

General Examinations - Contextual Area - Question 1 Response

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1 - The use of data as a tool for decision making has been controversial for Urban Planners. Please explain this controversy using debates around the use of GIS. Explain these debates, what were the arguments for and against GIS? Who were the key actors in the debates? These early debates lead to the development of Public Participation GIS and Critical Cartography, please define these two terms and explain whether you believe their application responded adequately to the criticism around data in urban planning? Would you deploy these strategies in your own work? Why or why not?

1 Why Data in Planning is Controversial

The controversy surrounding the use of data in urban planning is tied up in two related, but distinguishable critiques: that of the role of technology in society and that of the use of top-down, technocratic/autocratic decision-making. The first is relevant because the collection, storage, and use of data is one of the chief social technologies of humanity. Furthermore, it is mediated and made possible by technical means, of which geographic information system (GIS) is a notable example. The latter is relevant because, due to the facilitating nature of technology in data collection and use, the primary acquirers of data throughout history have been centralized sources of power who have often used this power in autocratic ways.

1.1 Technology

While the opinion of society about technology has gone through cycles of optimism and pessimism since the start of the Industrial Revolution and critiques of technological progress date back to at least Rousseau, the idea that technological, economic, and moral progress are both inevitable and inextricably linked has remained persistent, particularly among the scientists and engineers who were most directly involved with the development of technology [1], as is currently seen with the proponents of Big Data and machine learning [2]. They tend to consider technology either as neutral tools, mere extensions of human will, or as deterministic mechanisms of progress towards a better future. Questions of morality are thereby either shifted to the human users (and thus outside the jurisdiction of the designers) or resolved entirely. For example, John Maynard Keynes, one of the more influential thinkers of the early 20th century, explicitly linked technology to progress, as part of his sketching a utopian future: “This slow [historical] rate of progress, or lack of progress, was due to two reasons - to the remarkable absence of important technical improvements and to the failure of capital to accumulate” [3].

Amid the dilemma of “the disempowering habit of demonizing technology as a satanic mill of domination” and “the postmodernist celebrations of the technological sublime,” however, emerged scholars seeking to provide “a realistic assessment of the politics - the dangers *and* the possibilities - that are currently at stake in those cultural practices touched by advanced technology” [4]. Chief among these were Lewis Mumford and Langdon Winner. The former theorized that technology came in two different essential stripes, neither good or evil, but instead authoritarian versus democratic, that “from late neolithic times in the Near East, right down to our own day, two technologies have recurrently existed side by side: one authoritarian, the other democratic, the first system-centered, immensely powerful, but inherently unstable, the other [hu]man-centered, relatively weak, but resourceful and durable” [5].

Winner extended this theory, arguing that many technologies had politics embedded in them, regardless of the intent of either the creator or user. “It is neither correct nor insightful to say, ‘Someone intended to do somebody else harm.’ Rather, one must say that the technological deck has been stacked long in advance to favor certain social interests, and that some people were bound to receive a better hand than others” [6].

The ideas of Mumford and Winner have become commonplace. Even self-admitted technological optimists like Jeffrey Sachs [7] feel it necessary to qualify their optimism: “*Choosing the right technologies*, we can achieve continued economic growth and also honor the planetary boundaries” [emphasis mine] [8]. Similarly, the largest developers of new technologies, such as Google, find it necessary to put effort into studying the ethics of their systems (though there is some evidence that this is mere lip-service [9]).

1.2 Technocratic Planning

By ‘technocracy’ I mean Scott’s basic idea that “the human problem of urban design has a unique solution, which an expert can discover and execute. Deciding such technical matters by politics and bargaining would lead to the wrong solution” [10]. It is typical for a believer of this idea to quickly put themselves in the role of the “expert [who] can discover and execute.” That said, such a believer quickly finds themselves beset by complexity and gaps in the data that frustrate their efforts. For these aspirants “legibility [is] a central problem,” one that must be solved prior to addressing urban design itself. To this end, “exceptionally, complex, illegible, and local social practices” must be turned into “a standard grid whereby it [can] be centrally recorded and monitored.” This, of course, requires immense simplification. These “state simplifications... have the character of maps. That is, they are designed to summarize precisely those aspects of a complex world that are of immediate interest to the mapmaker and to ignore the rest. To complain that a map lacks nuance and detail makes no sense unless it omits information necessary to its function.” And the interest of these would-be technocrats tends to be their “unique solution.” Taken together, there are five specific characteristics of these simplifications [10]:

1. They are interested and utilitarian, aimed at a particular end.
2. They are nearly always written, as opposed to visual or verbal.

