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# idea journal

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interior technicity:  
unplugged and/or switched on

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vol. 17, no. 01

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2020

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the journal of IDEA: the interior design +  
interior architecture educators' association

# locative atmospheres: practices in networked space

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## abstract

Smartphones and social media create locative atmospheres: transportable, affective spaces modulated by the data of our temporal, networked identities. How might these atmospheres form, and how can we consider them in interior design? The conditions of these locative atmospheres are emergent; our practices with technology evolve quickly, requiring an understanding of how they affect us that extends beyond specific devices and applications. Within this ever-evolving context, it is crucial that interior design students have a philosophical understanding of the ways that technology might intersect with humans and lived space. Atmosphere is a useful spatial construct to begin unpacking this relationship in order to develop a critical stance. How might technology entangle with people atmospherically? This paper will read diffractively around theoretical positions, looking for patterns that might help to understand how atmospheres might emerge through technology. Initially, it will introduce atmospheric practices as a way of orienting the relationship between humans, affect, and atmosphere. It will then consider how the practices of technology are implicated in this relationship through the formatted subject and computational models of mind that are controlled by algorithms within the data gaze. Intersecting these ideas with Karen Barad's agential realism allows that the practices of technology might be atmospheric, to view our engagement with networked devices as producing an ongoing archipelago of locative atmospheres. It will conclude by speculating on ways to design attentively in order to reconsider our entanglement with data-driven, networked technologies in lived space.

### cite as:

Geck, Kate. 'Locative Atmospheres: Practices in Networked Space,' *idea journal* 17, no.01 (2020): 68-81, <http://doi.org/10.37113/ij.v17i01.365>.

### keywords:

atmosphere, practice theory, network culture, human-computer interaction

## atmospheres form through practices

Atmosphere can be a useful construct within which to consider the complex interactions of things, time, and space with human experience. We are always contained within atmosphere, yet it is not a singular, immutable entity. Atmospheres vary in intensity, enfold and overlap with one another, but are always bound to a body. What is an atmosphere without a sensing body to entangle with it? Atmosphere is a broad construct but a relational one, which encompasses dimensions of the material and the social, and we usually understand them in direct relation to the human. Considering atmospheres as an amalgam of practices<sup>01</sup> that are temporal, spatial, and mobile<sup>02</sup> provides strategies to research and evaluate them.

Here, practices can be understood as the processes, activities, habits, and actions that people do in space and time. They encompass the incredibly broad, nuanced, and embodied actions that we choose to do based on the context we have. Practices comprise the actions of different people.<sup>03</sup> Individuals perform practices, but they are woven into many through the threads of culture. They are shared ways of and reasons for doing—shaking hands to say hello or liking content in your social media feed. Social computing and mobile technologies bring with them a suite of emerging practices with devices and with data. Social computing encompasses the ways that digital systems are designed to support social interaction, intersecting social practices and computational systems to guide inter-human interaction.<sup>04</sup> Augmenting the shared, offline practices of

people, they include things like social media and email. Mobile devices, wearables, and smart objects connect, through algorithmic practices, with networked applications that track and share data. These things are now fundamental socio-materials. As such, the practices associated with social computing and data-driven, mobile technologies are now fundamental to the way atmospheres form and affect us in lived space.

Affect is usually implicated in discussions of atmospheres. Affect speaks to change and transformation, to influence on bodies; and so, atmospheres with their immersive, shifting qualities are inherently affective. We feel and cohere according to the cultural, material and social configurations of our surroundings. Consequently, affect can be seen to operate as an independent, active force that is made and remade according to these configurations; or bodies (things) can be seen to have inherently affective properties, operating as 'affect generators.'<sup>05</sup> Bille and Simonsen extend the latter with practice theory to see that affect is situated in human practices. These inherently affective practices operate as spatially embedded and felt phenomena, which links them inextricably to atmosphere.<sup>06</sup> Rather than atmosphere or affect as entities existing in the relation between people, places and things, atmosphere unfolds as the relation. This unfolding is termed atmospheric practices. It is through our bodily practices in time and space that affect or atmosphere emerges as a condition of being in that spatio-temporal configuration. In this way, atmosphere is not only phenomenological: it is contextual, mobile and pragmatic. Practices—the things we do—are critical in creating atmosphere.

