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## Flows and Streams of Data: Notes on Metaphors in Digital Cultures

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# **Flows and Streams of Data: Notes on Metaphors in Digital Cultures**

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**STREAM**

**FLOW**

**METAPHORS**

**DISCOURSE**

**DATA**

# Flows and Streams of Data: Notes on Metaphors in Digital Cultures

Mathias Denecke

**Metaphors influence our understanding of digital cultures. Concentrating on flow and stream metaphors in an academic discourse, this article particularly focuses on the metaphorical description of data transmission. The aim is to describe rhetorical and theoretical potentials as well as challenges that result from the use of the metaphors. Finally, the article provides an alternative interpretation of the metaphors.**

Flows and streams, today, serve as central metaphors for describing the modes of communication specific to digital cultures. This applies in particular to cultural and media studies. The metaphors tend to be interpreted in terms of their illustrative character. Following danah boyd, the talk of “content streams or streams of information” is ubiquitous. Furthermore, the metaphor suggests that “we are living inside the stream: adding to it, consuming it, redirecting it” (boyd 2010, 28). According to Lev Manovich on the other hand, users are not standing in the streaming river of information, but sit at the shore, observing and regulating the endless flow of “events” on Twitter and Facebook. For Manovich this stream of data “can be called a quintessential modern experience” (Manovich

2012). Combining both perspectives David Berry imagines internet users' activities as both plunging into flows of data and stepping out onto its banks (Berry 2011, 143). He also claims that "the mode of communication shifts towards a real-time streaming digital world" (Berry 2014, 5). And Mark Hansen states in *Feed Forward* that we are living in an "always flowing, massively technified world" (Hansen 2015, 269).

I want to take these exemplary passages as a starting point to interrogate the invocation of streams and flows of data in contemporary academic writings. Both terms are deployed to describe a wide array of heterogeneous phenomena such as users' online activities, the huge amounts of social media postings, and the modes of data transmission in digital networked media. As metaphorical concepts streams and flows evoke a series of connotations that range from ideas of an uninterrupted movement, non-resistant and hence unimpeded processes, to a unity of disparate elements created within the imagined streaming of a river.<sup>1</sup> According to Werner Stegmaier, the broad spectrum of different meanings can poignantly be traced back to the stream as "one image for *everything*" (Stegmaier 2007, 102, emphasis in original).<sup>2</sup> My aim here is to analyze flows and streams in regard to their metaphorical imaginations. This allows for an inquiry into different imaginations of flows and streams, and also their varying functions, for "[t]he use of a specific metaphor orients, guides and sometimes limits our understanding of media by emphasizing some aspects while overlooking others" (Thibault 2015, 111). Metaphorical imaginations are irreducibly characterized as being accurate and simultaneously misleading.

Drawing on Berry's account of data transmission, which heavily relies on these metaphors, I argue that flows and streams serve as a theoretical resource.<sup>3</sup> More precisely, the metaphors are not only used as rhetorical means. In the discourse on digital cultures they are employed when "lost for words" (Gleich 2017, 47).<sup>4</sup> The metaphors are treated in terms of their illustrative character in order to describe temporal aspects of data transmission. This especially accounts for an understanding of flows and streams as originating and revolving around the imagination of attributes of a flowing river. Notions of unity, continuity, and smoothness evoke rhetorical and theoretical difficulties that are unfolded in the following.

1 A general overview of scholarly literature on flows in digital cultures is provided by Braman 2016.

2 Original: "ein Bild für *alles*" (Stegmaier 2007, 102, emphasis in original).

3 See Löffler/Sprenger for the term "argumentative resource" (2016, 10).

4 In German: "sprachliche Verlegenheit" (Gleich 2015, 95).

Focusing on Berry's theoretical position exemplarily allows me to illustrate the potentials and challenges of the metaphors in relation to the scholarly fabrication of digital cultures. I do not claim that the metaphors generally reshape digital cultures themselves. This paper asks how certain usages of flows and streams contribute to a specific academic knowledge formation in terms of digital cultures.<sup>5</sup>