3. They are typically static and thus, perpetually out-of-date to at least some extent. “The cadastral map is very much like a still photograph of the current in a river.”
4. They are typically aggregate facts, not individual ones.
5. They are standardized, so as to enable comparison and longitudinal analysis.

These characteristics are important because, by and large, they aptly describe GIS data as one of the more recent expressions of this desire for state legibility.

The proponents of technocracy are what Easterly calls “Planners,” to be distinguished from “Searchers,” those who seek for bottom-up solution to specific, addressable needs [11]. The Planners fashion themselves into benevolent dictators (though they would typically protest the appellation) focused on implementing their solution [12]. Beyond outright failure, such endeavours have not infrequently caused immense social harms, including famines, cultural destruction, and environmental collapse. Furthermore, such technocratic planning is bound up in the history of colonialism and, while formal colonialism has ended, its impacts continue and certain mindsets are still embedded within such planning efforts [13].

Scott argued that certain elements were necessary to precipitate the most tragic of social engineering disasters, that what is “truly dangerous to us and our environment... is the *combination* of the universalist pretensions of epistemic knowledge and authoritarian social engineering” [10]. Such a combination often takes the form of undue focus being places on specific metrics, with little interest in underlying causes and dynamics, something that is certain not alien to the field of GIS. “Many studies involve ranking places on one or more criteria, and allocating policy benefits accordingly. At its crudest this applied geography merely provides a list of winner and losers with no understanding of why the differences occur” [14].

Another of Scott’s key elements is a high-modernist ideology that is not scientific practice exactly. Rather, it is a “faith that borrowed from the legitimacy of science and technology.” This faith is used as an aesthetic veilings, such as when Social Darwinism used evolutionary theory to justify eugenics. In this way “the classism and racism of elites are mathwashed, neutralized by technological mystification and data-based hocus-pocus.” [15] This ideology could also be considered a “dangerous form of magical thinking [that] often accompanies new technological developments, a curious assurance that a revolution in our tools inevitably wipes the slate of the past clean” [15] (something that we have seen previously with GIS and are currently seeing repeated with discussions about Big Data and machine learning [16]).

2 The Role of GIS

The term GIS refers to any digital system for storing, visualizing, and analyzing geospatial data, that is data that has some geographic component. It can be used to discuss specific systems, a method that uses such systems, a field of studying focusing on or involving such systems, or even the set of institutions and social practices that make use of such a system [17]. This may seem vague, but due to the diversity of its use, it is difficult to hammer out a more specific definition without excluding important aspects [18, 19, 20, 21]. While there is a significant debate within academia as to whether GIS should be viewed as a scientific field

in its own right or as a mere tool for use in various other fields of science (such as environmental science, economics, etc.) [22, 23], it is undeniable that the term and the field originated in government-run efforts (specifically in Canada and the US) to digitize demographic and land cover data in the 1960s and 70s [24], and were thus primarily application, rather than technology driven [22]. The key value of GIS was that it “allows geographers to integrate diverse types of data over different spatial scales from the regional to the global, while the advanced capabilities of GIS for organizing and displaying these data transform the geographer’s view of the world” ([25] as paraphrased in [26]).

It is undeniable, however, that the history of mapping and thus of GIS is one of centralization and authoritarianism. National mapping in the US originated in motives that were explicitly ones of means for resource exploitation and control [27]. Furthermore, as pointed out by Pickles, historically within the GIS research community and its predecessors, there has been a certain “technocratic myopia” and unwillingness to consider novel, insurgent uses of GIS that has led critics to label it as an “inherently conservative form of analysis” [28], or as McHaffie put more movingly: “Perhaps the ‘frightened Africans’ who once ‘threw spears at an Aero Service aircraft’ or the ‘suspicious moonshiners in Appalachia’ who ‘took a few rifle shots’ at aerial mappers did so not because the intentions of the mappers were ‘not always understood,’ but because those intentions, and the powerful forces being them, were understood only too well” [27]. Jackson, meanwhile, relates the results of an ethnographic study that highlighted the almost comically numerous negative consequences (both intentional and unintentional) of the introduction of GIS into local planning in Kansas City [29]. Closely tied to this issue of control is privacy, also advanced by Pickles [19]:

