comment on their work (Eaves: 147).

Wikis can also be used to engage the public in the functions of government. The wiki of the US Seventh Court of Appeals is partially open to the public, with the Practitioner's Handbook for the Court published on the wiki (http://www.ca7.uscourts.gov/wiki/). To help generate information, ideas and tools to protect the Puget Sound, the EPA sponsored the Puget Sound Information Challenge. This wiki challenged 2007 National Environmental Information Symposium participants to collaboratively share resources, best practices, and ideas relevant to protecting the Puget Sound waterway. Within the 48 hour challenge, participants contributed nearly 200 ideas and reviewed 18,000 pages of information (http://pugetsound.epageo.org).For those interested in exploring the uses of, and issues surrounding, wikis in the public sector, the Library of Congress' white paper is an excellent resource (IOG Task Force).

However, the most extensive use of a wiki to more fully engage the public in the process of governance may be New Zealand's experiment in rewriting their foundational police law. Having decided that a rewrite of the country's Police Act was warranted, the government took many of the usual steps to inform and include the public in the process: publishing issue papers, holding roundtables, conducting a multimedia public awareness campaign, holding local public meetings, and reaching out to minority groups (Public Views on Policing, 2007). Then, as part of their ongoing ParticipatioNZ effort (http://wiki.participation.e.govt.nz), the government established a wiki, allowing New Zealanders around the world to log in and directly shape the new legislation as it was being written (Policing Act wiki). As ParticipationNZ notes, "People who are affected by public policy and services are in a good position to help improve them" (Guide to Online Participation, n.d.). Through the wiki, citizens could comment on the current law as well as the proposed new legislation; additionally, they could also propose revisions and comment on fundamental issues underlying the legislation. At its peak, the wiki generated nearly 10,000 posts per day, although this level of participation was not maintained over time (McCardle, n.d.). While these postings did include inappropriate and off-topic posts, comments were moderated. In addition, the wiki was self-moderating, as contributors took it upon themselves to remove mischief posts (McCardle, n.d.).Wiki participation reversed the usual legislative process where laws are developed by experts in a closed forum and applied to citizens

when completed and legitimized by the government. Here, the law was legitimized as it was being created by the public to whom the law would apply – governance moved out of the halls of government and directly into the hands of the people.

Cases of direct citizen involvement in the processes of government can also be found in the United States. The US Patent Office faced a crisis typical of government agencies in the information age. The Office employed a limited number of patent examiners, who were expected to be experts not only in patent law, but across the vast range of subjects covered in patent submissions. As a result, by 2008 the Patent Office faced a backlog of 700,000 applications that was growing by roughly 100,000 per year, while patent examiners were reduced to 20 hours on average to review each application (Noveck, 2008). In response, the Office initiated an experimental program in collaborative democracy and distributed expertise, the Peer-to-Patent program. This platform allowed eligible patent applications to be posted for review for up to four months. Members of the public could register to review these patents; groups had the ability to comment on applications, rate their quality, and conduct research relevant to the application. The group also self-moderated, rating member comments and contributions and selecting the best reference material to pass on to the patent examiner (Noveck, 2008: 37-38). One of the strengths of this program is the extent to which it opens the research process, bringing in much wider sources of both information and experts to search, evaluate, and comment on that information. The program's founder observes that this process harnesses competitive self-interest as a driver of civic participation and public good, with both IBM and Microsoft permitting employees to participate in the program during work hours (Noveck,2008: 40). At the same time, opening up the decision-making process improves transparency and accountability. With more people paying attention, this program aims to improve the quality of patent applications, involve a wider range of participants, and thereby reduce corruption in the examination process. Crucially, information is also more widely distributed among the interested public, freeing information and increasing our knowledge economy. Begun as an experiment with 250 patents in 2007, the program has been extended; a review and recommendation on the program is expected to be available in by the end of 2010.