## Imaginative Capacities of Flows and Streams

Berry describes the contemporary computational world as "'smart', digital and increasingly colonized by computationally enhanced networks, objects and subjects" (Berry 2014, 1). Following his assumptions, we are living in a world that is made up of "computational ecologies, which we inhabit with non-human actors" (Berry 2014, 122). To illustrate this, Berry describes Twitter—particularly its temporal aspects. The San Francisco-based short message service Twitter is an online platform that allows subscribed users to connect globally with others. Twitter promises users to see "what's happening in the world and what people are talking about right now." (Twitter 2018a) Claiming that "'live' comes to life as conversations unfold" (Twitter 2018a), Twitter refers to an always ongoing posting of ever new messages on the timeline. The general "mission" of the service is to "[g]ive everyone the power to create and share ideas and information instantly, without barriers." (Twitter 2018b) The platform's marketing focuses on "real time" (Twitter 2018c).

For Berry, Twitter constitutes a "new way of accessing, distributing and communicating via the real-time stream" (Berry 2014, 72). He understands the real-time stream as a "reconfiguration of temporality," concerning both "an experience mediated in real time through Twitter's service" as well as a "radical now" (Berry 2014, 76). Besides "nearly real-time updates" and different "cadences of streams," Berry describes a "pace of flow"<sup>6</sup> as the stream changes "dynamically over time in response to external events and activities." He therefore suggests understanding Twitter "as a ticker," as this "reinforces its sense of temporality as a constant set of discrete 'ticks'" (Berry 2014, 81). These ticks "move dynamically around the world, and are connected to the activities and tweets of the users that use the service"

5 For a general account on metaphors see van den Boomen (2014). Here, the assumption is that metaphors "shape and transform digital practices and social ordering, and vice versa" (van den Boomen 2014, 13). See Shnayien's contribution in this edited volume for a concise analysis of the "virus" as a computational metaphor and its genealogy.

6 See also Weltevrede et al. 2014, 127.



(Berry 2014, 81). These descriptions tend to produce an incongruence concerning the temporal aspects. Twitter communication is described both with flow and stream words and in terms of discreteness. On the one hand, there is “the image of regulated, omnipresent, uninterrupted, and continuous flow” (Sprenger 2015, 88). On the other hand, there are “discrete ticks” or the emphasis on “*nearly* real time” (Berry 2014, 81; emphasis MD), which oppose the images. It flows and it does not flow.<sup>7</sup>

This inconsistency is owed to the argumentative distinction between the technical and phenomenological domains. Berry differentiates Twitter’s front- and back-end from each other. Whereas Twitter’s “interactional layer” takes on “the form of a flowing stream of information,” the interface “hides the underlying mechanisms, which are constantly shifting at the levels of codal, logical and physical layers” (Berry 2014, 70). Users experience an ever-ongoing, smooth stream of data, which is opposed to a data transmission that is computationally characterized by discreteness and discontinuities. While streams and flows refer to human sensorial capacities (“radical now,” “nowness,” “real time”), indiscernible discrete moments are affiliated with a perspective on the technical architecture of Twitter (“discrete ticks,” “nearly real time,” “underlying mechanisms”). The difference between the capacities of discrete technical operations and their perception as being uninterrupted is irresolvable. Both descriptions are accurate to a certain extent, depending on the analytical point of view. However, since flow and stream words are applied to both the phenomenological and technical domains, this difference is likely to blur. Berry claims, for example, that beneath “the screen surface [...] there is a constant stream of processing” (2014, 1–2).<sup>8</sup> Concerning the temporal aspects of data transmission, this makes an argumentative incoherence likely. The difference between perceiving a continuous flow of data transmission and the discreteness of technical operations tends to fade. Therefore, flow and stream words have to be explicitly marked in regards to their

7 Florian Sprenger describes this in terms of a “coherence in contradiction.” The important part is that this “expresses the force of a desire” (Sprenger 2015, 76). Deriving this figure of thought from Derrida (2001, 352), this signifies descriptions of transmission and the longing for “immediacy”: “Historically, the emphasis on the meaning of media is thus permeated by the dream of media-less immediacy” (Sprenger 2015, 87).