But in practice, developers and users of GIS have not paid much attention to the rights of individuals to control information about themselves, to withdraw from databases involving themselves, and to review the information available and the ways in which it is being used. Instead, in cases other than those involving criminal and victim identification (and in some cases even there), the field of GIS (as far as I am aware) has no substantive protocols or methodological principles that govern the use of information about individuals or guarantee the rights of individuals included in databases to remove themselves or to see the results of the analysis.

This concern presaged many contemporary concerns about facial recognition [30, 31], statistical algorithms for criminal justice bail and sentencing setting [32, 33, 34], telecommunications data gathering [35], and big data in general [2].

Many of these critiques can be traced to the origin of GIS and the role that it had in splitting the geography community between “techies,” who were more interested in the natural sciences and positivism, and “intellectuals,” who felt more at home in the humanist social sciences [17].

GIS is thus firmly a technology, subject to the arguments of Mumford and Winner, and an expression of a technocratic planning orientation. Such a recognition within the field of geography picked up steam in the late 1980s, when scholars informed primarily by Michel Foucault and Karl Marx started challenging the idea that “cartography produces maps of truth in an objective, neutral, scientific fashion.” [36]. The aforementioned Pickles was one of the more articulate purveyors of such an argument [37]:

The Western trope of a public space in which people (usually “men”) of good faith join in debate about their future, appropriated by industrial and urban forms of modernity as a mythic image of a democratic culture of debate and negotiation predicated on individual autonomy, private property, and state power has more recently been further appropriated by the news and communication media through their claim to be the embodiment of the modern civic arena. This trope of public space is now being reappropriated by the electronic age as its wish image - the promise and possibility of “information.” The putative openness of new electronic information media and the rhetoric of “voice,” “openness,” and “information” - the trope of reasoned, open, uncoerced discourse in a public place - is appropriated to the project of social development and private profit.

But, like all highways, the information highway requires points of access, capital investment, navigation skills, and spatial and cultural proximity for effective use. Like the automobile highway, the information highway fosters new rounds of creative destruction and differentiates among users and between users and nonusers. It brings regions of difference under a common logic and technology, and through differential access and use exacerbates old and creates new patterns of social and economic differentiation. While for some, information means the provision of alternatives and the satisfaction of choice (even if a “choice” signifies a socially constructed yet now naturalized whim of the wealthy consumer), for others this postindustrialism (and its attendant postmodern cultural forms) must still be seen in the context of a political economy of graft, monopolism, and uneven development.

Such processes of territorial colonizations, globalization, and production of new scales of action contrast sharply with a technocultural ideology of enhanced autonomy and self-actualization, and severely complicates the assessment of the relationship between technological innovation and social change.

One of the consequences of the Mumford-Winner view, is that it implies that the designers of technology have both agency and responsibility to determine what politics are embedded in their designs. To reject either the agency or the responsibility is highly problematic. Many designers of digital tools seek to refuse such agency-responsibility and commit themselves to a sort of technological determinism [17]. For example, Goldsmith and Crawford, who did a great deal to implement such technologies in New York City and Indianapolis, wrote that “the process of collection is *not going to stop*. We think, in fact, that it would be shortsighted and *probably impossible to halt this natural evolution*. That is all the more reason, then, to carefully establish policies covering data access, data security, and transparency with respect to its collections” (emphasis mine) [38]. They thus divorce themselves of responsibility for the design of the technology itself and restrict themselves for seeking to govern who uses it.

Meanwhile Goodspeed writes about the opposite problem, that of treating GIS and other technologies as neutral tools: “Planning theorists have too often accepted Habermas’s view that technology is primarily associated with technical rather than moral rationality, which leads them to overlook technology’s potential normative dimension... Even choosing a digital tool requires making value-laden judgements about what issues matter enough to be analyzed. Because digital tools typically inherit the worldviews and assumptions of their creators, even well-meaning applications of them can inhibit potentially valuable new ideas or critical perspectives.” He then proposes the term *tool of inquiry* to “describe the ideal in which tools are continually shaped, used, and tested by public users,” [39] thereby aligning it with the democratic, human-centered type of technology. This leads us to question of whether such public involvement and critical perspectives can adequately respond to the above concerns.

