An Experience in the Gather.town: Factors That Promote Immersion in Systems for the Metaverse

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Abstract: As UX becomes important in future digital technologies, Immersion is considered an essential UX aspect in emerging technologies, including Metaverse. Big tech companies have been interested in Metaverse platforms and services. Because the Metaverse has only recently begun to be studied, We are still on the way to exploring it, although its concept has been proposed for more than 30 years. We present an investigation into the factors that promote Immersion in Metaverse platforms using Gather.town. We promote an immersive experience on the Gather.town platform and then conduct a focus group to capture participants' perceptions. We performed a qualitative analysis to identify the factors that most contributed to the Immersion in the experience. Our findings provide implications for how the Metaverse platforms should be designed and what factors should be emphasized to promote a good user experience in terms of Immersion.

1 INTRODUCTION

Since mid-2021, the Metaverse has been gaining increasing prominence, and large technology companies are interested in platforms and services for the Metaverse (Lee and Kim, 2022). The 2022 Gartner Hype Cycle (Gartner, 2022) showcased the top emerging technologies for technology innovation. Among the top themes addressed was the evolution and expansion of immersive experiences, mainly regarding the Metaverse. According to the organizers, the Metaverse tends to evolve over the next ten years.

Currently, the platforms designed for the Metaverse are differentiated mainly by immersion and realism (Shin, 2019). In addition, they support an easier communication and interaction process between people and people and between people and computers (Lee and Kim, 2022).

Many platforms for Metaverse are Virtual Environments (VE) that try to replicate reality on digital devices, such as the Gather.town platform. Gather.town has different forms of communication (audio, video, and avatar), allowing users to create

304

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avatars of themselves and change the virtual environment around them (McClure and Williams, 2021). These features contribute to the system providing more Immersion, improving the user experience.

As User eXperience (UX) becomes essential in future digital technologies, Immersion plays a key role in the design and development of emerging digital technologies (Shin, 2019). Immersion determines the degree to which the user feels teleported to an alternate synthetic world (Teng, 2010)

This paper presents factors that promote Immersion in systems for the Metaverse. We performed an empirical study using the Gather.town platform and its interactive features, providing the participants with interactive environments and creating some enigmas to be solved. We aimed to provide a Metaverse experience and then discuss it in a Focus Group later.

The results show that the characteristics of the Gather.town platform, differentiating it from other online meeting and conference tools, collaborated to promote a greater sense of Immersion. Based on a qualitative analysis, we present how participants' perceptions of the immersive experience at the Gather.town support our findings.

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2 BACKGROUND

2.1 Metaverse

The Metaverse is a rapidly expanding term. Since 2021, big tech companies have been interested in Metaverse platforms and services (Lee and Kim, 2022). The term "Metaverse" was first introduced by Neal Stephenson in his science fiction book Snow Crash in 1992. Since then, it has continued to be an idea that is constantly changing (Ning et al., 2021).

Through a survey of the literature, Lee and Kim (2022) combined prior studies' conceptions of the Metaverse, defining the Metaverse as "the permanent and immersive mixed reality world (including the virtual world as the parallel world of the real world or the real world of data being augmented) where people and people, people and objects can interact, collaborate and live synchronously under the limitation of time and space, using avatar, Immersion support devices, platform and infrastructure". We adhere to this definition in our work.

2.2 Gather.town

Gather.town¹ is an online video conferencing platform that supports conversations and business in a virtual space. Gather.town also tries to replicate reality on digital devices, seeking to build a Metaverse with more human virtual interactions (Figure 1).

Each user on Gather.town receives an avatar that can freely move around the environment. It is possible to use the camera, and microphone, in addition to the chat, to communicate with all participants. When two users are close, Gather enables them to hear each other's voices and lowers the pitch when they are away. Several interaction objects, meeting rooms, individual silence booths, communication tutoring rooms, pet spaces, and game rooms can be built (Gather.town, 2022).

According to Acceleration Studies Foundation (ASF) (Smart et al., 2007) the Gather.town can be considered a Metaverse of type *Mirror world* - a type of simulation of the external world that refers to a virtual "reflection" model of the real.

2.3 UX in Immersive Interactions

Immersion is mentioned as a key aspect to be attained in digital systems, virtual reality and games (bases of Metaverse) (Shin, 2019). Immersion determines the



Figure 1: Gather.town environments.

degree that the user feels that she is cognitively teleported to an alternative, synthetic world. For Teng (2010) this degree is expressed in terms of engagement, engrossment, and total Immersion.

According to Brown and Cairns (2004), the first stage of Immersion is Engagement. This is the lowest level of involvement and occur before any other level. The lower the barriers to entering this level, the more the user invests time, effort, and attention. From engagement, the user may be able to become further involved and become engrossed. According to the Cambridge Dictionary², engrossment is a feeling of great interest that makes a person give something all of his attention. That is, "great interest" and "give all attention" indicate a deeper level of engagement.