This conception of atmospheric practices draws on practice theory, which considers how humans transform the world through the practices they undertake. An incredibly broad concept; as such, there is no singular practice theory, rather, a suite of practice theories where practices become the primary element of social analysis.<sup>07</sup> Practice theory is criticised as being too broad to interpret human life, and because it quickly becomes a 'theory of everything.'<sup>08</sup> However, the notion that the activities we do are fundamentally implicated in the experiences we have is seemingly self-evident. As such, practice theory could help acknowledge and explore how human (and non-human) performances in space and time might form atmospheres. This differs from a purely phenomenological approach to understanding atmosphere, as it organises experiences of space through specific, shared activities, habits, routines and actions that are common to many individuals.

Obviously, we cannot predefine the experiential qualities of a space by enforcing or encouraging particular practices. Rather, we can attune ourselves to the practices that exist within a space and take this into consideration when designing or appraising space. This is an approach taken by Sumartojo and Pink in their ethnographies of lived space, where they suggest a new agenda for thinking atmospherically.<sup>09</sup> Atmospheres are a part of how we know things, but because they are emergent and dynamic, they are known, not in the sense of something fixed and established, but as a way of feeling and inhabiting the world.<sup>10</sup> Again, atmospheric thinking implies the doing-being of bodily

practices in time and space, rather than describing atmospheres phenomenologically in terms of specific material and immaterial configurations. Atmospheres are subject to 'differential apprehension by different people.'<sup>11</sup> Practices could be a way to explore how this unfolds—how the practices of different people implicate atmospheres with power, belonging, and the formation of individual experiences. For example, the individual experience of a space changes depending on what practices are associated with your gender or your ability.

An important element of atmosphere that Sumartojo and Pink introduce is the temporal. Bound to memory, 'affective echoes' can influence the present experience of an atmosphere. This temporality is described as inherently mobile; atmospheres are sensed through movement and are also made as people move through the world.<sup>12</sup> Considering atmosphere as a temporal, mobile amalgam allows specific points of entry for analysing and understanding lived space, and these points of entry may be revealed through the practices we engage with in those spaces. Why, when, and how do we move in space and time, and how does this contribute to an atmosphere? Returning to technology, how is atmosphere complicated by emerging practices with real time data-driven technologies? And could the data-driven practices of technologies be understood atmospherically, given their real-time temporality and an algorithm's capacity for 'differential apprehension'?

## **temporal identities: data-driven practices with technology**

Much of the world now engages in relatively new practices, with technologies that specifically modulate experience based on the capture and processing of data from mobile and networked devices. These are consumer grade technologies operating as part of the Internet of Things (IoT), with sensing hardware connected to software in real time via the internet, such as smartphones, Fitbits and other smart objects. These continuously collect information on an individual's phenomena, such as movement (GPS, accelerometers), language (sentiment analysis, search keywords), social trajectories (email, social media, Bluetooth) and biometric data (sleep, heart rate, steps). Often, they use machine learning to process this data and push content, with an increasing level of personalised proficiency, as exemplified by news feeds and targeted ads.<sup>13</sup> There is a loop of practices exchanged between the user (searching, emailing, scrolling) and the technology, (sorting, recording, pushing) which is atmospheric (temporal, mobile, spatial). This could be seen to produce temporal identities; abstracted, datified schemata of ourselves which are used in real-time by computational systems to modulate certain conditions of our immediate environment. Neal Thomas offers *The Formatted Subject*<sup>14</sup> to explain how humans are understood by machines, and David Beer offers *The Data Gaze* (updating Lacan's *Clinical Gaze*) to focus this new landscape of human-machine interaction.<sup>15</sup> The philosophy of Karen Barad can diffract around these ideas to further understand how

the practices of devices, through algorithms, intersect with atmosphere. This produces what could be understood as an archipelago of locative atmospheres; modulated, individual experiences of reality adrift in a networked sea of sense and sensed data.