8 Exemplarily, Berry argues that concerning “the new industrial internet the paradigmatic metaphor [...] is real-time streaming technologies and the data flows, processual stream-based engines and the computational interfaces that embody them” (Berry 2014, 1). The difference between metaphorical and non-metaphorical streams is struck out, as well as the consideration of the discrete temporal aspects of computation.

respective meaning. Otherwise, it becomes unclear what exactly flows and streams signify and especially which temporal aspects they refer to.<sup>9</sup>

In the text the possible argumentative incoherence intensifies further through the various linguistic functions of flow and stream words. Berry considers their decidedly metaphorical usage (“paradigmatic metaphor” [2014, 1]), their explicit non-metaphorical usage in technical descriptions (“extremely fast data transmission systems usually built around a proprietary data protocol generally for transmitting real-time news, data and financial market information” [2014, 78]), their conceptual usage (“cyberstructure” [2014, 73]), and their usage in terms of Twitter’s advertising (“nowness” [2014, 76]). In consequence, assumptions on so-called streaming technologies (as a technical term) are affected by and intermingle with metaphorical imaginations of flows and streams, with computational concepts, and with Twitter’s advertising incentives. Noticeably, the notions of flows and streams are applied to a broad spectrum of phenomena. Simultaneously they do have different linguistic functions. Since flow and stream words are used in an indiscriminate way, their meaning is generalized. Since it is not always clear which domain (perception or technical architecture) flow and stream words signify, this randomness or becoming indifferent has an effect on the description of temporal aspects of data transmission. Flow and stream vocabulary used in such a generalized way blurs the different assumptions concerning its multiple specific temporal aspects. Notions of continuity and a differentiated take on temporal aspects of data transmission in particular create a conflict. While discussing data transmission with respect to the distinction between perceptual and technical domains, a generalized usage of flows and streams undermines this difference. Regarding the respective theoretical claims, the coherence of the argumentation is at stake.

I argue that this generalization is owed partially to the seeming self-evidence of the metaphorical imagination of flows and streams. The imaginative potential of flows and streams is taken for granted. This becomes clear in another theoretical account on data and information streams from 2011. Berry elaborates that the user is “living within streams of data, [which] is predicated on the use of technical devices” (Berry 2011, 143). Users depend on these devices in order to “manage and comprehend” all sorts of “data,” as otherwise they “would drown in information overload”

9 Weltevrede, Helmond and Gerlitz (2014, 127) criticize such a “universal account of real time.” They specify their approach to real-time streams by taking the “fabrication of real time” and its multiple temporalities into account, focusing on the specific “front- and back-end temporalities” of social media platforms (Weltevrede et al. 2014, 143).

(Berry 2011, 143). Underscoring the argument, he refers to a definition by John Borthwick. In a blog post he predicts that the internet's structure will change significantly. Borthwick notes that the internet is becoming "[a] real time, flowing, dynamic stream of information" (Borthwick 2009, as cited in Berry 2011, 143).<sup>10</sup> Furthermore, "we as users and participants can dip in and out of and whether we participate in them or simply observe we are. . . a part of this flow" (Berry 2011, 143).<sup>11</sup> This is also the take that tech and advertising companies make use of when promising an even, uninterrupted, and always disposable flow of information. It illustrates a certain proximity to "the moment of fascination" (Simonsen 2004, 1337) for the capacities of data transmission. Instead of standing in when "lost for words" (Gleich 2017, 47),<sup>12</sup> the metaphorical imagination's evidence fosters an indiscriminate usage of streams, taking for granted a continuous, uninterrupted processuality of data transmission. These descriptions allude to "a world that appears to flow" (Sprenger 2015, 112). This furthers phantasms of a seamless, continuous connection to a networked society of users and potentially uninterrupted communicative presence (cf. Sprenger 2015, 112). Therefore, in scholarly writings the metaphorical imaginations of flows and streams have to be reflected. Sutherland poignantly states that the flow metaphor "needs to be used with a greater degree of caution" (Sutherland 2013, 7). But what is at stake besides the strict differentiation of analytical layers and argumentative coherence?

## Flipsides

The persuasiveness of the imagination of streams and flows conceals the need to look for power structures. They offer "an appealing, easily graspable image." Following Sutherland, on the one hand flow talk is "useful for rhetorical purposes," but on the other hand the metaphor "actually fails to elucidate the problems that we face" (Sutherland 2013, 18). Getting a closer look at these problems requires a shift in the analytical perspective.