3 Public Participation GIS & Critical Cartography

These critiques of GIS resulted in a reconsideration of the top-down nature of the field and the identification of several potent reasons for broadening the base of participation. First, there was the recognition that the developer of a GIS is not the supreme authority on all fields. “It is the geomorphologist who is best able to choose the data model for representation of terrain in a GIS, not the computer scientist or the statistician, and it is the urban geographer who is best able to advice on how to represent the many facets of the urban environment in a GIS designed for urban planning” [24]. This means that, while collaborations certainly can introduce additional difficulties, such as cultural conflicts, issues of interpersonal trust, effort required to establish rules and norms of participation, they are also immensely rewarding and can improve the results of the work [40].

Second, there was a recognition of the equity concerns at play. Users and disadvantaged communities needed to be involved in the development of GIS data, analysis, and use, if they were going to have a meaningful chance of improving their circumstances [41]. The Canadian International Development Research Centre noted that, “It is impossible to have sustainable and equitable development without free access to reliable and accurate information” [42]. Meanwhile, geographer Matthew Edney argued that, “Without equitable access to GIS data and technology, small users, local governments, nonprofit community agencies, and non-mainsream groups are significantly disadvantaged in their capacity to engage in the decision-making process” ([43] as paraphrased in [44]).

There was thus reason to seek ways to overcoming the limitations of the technology which, as was common sentiment at the time, meant that 11for billions the possibility of accessing the best technology and information made available through digital communications network will always be a luxury. Cartographic information, digital or otherwise, becomes a commodity in its mass production and marketing” [27].

In the mid 1990s, this desire motivated the deconstruction of current practices and expansion of participation. Several names and frameworks were proposed, including Bottoms Up GIS [41], critical cartography [45, 46], GIS and Society [47], and public participation geographic information system (PPGIS). The last of these, which sought to directly involve the public, would become the most widely used, and would be associated with the broader field of participatory geographic information system (PGIS) [47], which also included other stakeholders, including government officials, non-governmental organizations (NGOs), private corporations, etc. It should be noted that PPGIS seeks involvement in both the production of data and in its application, not merely one or the other [41, 48], and specifically seeks to use this increased engagement with the public with the goals of ” “improving the transparency of and influencing government policy” [47]. For example, in Washington state in 2002, several American Indian tribes were using GIS technology to ”inventory, analyze, map, and make descisions regarding tribal resources... includ[ing] timber production, grazing and farm land, water rights, wildlife, native plants, cultural sites, environmental data and hazardous site monitoring, historical preservation, health and human resources” [49]. And in 1999, the 'What If?' Planning Support System (PSS) was created to use “GIS data sets that communities have already developed to support

community-based efforts to evaluate the likely implications of alternative public-policy choices” [50].

This dual involvement promotes, as Curry put it, both “knowing *how*” (the “ability to do something”) and “knowing *that*” (the “knowledge about how something works”) [51]. Having only the former forces the user to rely upon blind trust, instilling a sense of complacency or alienation and preventing creativity. Knowing only the latter enables discourse about a topic but prevents the user from actually implementing new ideas. It is only with both together that a person becomes a true participant in a field and make their own choices. This is important as expansion of choice is valuable for both intrinsic (for its own sake) and instrumental (to attain preferred positions) reasons [52].

PPGIS has thus naturally been strongly advocated by various groups and seen numerous applications over the past three decades [53]. A relatively early project in this vein (which predates the coining of the term PPGIS) sought to try and overcome issues of unequal access and use of GIS technology in South Africa in the early 1990s through the pursuit of five specific objectives [44]:

1. Enhanced community/development planner interaction in a research and policy agenda setting
2. The integration of local knowledge with exogenous technical expertise.
3. The spatial representation of relevant aspects of local knowledge.
4. Genuine community access to, and use of, advanced technology for rural land reform.
5. The education of “expert” rural land use planners about the importance of popular participation in policy formulation and implementation.