The 'formatted subject' describes users of technology, implying that humans are increasingly structured by design to improve their interaction with machines.<sup>16</sup> Systems and machines begin to understand us through schemata, through representations of ourselves extracted from data: location, text analysis, social connections, biometrics, and so on. They use these understandings of us to send us new information, new instructions for navigating space and time. Machine practices with our data begin to drive our interactions with the real world. Ubiquitous sensing technology becomes embedded in our lived space, generating an informational milieu.<sup>17</sup> Interfaces and technologically imbued spaces may seem human-centred and user-friendly. However, underlying these entry points are formalised, algorithmic techniques for staging agency, developed via functionalist accounts of the subject.<sup>18</sup> In order for us to interface with the system, we must be abstracted into a simplified structure capable of entering into an algorithm of some sort.

Thomas describes this formatting as occurring through global graphs. These foreground certain aspects of a social subject in technical relation to an information-object, backgrounding others.<sup>19</sup> Different graphs treat different feeds from a subject as the data source from which the system will reason.

David Beer discusses life under The Data Gaze where the constant observation of machines extracts, analyses and predicts aspects of the world to define and direct it with increasing precision.<sup>20</sup> Our topologies of experience, of time and space, are now shaped by shifting seas of data. The implication of this gaze is that the world begins to be organised through data practices, but these practices may change as technology develops, apps change, and machines learn. How then, as interior designers, can we find a foundation on which to understand this relationship between technology and atmosphere?

### **the apparatus of the algorithm**

The concepts of atmospheric practices and practice theory are pragmatic at heart, as is Sumartojo and Pink's conception of thinking atmospherically. These ideas are bound in part by phenomenology and ethnography, which preface and prioritise human sense in the formation of meaning and experience. These are not to be discarded: these are incredibly valuable tools for human designers to conceive of and understand atmosphere. Yet the world is inarguably modulated, not just by our practices *with* technology, but by the practices *of* technology—many of a complexity that we don't understand. So how do we extend the vernacular around practices and atmosphere to discuss the role of intelligent technology?

The algorithm resembles an apparatus of sorts—it responds to certain things and not others, presenting new conditions and eliminating others based on these responses. There is a critical relationship between the

observations of technology and its ability to articulate conditions that are atmospheric. Bachelard describes this as 'phenomeno-technique,' seeing phenomena as dynamic things produced or composed by the technical instrumentation that frames or measures that phenomenon.<sup>21</sup> This predates with resonance Karen Barad's idea of intra-action, where a classically understood objectivity is impossible. This is a relevant line of thought for considering algorithms, particularly those in intelligent systems. Intra-action posits that the apparatus which measures a property is not separate to the material being measured, and in fact is a condition of that phenomenon being recorded. The material of the apparatus exchanges and diffracts with the material being measured, to configure and reconfigure material relations and produce realities.<sup>22</sup> At a quantum level, Barad deploys this thinking to explain the wave-state nature of sub-atomic particles. At a macro level, this thinking resonates with the idea of atmospheric practices. The material intra-action of human, context, action, space, and time is atmospheric, recorded or produced through the various matters of the body's sensory apparatus. As such, the apparatus is 'material-discursive,' allowing some productions of reality to become possible, while others are not.<sup>23</sup> This is a post-human approach to the performativity of the subject, where 'matter' replaces conceptions of 'human' or 'nonhuman.'<sup>24</sup> This forms Barad's idea of agential realism, where it is only through the intra-actions of materiality that reality can emerge. Returning to atmospheric practices and technology, agential realism underlines the criticality of an algorithm's observational

practices in forming atmosphere. The observer and the observed cannot be separated; human, device, algorithm, sense. Phenomena are the constant becomings of matters and their intra-activities.<sup>25</sup> In the case of contemporary, data-driven technologies, the algorithm becomes an intra-active apparatus through which reality is cut or measured.

In this diffractive reading<sup>26</sup> of atmospheric practices and agential realism, an atmosphere is unformed and uncertain until it filters through the sensing-practice of an individual matter—technical or living: an eye, an accelerometer, skin cells, or an algorithm. Our constant practices with data-driven technologies can be seen to create locative atmospheres; enveloping us in co-constituted, intra-active relation. These are locative in that the location sensing of the device is an inherent condition of their production. The apparatus of the algorithm is critical in

modulating our affective becoming in space and time as it atmospherically intra-acts with our material to produce new phenomena. In this way, data-driven devices could be seen as generating an evolving archipelago of locative atmospheres. These experiential pockets emerge when the practices of humans and data-driven technologies entangle. In the diagram below, practices of matter (human and technological) intra-act via their sensing apparatus (corporeal, algorithmic) with material (data, phenomena) and form islands of atmosphere. These practices are algorithmic, social, and sensory (Figure 01). These co-constitute one another through intra-action of their matter and are inseparable.