10 See Borthwick's blog post: [www.borthwick.com/weblog/2009/05](http://www.borthwick.com/weblog/2009/05).

11 Although in a book chapter from 2011 on "Real-Time Streams" it is claimed that the stream has to be differentiated into "an empirical object" on the one side and "a technological *imaginary*" on the other (Berry 2011, 143, emphasis in original), the argumentation misses in terms of strictly underscoring the respective temporal aspects regarding Twitter. This specifically accounts for the computational processes as well as the experienced real time. Whereas the "empirical object" refers to a material "computational environment" that "deliver[s] [...] 'nowness' to the users and contributors," the imaginative component signifies "new computational devices and experiences" (Berry 2011, 143).

12 In German: "sprachliche Verlegenheit" (Gleich 2015, 95).

Sutherland refers to the broader framework of the “network society” (Sutherland 2013, 18). He claims that the flow “does a lot more than simply operate as a negative metaphor: it becomes the ontological basis—the very ground of reality—for the economic, social, and political functioning of the network society” (Sutherland 2013, 8). Here, the flow “plays into some of [its] most damaging hegemonic ideals” (Sutherland 2013, 7).<sup>13</sup> Analyzing Twitter merely in regard to its communicational capacities, i.e., as an endless timeline of messages continuously unfolding live, the flip sides of Twitter’s self-promotion cannot be taken into account. This holds for “the algorithmic ordering and presentation of information,” which is tightly connected to the economic interests of the platform (Weltevrede et al. 2014, 127),<sup>14</sup> as well as more generally for data collection and surveillance.<sup>15</sup> In this light Twitter is an example for the economic foundation of social media services.

If the usage of flows and streams is not rigorously reflected, the vocabulary does not allow for a thorough consideration of manifold questions of power relations (Thibault 2015; cf. Hu 2015).<sup>16</sup> The problematic does not reside in deliberately neglecting questions of power. However, generalizing metaphorical imaginations of flows and streams and taking them for granted is the core problematic, as it obstructs the appropriate discussion of questions of power from the outset.

- 13 Concretizing shifting forms of political regulation co-emerging with technology Alexander Galloway sheds light on decentralized power structures that are enabled via the internet’s protocol structure (Galloway 2004). Further illustrating this mode of regulated data distribution Sprenger points out: “To be able to interrupt communication is to possess power. To be able to do this without being observed, moreover, is to exert an invisible sort of power” (Sprenger 2015, 102).
- 14 Weltevrede et al.’s (2014) argument on “political economy” refers to “companies” and “cooperating partners” of online platforms that are willing to pay money for “introducing selected sticky content for gaining attention” (Weltevrede et al. 2014, 143).
- 15 See the contribution by Degeling/Degeling in this edited volume. Galloway argues that “power today resides in networks, computers, algorithms, information, and data” (Galloway 2011, 95).
- 16 Before the backdrop of on-demand TV streaming, Thibault is primarily interested in how the metaphor “remediates past media economical models, technological forms, and functions as a way to control and capture audiences” (Thibault 2015, 111). Asserting a certain “persistence of mass media culture,” he claims “that online streaming marks the grand return of broadcasting media in digital culture” (Thibault 2015, 111). In a study on the cloud metaphor Tung-Hui Hu quite similarly argues that “the supposedly anachronistic mode of sovereign power may be returning under different forms” (Hu 2015, XVI).

This is underscored in theoretical writings that also critically reflect flows and streams as metaphors. Yvonne Volkart's analysis proves to be a valuable source. In general, she observes that the "stream metaphor" accompanies the "algorithmic programmability of digital media" (Volkart 2006, 14; transl. MD). In this Volkart sees the "ideological and technical preconditions" produced, which are responsible "for a new phase of global capitalism." This is marked by the keywords "networking, mobility [and] flexibility" (Volkart 2006, 14). She describes this in terms of a phantasm in which "everything is interconnected and administered, in permanent flow, cross-border and variable" (Volkart 2006, 14). Hereby Volkart ascribes the flow a decidedly political foundation. This also holds for the label "liquid modernity," which Christoph Asendorf (2005) outlines, critically drawing on Zygmunt Bauman (2000). He understands a "world of total networking," which is moreover "positivized without further ado by the protagonists of the information society" (Asendorf 2005, 212; transl. MD). Concisely, "communication and control" reciprocally condition each other and are "deeply entangled with one another" (Asendorf 2005, 212). Instead of falling for the imaginative potential of the metaphors, flows and streams are embedded in a critical descriptive framework. These approaches accordingly contribute to an understanding of digital cultures that is not driven by a fascinated view on technology and imaginations of flows and streams.