Such objectives are common across PPGIS projects and the success of this pursuit has come to be recognized even by many entrenched institutionalists. The former vice-mayor of New York City, for instance, argues that digital GIS tools that provide open data (1) free data from bureaucratic constraints, allowing real time combination of data from different sources; (2) construct a loop between government and the community in which cooperation builds respect continuously; (3) enable two-way communication, promoting collaboration [38]. That said, some of these implementations have been criticized for being participative in name only, particularly within the research domain [54].

Critical cartography, meanwhile, is, in some ways, what this paper itself is. It is an effort to study and situate cartography as a political and social issue, as “specific relations of power and not as neutral scientific documents.” Moreover, it seeks to consider this particularly in our current world, which has seen the development of open source tools and the democratization of mapmaking (of which the rise of GIS has played a key part). Critical cartographers are thus inheritors of the Foucault-Pickles arguments who seek to demonstrate this historical perspective in various subversive, often artistic, expressions of cartography that highlight disparities of power and access to technology [45]. They insist that we must recognize that, as Krygier and Wood so playfully illustrated, maps (and all GISs) are, fundamentally, propositions about that world that are asserting a fact and promoting an action. Because of this “you must accept responsibility for the realities you create with maps” [55]. And this is not limited to maps. Design itself is purposeful in that it forges both pathways and boundaries in its instrumental and cultural use” ([56] as paraphrased in [34]).

The question remains, however, as to whether PPGIS and critical cartography are sufficient to address their aims.

3.1 Is this sufficient?

We must return to the Mumford-Winner question of whether GIS is an inherently authoritarian technology (or at least easily co-opted by authoritarian technocrats) and whether PPGIS and critical cartography are sufficient reforms.

It should be noted that Pickles himself did not feel that GIS was irredeemable. Centralized authoritarianism was not ‘baked into’ GIS. “GIS and informatics do open virtual space of ‘real’ social interaction, new communities of dialogue, and new interactive settings... Systems of informatics provide a potential source of counterhegemonic social action, and GIS... offers a diverse array of practical possibilities... Informatics are seen as a potential liberator of socially and politically marginalized groups, and thus a source of democratizing power for these newly networked groups” [28]. Meanwhile Tulloch argued that GIS is naturally developing through phases, seen in Figure 1. While the problematically simplistic outcomes of efficiency and effectiveness were the primary results of earlier stages, future states, including the democratization of GIS advanced by PPGIS and critical cartography, will instead produce equity.

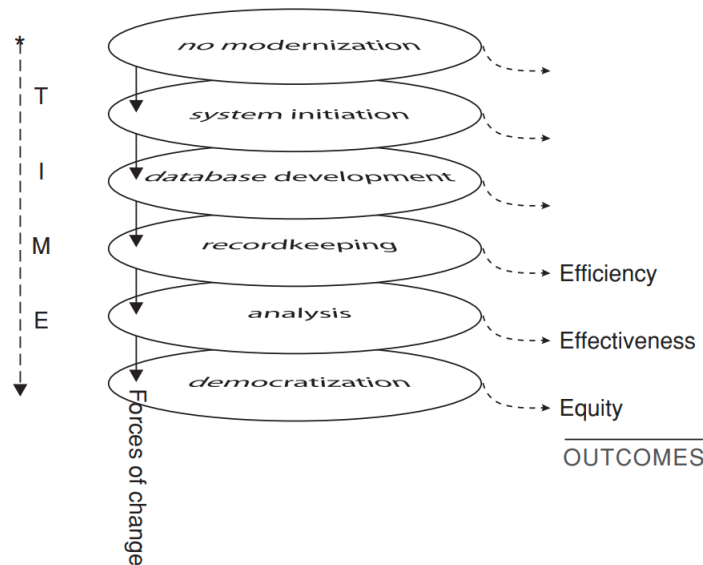


Figure 1: Development of GIS development and associated outcomes. From [57] as reprinted in [40]

We can see a direct example of GIS being applied for counter-authoritarian ends in the “Million Dollar Blocks” project, in which Kurgan and others powerfully visualized the impact of mass incarceration upon particular, primarily black, American communities, helping to shift public perception and policy discussions [58].

One key aspect of this is the avoidance of the seamless tool, because “the most significant impacts of technology tend to occur when the technology becomes indistinguishable from the fabric of every day life” ([59] as paraphrased in [26]). PPGIS and critical cartography both address this concern. The former does

this by directly involving the public in the data collection, processing, and use, thereby confronting the public with the existence of the tool, the arbitrary nature of its underlying assumptions, and its mutability. The latter instead brings a historical, social and class perspective to the use of these tools, forcing it out of veils of tabula rasa objectivity.