This archipelago has mutable edges and is buffered by other, larger tides of atmosphere, but the soft boundary of each island forms through the ongoing intra-action of human, device and data. For example, a human

**Figure 01:**

Locative Atmospheres: Practices in Networked Space. This diagram attempts to visualise the ongoing relationship between humans and machines through atmospheric practices. Kate Geck, 2020.

engages in the practice of scrolling their newsfeed, liking or lingering on certain material (posts/images). The apparatus of human eye and skin engage in practices of sensory exchange with this material, creating an atmosphere of focus, engagement or concentration. Their swiping, tapping and pace is material used by the app's algorithms to produce more material (content) that reinforces atmosphere. This is a mutually constitutive force. These appear as an archipelago, small networked islands adrift in the same sea of sense and sensed material, yet ontologically separate in their productions of atmospheric pockets unique to their own networked feedback.

### **technology and atmosphere: models of mind**

Sophisticated examples of these productions exist. Through networked multimodal sensing (GPS and motion data from your phone, sentiment analysis from your social media), systems can collect multiple phenomena from an individual as well as multi-individual phenomena; Affectiva is one such system. This is an affective computing system which detects facial expressions and heart rate via webcam and classifies this data into emotional states to then modulate content for a particular user.<sup>27</sup> The Affectiva Automotive AI is used in vehicle cameras to 'measure in real-time, the state of the cabin, the driver and occupants.'<sup>28</sup> This can then be used to control the vehicle or modulate conditions in the interior to calm people, energise them, or motivate them for their day ahead. The EMMA system is an emotionally aware chatbot, which uses machine learning and smartphone

sensors to establish the user's mood, in order to then suggest micro-activities for wellness such as breath work.<sup>29</sup> EMMA attempts to connect emotionally with you, changing the language it uses to make its suggestion more compelling to you based on how it thinks you feel—in much the same way as you might empathetically tailor your own language to a friend in times of need.

Through social media feeds, large swathes of reality are now produced through human/algorithm intra-action. In light of this fact, it is important to maintain criticality around the sources of these algorithms, and whose interests they serve. Cognitive capitalism sees companies form schemata of us through computational systems in order to further their market interests. The 'Emotional Contagion' experiment manipulated the feeds of certain Facebook users for one week to show more positive or more negative content.<sup>30</sup> They found that emotions could transfer through social networks; when positive content was reduced in someone's feed, that person would go on to post less positive and more negative content themselves. While this study may have had 'a negligible real-world impact' in terms of individual affect, the potential it suggested for manipulation was huge.<sup>31</sup> Arguably, this potential was realised in the Cambridge Analytica scandal, where the Facebook data of millions of users was used algorithmically to target ads, essentially amounting to 'mass psychological manipulation.'<sup>32</sup> These developments exemplify how capitalist interests can commodify affect with little regard for the wider, atmospheric impact it may have.



Thinking about algorithmic design atmospherically might enable us to extrapolate broader relational implications. Acknowledgement of the shared atmosphere that exists between human and system provides opportunity to consider the effects of algorithmic practices on the system itself. From this angle, some intelligent systems could be seen to create a 'Model of Mind' of the human user.<sup>33</sup> As systems read expressions of human life through sensing data, they correlate device phenomena with human emotion. Borrowing from philosophy's theory of mind, which refers to the human ability to reason about mental states, Merrill et al. propose 'Models of Mind,' to emphasise formal or algorithmic representations of how humans feel.<sup>34</sup> Barad's agential realism could view the model as an agential cut, producing new conditions that flow into atmospheric expressions of reality. Merrill et al. provide a compellingly bizarre and unsettling analogy of an ant fungus, which, 'using the ant's bodily infrastructure, creates a model of ant-experience' robust enough to control the organism completely.<sup>35</sup> There is and will be a point at which algorithms decide too much for us, so how can we explore this tension? One way could be to acknowledge that humans and technologies engage in practices that co-construct shared experience. Thinking about these interrelated practices as atmospheric could help us to pre-consider or extrapolate their broader, ongoing implications.