Programs like the New Zealand's ParticipatioNZ and Police Act wiki, and the Peer-to-Patent experiment move us beyond Kettl's model of vending machine government, where participation is limited to putting money into the system and enjoying the service that falls out (2009: 29). To badly stretch his analogy, we now have the ability to not only decide what goes into the machine, but to help bake the products, control the selection of ingredients and determine how the machine will be stocked.

## Conclusion

In an age when civic participation is possible on a wider and deeper level than at any other time in our history, good governance obligates us to involve the public as much as possible. This no longer means taking government to the people – showing what's in the vending machine isn't enough. Instead, government needs to invite the public into the machine. Even this is not sufficient: government has an obligation to educate the public about its operations so that citizens are better able to evaluate and participate as equals in their government. President Obama has called for increasing levels of government openness, transparency, participation, and collaboration with the public (2009). As the following two responses from ParticipatioNZ's wiki make clear, the public are also demanding these same things from their governments:

- *Allow us to be valued participants in the formulation of policy, permit us to share our combined wisdom with you and most of all respect the voluntary commitment we continue to gift to our individual communities and allow us to sit at the table as equals.* -- Community leader
- *The technology is lovely but where is public participation valued? If we don't have buy-in from civil servants and MPs we won't get far.* -- Workshop participant

Guide to Online Participation, section 1.3.2

Informatics provides a range of methods to harness technologies to more effectively serve the public interest; platforms provide a framework within which to collaboratively advance the public interest. Platforms may be a particularly apt means of more efficiently managing information, as the marginal costs of distributing digital information are near zero (Moglen, 2003): given the internet, the cost of making information available to a few or to everyone are nearly the same. Management of information as a resource revolves human elements rather than focusing on problems of scarcity or distribution. Guidelines for effectively managing the distribution of public information may be summarized in the following points:

Information should be:

- **Complete**. Data should be accurate and reliable, and wherever possible, should come from primary sources, and be presented at the highest possible level of granularity.
- **Accessible**. Data should be available to the widest possible range of users and for the widest range of purposes. Data should therefore be machine processable and not restricted by licenses, fees, proprietary format or hardware requirements.
- **Placed in context**. Data may be given context through comparative sets. Users also require context: it is not enough to make information available; government also has obligations to help make data useful. This may include showing how information has been used, and what action has resulted. Users may also require help defining and finding the data they need. Actively working to make the public know what information is available is necessary, not merely responding to requests.
- **Relevant**. Information has no value if it is not used. This means that timeliness is important, as is providing information that can be used to help make decisions and improve efficiencies.
- **Cost-effective**. Information is an asset. A strategy is needed to appropriately value information, establish standards for investment, and value the returns on that investment. Set priorities for disclosing information, and on desired returns from data.

Sources: AGA Annual CFO Survey, 2009; Benkler & Nissenbaum, 2006; Lessig, 2006; Noveck, 2008; Resource.org, 2007.

Policy informatics provides the tools to effectively communicate social problems to the public and involve them in the efforts to solve those problems. The following principles may serve as useful guidelines for establishing a framework to include the public in these efforts. Increasing civic participation cannot simply consist of waiting for the public to come into government. Rather, these principles elucidate government's obligations to actively inform and include the public.

Throughout, these principles exemplify a shift in governance outside the walls of bureaucracy and into the public, a shift that government should lead. The Obama administration's call to establish an Open Government Directive is a good opportunity to build on the successes of programs discussed here. However, beyond programmatic changes, a shift in the culture of government is needed. We need to recognize that "if a document is to have the force of law, it must be available for all to read"; and that 'available' now means 'online' (Malamud 2009). In other words, we must open government information to the people. Our culture must shift to recognize that doing so is good for the country and adds value to our information economy.

**About the Author:**

Aaron Wachhaus is an instructor at Penn State Harrisburg, where he received a Ph.D. in public administration. His research addresses how groups respond to complexity and uncertainty and how ordered behavior emerges from unstructured environments. He is the editor of *Public Administration Quarterly* and the *Journal of Health and Human Services Administration*. His work has been accepted in *Public Administration Review* and *Administrative Theory and Praxis*.

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