Building on these diagnostic endeavors, I want to ask for possibilities to conceptualize the metaphors differently. As argued above, the problems particularly reside at the junction of data transmission and questions of power, as well as their non-consideration. Aiming at the phantasms of flows and streams in digital cultures, there are options to give the metaphors a different *sound*. In the following, the first approach presents a different perspective on the metaphors by seeking for other word origins than that of flowing water, whereas the second option is to playfully vary the imaginations of continuity, unity, and presence themselves. This alternative approach separates itself from the assumption that the metaphors are merely translatable into non-metaphorical terms. Such an assumption is based on a linguistic misconception. According to Petra Gehring this corresponds to "an epistemic preconception," whereas metaphors in general would be "less exact" and their function not be as "precise" as non-metaphorical terms (Gehring 2011, 5; transl. MD). I likewise do not seek for an *actual* or *authentic*, non-metaphorical alternative to flow and stream metaphors in terms of technical descriptions of data transmission. The reason is that this would affirm a descriptive asymmetry between a

non-actual metaphorical language and actual technical capacities, which ultimately supports a technical definition a priori.

The first option is shifting the semantic context of the metaphors. Questioning the metaphors' descriptive potential, metaphorical imaginations of flows and streams are put into another context. In a study on on-demand streaming Patrick Vonderau addresses the semantic origin of "streaming" (2015, 718). He observes that "streaming does not refer to the wide territorial dissemination, planned (dis-)order, and real-time experiences of established media" (Vonderau 2015, 718). On this basis he asks for another origin of meaning that suits contemporary media better: "With word history pointing to origins in mining—the washing or streaming of the earth to obtain tin ore or gold—and in theology, as in 'the streamings out of sin,' the concept of streaming seems most closely linked to an economic belief in a conversion of values" (Vonderau 2015, 718). Coming back to Twitter, this "belief" also fits the economic foundation of social media services better than the promises of connection and real-time communication. In a similar way John Roberts and Jonathan Joseph (2015) refer to a more recent origin in which flows and streams are used frequently, i.e., in a "management discourse" (Roberts and Joseph 2015, 2). The authors focus on "the link between contemporary social theory and the market world" (Roberts and Joseph 2015, 2). Concerning social theoretical approaches that purposefully make use of the connotations of flows and streams, Roberts and Joseph suggest that "the fetishism of flows and networks is at risk of perpetuating a particular management ideology that justifies and legitimates a market-based logic." Furthermore they claim "that this type of management ideology, concerned as it is in arguing that the world is now more fluid than in previous decades, helps to mask specific contradictions and inversions in the structures of capitalism" (Roberts and Joseph 2015, 4). Although the authors refer more generally to the workings of capitalism, it also applies to the descriptions of Twitter through flow metaphors, leaving the platform's economic foundation unconsidered.

In both cases the meaning of the metaphors is shifted through seeking a different semantic context. By contrast the second option breaks open the metaphors' one-dimensional focus on positively connoted imaginations. For a cultural theoretical context Cassandra Nakas suggests placing the assumption of an ever-ongoing flow in relation to its passing and loss (2015, 9).<sup>17</sup> The tension introduced is explicitly understood in terms of a figure of thought. Claiming that the figure *flowing as passing* allows the

17 In German: "Ver-Fließen" (Nakas 2015, 9).

comprehension of “ambivalences and inconsistencies” in regard to “cultural activities” (Nakas 2015, 10; transl. MD), the metaphor is ascribed a “critical epistemological potential” (Nakas 2015, 12). A quite similar cultural theoretical approach connects to this assumption: Behnstedt et al. (2007) ask for the descriptive and epistemological potentials of “blockages” and “stagnations” when read with or against imaginations of uninterrupted flows (Behnstedt et al. 2007, 7). This position works on the critical reflexive level of the metaphors themselves. Both attempts could serve as starting points to readdress the connotation of data flows, opening up dominant and conventionalized perspectives and imaginations as well as allow for inclusions of power-related questions in terms of non-flow.<sup>18</sup>