There are counterarguments to this idea, however. One of the proponents of high modernist ideology recognized that “rational, hierarchical, closed-door decision strategies” had negative consequences and that “more democratic process might produce worse results, but it would respond to the increasing sense of alienation among the nation’s urban population” [60]. There is thus interest in avoiding the “sense of alienation” while still preserving the technocratic decision-processes. By providing tools for more participation, we are not necessarily changing anything fundamental. “Participation is not power; its reform is not radical” [61]. Even if participation is quite extensive and includes actual political power, “democracies rarely end up expropriating and redistributing capital” [62]. Thus even “inclusive planning practices cannot ‘shift the effects of (post)colonial structures and relations of power on indigenous nations without a fundamental recognition of rights’” [13].

Not only is participation evidently insufficient on its own, but some argue that technocratic neoliberalism in fact prefers to use participation as a means of undermining resistance, rather than oppress through outright violence (though this tactic runs the risk of providing a structure for coalition building and radicalization) [63]. This can occur even unintentionally, as “an inappropriate level of participation may disempower individuals... and it also can distract groups from a desired outcome” [47]. In fact, increased community involvement can result in more restrictive, unambitious goals that are not in the interests of certain minorities [64]. A key aspect of participatory planning is that participation alone does not magically eliminate power hierarchies. Such pre-existing hierarchies can wield their power in planning discussions in at least three ways: “by promoting formal decisions, setting the agenda, and influencing the broader ideological context of the debate” ([65] as paraphrased by [39]). Similarly, merely connecting individuals and enabling the sharing of information does not necessarily promote engaged political deliberation [66].

Despite this, there is evidence that, with proper creation of the structures of participation or in the wholesale rejection of the state-led participatory structures, planning can be used to promote equity and development. Goodspeed points out several examples of how participatory and even insurgent scenario-based planning helped address injustices such as racism in urban development [39]. To resolve this confusion, Arnstein proposes an eight-step “ladder of civic participation” [67] that separates out manipulation and other forms of nonparticipation; placation and other degrees of tokenism; and true forms of citizen power. A state-run, nominally participative, planning effort may fall into one of the first two categories. Bekkers and Moody provide some examples of visualization and GIS use that made the citizenry feel manipulated [68].

This suggests that, while technology-based collaborative or participatory planning efforts are unlikely to effect radical change, they can, *if done well*, still affect positive change. Gordon and Manosevitch, building upon Gastil, argue that two components are needed to have truly participative planning: an ‘analytic process’ for sharing and analyzing information and a ‘social process’ for providing for deliberative discus-

sion [66].

In line with some of Easterly’s arguments, Eubanks proposes two gut check questions to ensure that a planning tool, GIS or otherwise, avoids harmful consequences [15]:

1. Does the tool increase the self-determination and agency of the poor?
2. Would the tool be tolerated if it was targeted at non-poor people?

Furner, meanwhile, proposes three strategies for developing such tools ([69] as paraphrased by [34]):

1. Admission on the part of designers that bias in classification schemes exists, and indeed is an inevitable result of the ways in which they are currently structured.
2. Recognition that adherence to a policy of neutrality will contribute little to eradication of that bias and indeed can only extend its life.
3. Construction, collection, and analysis of narrative expressions of the feelings, thoughts, and beliefs of classification-scheme users who identify with particularly racially-defined populations.

With all of this in mind, I argue, while no proposal offers an easy path to righteous action, a combination of new methodologies and technologies, collaborative and participatory design, and a general intellectual humility are sufficient to avoid the harmful outcomes of the past (and present). None of this is guaranteed or effortless. It requires intentionality and reflection on the part of the designers, as well as a humble willingness to listen to criticism from anyone, including those who are not ‘experts.’ As we proceed, we must keep in mind that history of cartography and planning is one of oppression and control; that the cautions of Pickles, Eubanks, and others still hold force; that “the very notion that technologies are neutral must be directly challenged as a misnomer” [34]; and that, as Smithsonian curator Lucy Fellowes said, “Every map is someone’s way of getting you to look at the world his or her way” [70].

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