### **rethinking technosocial practices**

Neal Thomas asks how we might approach the conceptual relationship between user and system in general: what ontological

terms of reference should we define, enable, or constrain to operate in data driven, technological spaces?<sup>36</sup> As interior design educators, it is actually crucial that we begin this conversation with students. We should platform a philosophical understanding of the influence of technology that can transpose specific applications or objects. We should encourage students to critically consider the implications of technology by thinking about its associated practices in lived space, and how these contribute to atmospheres—to how we feel.

Greenberg et al. critically discuss the dark patterns of proxemic interaction design, arguing that it is important to consider the 'intentional or unintentional abuse' of ubiquitous computing situations.<sup>37</sup> The paper details a suite of seven 'dark patterns' in proxemic user interaction design that are emerging, such as 'The Captive Audience.' This involves a system that senses when a person is unable to move from a particular location, and then displays content to them while they are captive—such as Captive Media's urinal advertising screens which detect the position of a man's urine stream to activate ad-sponsored pee-controlled games. Gray et al. further describe Dark Patterns in general user interface design, analysing a corpus of examples where designers exploit their knowledge of human behaviour to implement deceptive functionality.<sup>38</sup>

Dwyer et al. provide 'the first evidence' that increased notifications can actually cause ADHD-like symptoms, underlining the emerging connection between human,

practice, technology and atmosphere.<sup>39</sup> The Center for Humane Technology has drawn up a Ledger of Harms, describing the negative effects of technology on adults, children, and society as a whole.<sup>40</sup> Here, shifts in attention capacity as well as in empathy and connection are cited as the key influences of technology driving the decay of real-world atmospheres. Social media platforms and their resultant interactive strategies draw heavily from the spatio-temporal tactics of casinos, which promote a sense of isolated flow, minimal decision-making, and biofeedback in the form of dopamine loops to keep people suspended in a state of consumption.<sup>41</sup> It can be seen from just these few examples that our understanding of the atmospheric effects of technology is still unfolding, so we need to maintain criticality.

### attentive design

**Figure 02:**

DroneChi is an interactive drone using principles of Soma Design to engage people in awareness of their body in order to develop a meditative practice. An individual moves their hands and body slowly in response to the light and movement of the drone, as it in turn responds to the person. DroneChi 2019, ongoing by Joseph La Delfa.

Could we begin to question how or why we integrate technology into lived space? Much technology is attention-extracting—it uses our data to produce atmospheres that suck us in for capitalist gain. So, what if we operate from a perspective of attentive design? These would be practices with technology that listen rather than call. That nourish rather than nudge. Contextually, they might consider well-being across aspects of the social, emotional and physical. A study by Bittner et al. looked at home automation of plant watering.<sup>42</sup> Rather than replace human activity with automation, the interaction design looked to use mobile technology to support people in watering their plants properly in order to maintain the benefits they may have from interactions with their plants.<sup>43</sup> The CaTpin is a wearable device that uses the idea of ‘Conversation as Therapy’ to address loneliness (Figure 02).<sup>44</sup> Worn as a piece of personalised jewellery, the device collects data on the rate of speech. If this rate drops below a critical point, the device sends reminders to friends and family, encouraging them to reach out and connect with that person. Both of these examples relationally consider how practices might be nourished or augmented by technology to contribute to restorative or positive atmospheres, without algorithms alone acting on direct assumptions about human wellbeing. ‘Watching Mephitic Air’ by Tobias Revell provides a gentle, ambient indication of outside air pollution through an aesthetic transposition of data into projected visuals.<sup>45</sup> This provides an example of how data can be embedded atmospherically into lived space as a quiet, peripheral site of exchange.

**Figure 03:**

Individuals can customise their own CaTPin using personal and precious artefacts. Each pin is original, and embedded with sensing technology that shares conversation data. Leah Heiss, Emma Luke, Mattiu Bush, Paul Beckett, Glenn Matthews with industry partner Bolton Clarke. The CaT Pin (Conversation as Therapy). 2017, ongoing. Photo RMIT Wearable + Sensing Network.