The last option is a bit different and is exclusively to be read within an experimental framework. It tackles the imagined capacities of data flows with regard to its cleanness, attuning the general context of reference of the metaphorical imaginations. I propose to read flows and streams before the backdrop of sewerage and open up the play of possible semantic translations between the domain of social media on the one side and sewerage on the other. Concerning Twitter, the imaginative “reference system” (Blumenberg 1971, 173) of waste water might somewhat be closer to *shitstorms*, *fake news* and *hate speech* in a quite literal sense than clean, unpolluted streams of data. Compared to the imaginative sceneries of data flows sketched in the beginning, a playful account does not seem to be too inviting. Instead of a continuously running, pure stream of homogeneously flowing neutral data that users dive into, the imaginative reference to a *sticky sludge* would both imply and acknowledge the messiness of some content’s quality as well as hint towards its economic underpinning.<sup>19</sup> Also, the potentially misleading character of flows and streams could hereby be minimized.

Ultimately, this concerns the question of “representability” of power structures (Galloway 2011, 98). Alexander Galloway calls for a “critical or poetic language in which to represent the control society” (Galloway 2011, 99). The imagining of sewerage could be a quite non-poetic suggestion, yet in a way serve as a “counter-aesthetic” (Galloway 2011, 100) in regard

18 There is a plethora of potential metaphorical imaginations standing opposed to connotations of uninterruptedness of information transmission: exemplarily “leaks” of information (Ippolito 2015), a “drain off” of hacked data, the “information flood” (Gugerli 2012), or “bursts” of information (Sprenger 2015; Abbate 2000). However, one has to be cautious, as each metaphor has its own meanings, conventionalized imaginations, contextualizations, and risks (cf. Gehring 2010).

19 For example this would fit Weltevrede et al.’s (2014) take on Twitter’s “selected sticky content” (Weltevrede et al. 2014, 143).

to advertising incentives as well as uncritical analytical accounts of social media content and online communication. This does not provide for a proper inclusion and reflection of regulating structures and modes of power, of course. However, at least it cracks advertising incentives and self-evident usages of data flows and streams in regard to social media.

## Rereading Flow and Stream Metaphors

Generalized imaginations of flows and streams cannot grasp underlying questions of power. In the narrative of fluidity its contours can hardly be rendered manageable, as they withdraw themselves from discursive descriptions of digital cultures. Instead, they figure users that are engulfed by entertainment opportunities and only focus on the possibilities of online communication. Thus, it is not the task to demand a better or more accurate description of data streams and flows in digital cultures. If the words are extensively employed as metaphors in a media scholarly discourse in order to describe data transmission, the talk about flows and streams has to be investigated. It has to be put to test in regard to rhetorical “overstraining” and “misusage” (Blumenberg 2012, 225; transl. MD).

Finally, imaginations of fluidity accompany descriptive endeavors that have sought to engage with technical mediation since early experiments with electricity (Sprenger 2015; cf. Burroughs 2019; cf. Thibault 2015). These respective phantasms are not directly comparable with contemporary connotations as in the discourse outlined above. Yet they allow for a sensibility of the metaphor’s history and its scholarly reflection regarding respective knowledge formations. The same applies to cybernetic origins of flows and streams, which are connected to information theory and the building of computational networks (Elias, Feinstein, and Shannon 1956; Ford and Fulkerson 1962). Tracing possible genealogies of imaginations of flows and streams is a pending task needed to frame the contemporary usage of the metaphors in relation to data transmission.

Focusing on a media scholarly discourse this article showed that metaphors of flows and streams contribute to the discursive understanding of digital cultures and especially data transmission. Critically reflecting the talk about flows and streams in a media scholarly discourse, tracing back its genealogies, as well as asking for productive alternatives, fuels a process in which the particular modes of power in contemporary technically mediated communication unfold.



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