'Traekvejret' (Figure 04) is a subtle wooden design object placed quietly in kitchens or living rooms that 'breathes' at a relaxing pace.<sup>46</sup> When people encountered the object by chance, they reported that their own breath would come to mirror the pace of Traekvejret as they observed it, causing them to feel more relaxed.<sup>47</sup>

DroneChi, by Joseph La Delfa, is a mindful engagement for individuals, where a small, 3D, flower-printed drone responds to your body through gentle light and movement, to help you to develop meditative practice (Figure 04 and 05). 'Leading the drone is designed to bring about a focused state of meditation as the drone is constantly engaged with the body and requires the participant to pay attention to both the drone and their body.'<sup>48</sup> Soma Shimmer is a speculative spatial intervention where smartphone-augmented reality is

used to encourage stretching movements for carers in a children's hospital.<sup>49</sup> Glowing particles grow and sparkle to provide real time feedback on your pace, encouraging slower, mindful movement in a small and stressful environment. These three attentive examples consider atmospheric practices with technology, demonstrating how the atmospheric practices of machines can work to shift the atmospheric practices of people. They focus on somaesthetics, integrating an attentiveness to bodily practices through technology.<sup>50</sup>

**Figure 04:**

Trækvejret: A Kinetic Device Encouraging Bodily Reflection. Actuators enable the wooden device to 'breathe' in and out at a relaxing pace. It sits quietly, allowing for incidental and open-ended engagement. Vanessa Carpenter, Thomas Sokoler, Nikolaj Mobius, Dan Overholt, 2019.

A video is also available on the idea journal website at: [idea-edu.com/media/2020/ideajournal\\_17\\_01\\_2020\\_Geck\\_figure04.mp4](https://idea-edu.com/media/2020/ideajournal_17_01_2020_Geck_figure04.mp4).

**Figure 05:**

DroneChi is an interactive drone using principles of Soma Design to engage people with awareness of their body in order to develop a meditative practice. It comprises a small drone and a 3D printed body, as well as infra-red hand tracking. DroneChi 2019, ongoing by Joseph La Delfa.

**conclusion**

As data and algorithms become more opaquely embedded in our lives, it is important for students to have a philosophical understanding of how technology affects human becoming. In part, this can happen through a consideration of atmospheric practices, to understand that humans and technology engage in practices which contribute to the layered atmospheres of lived space. Through The Data Gaze we now come into being alongside technology in a constant, intra-active, informational milieu. Global graphs and their associated data-objects become reductions of ourselves, producing an abstracted construct against which humans and machines affect and are affected. Algorithmic global graphs can be seen as a material apparatus within which matter is entangled, limiting or reinforcing particular

ontological potentialities. Acknowledging the highly formative effect this relational milieu has on individual and social becoming could be as simple as considering how attentive the practices of a technology may be to our own agency and wellbeing. It is unclear to what extent intra-actions with technology are atmospheric. This could be an interesting area to explore further in order to create a typology of interactions which describe the gamut of atmospheric practices with and of technology. Furthermore, this diffractive thinking opens up a way of approaching a future in which our practices with technology could have implications on the atmospheres experienced by post-human entities.

**author biography**

*Kate Geck* is an artist interested in network culture. She works with code and textiles to create interactive surfaces. Through her PhD, she is researching somatic XR and the idea of attentive design. These are extended reality (XR) systems that reimagine human computer interaction to oppose ‘attention-extracting’ systems, which modulate stress and anxiety through consumptive content loops. She has exhibited in Australia, online, North and South America, Japan, and Europe, with funding and commissions from a range of organisations. She is presently an Industry Fellow in the Bachelor of Interior Design (Honours) at RMIT University.

*I acknowledge the people of the Kulin Nation on whose unceded land I wrote and researched this paper. The Boon Wurrung and Woiwurrung (Wurundjeri) peoples of this Nation are the traditional owners of this land in Maribyrnong and Narrm. I thank their ancestors, elders and families for their care and knowledge of this land. I will keep learning about the full history of this country, and will find ways to decolonise my thinking, in particular, my understanding of space and design.*

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