Finally, total Immersion is presence. Presence refers to the extent to which two people interacting via a technological medium and feel as if they are together. (Shin, 2019). The concept of presence has been investigated along with Flow. People in the Flow shift into a common mode of experience when they have become absorbed in their activity (Shin, 2019). Therefore, since we intend to identify factors that promote Immersion in systems for the Metaverse, we discuss UX considering the concepts presented in this subsection in our results.

2.4 Related Work

Lee and Kim (2022) present a case study to verify user acceptance of the "Ifland" Metaverse platform using the Unified Theory of Acceptance and Use of Technology. The results indicate that the platform's performance expectation, effort expectancy, and social influence significantly increased satisfaction, usage intent, purchase intent, and word-of-mouth (Lee and Kim, 2022). The results provide implications on how to design and what factors to prioritize in platforms for the Metaverse to increase user acceptance.

As with the study by Lee and Kim (2022), our study is also a pioneer in investigating users' perceptions in the Metaverse. Both studies contribute to how the Metaverse should be designed, taking into account

¹https://www.gather.town/

²https://dictionary.cambridge.org/

UX factors such as acceptance and ease of use or the qualities of Immersion in Metaverse platform design.

McClure and Williams (2021) present a study that aims to investigate the practical utility of Gather.town in the context of a UK university with rural students who are unaware of this technology. The objective was to determine students' and educators' perceptions regarding the tool's effectiveness in distance education. The findings demonstrated that Gather.town is a valuable and well-liked tool for students and educators that can promote distance learning communities, supplement face-to-face synchronous meetings, and offer personalized and customized learning.

Latulipe and Jaeger (2022) conducted a study comparing students' experience of collaborative learning in synchronous classes of Computer Science. Results show students' preferences for Gather.town due to its support for peer socialization, sense of place, agency, engagement, and fluid interactions.

3 EMPIRICAL DESIGN

We conducted the study with 33 computer science undergraduate and graduate students at Federal University fo Amazonas, 11 women and 22 men Special Topics in Human-Computer Interaction class. Participants should access the Gather.town platform and experience the platform's interactive features. The goal was to provide a Metaverse experience further evaluated and discussed in a Focus Group.

3.1 Preparation

The study consisted of using and exploring the Gather.town platform, in that we planned a gamified activity. Each group had to access a specific room on the platform and carry out the established tasks. The gamified activity we planned involved unraveling a mysterious enigma. To do that, two groups disputed each enigma (except moment 4, which involved three groups - see Figure 2), and the group that unraveled the mystery first won the challenge.

We elaborated four enigmas based on a search in gray literature as shown in the Figure 2. The level of difficulty is the same for all enigmas.We created four different rooms on the platform. We hid the clues using the platform's features so that the participant had to explore the environment in search of clues.

To contextualize the subjects, we presented storytelling regarding the enigma and the task each group should perform. We aimed to provide all the instructions necessary to perform the activity. We present these instructions in the following: **Mission** - You are a group of private investigators hired to unravel a mysterious crime. For this, it is necessary to find clues and identify the killer. Your group will be placed in a virtual setting, which may be an office, a shopping center, or anything else. The clues are scattered all over the place. Your team must find all the clues and together find the killer. However, remember, you are not the only group of investigators. In the same environment, another group is also trying to find clues and unravel the same mystery as you. So it is a contest between teams of investigators. The team that first solves the mystery wins.

Access the Platform - We will send the link to the room by email to the groups. You will need to provide your email address to log in, enter your name, and if you would like, personalize your avatar. Tou need to provide access to your microphone and camera. After that, you can use the platform.

Solving - in the platform, there will be a special and interactive item (a supercomputer), which a group member must access and inform their answer. When submitting, we will inform you if it is correct or not.

3.2 Execution

We split the participants into nine groups with 3 to 4 members. We distributed the groups according to the number of rooms with enigmas. There were four application moments, one for each room with enigmas, as shown in Figure 2. In each room, in addition to the teams, a monitor was present, observing and solving doubts. The monitor was only in the final room (the room where the team should go to report their answer to the enigma). There was no interference in the execution of the activity. The monitor support was only for technical issues that could happen.

Upon unraveling the enigma, all group members should inform the answer, validating their participation. We considered only the group's first response time to determine the team's resolution moment.

	Group	Enigmas
Moment 01	Group 01 Group 02	Murder at school
Moment 02	Group 03 Group 04	Murder of an aristocrat
Moment 03	Group 05 Group 06	Corleone Crime
Moment 04	Group 07 Group 08 Group 09	Murder on the Japanese Ship

Figure 2: Distribution of enigmas by groups.

4 **RESULTS**

From focus group data, we performed the qualitative analysis using some steps of the Grounded Theory coding process (Corbin and Strauss, 2014): open coding (phase 1) and axial coding (phase 2). We carried out both steps using Atlas.TI³ qualitative analysis support tool. In the analysis process, we created codes related to the group's comments (open coding). Then, we grouped the codes according to their properties, forming concepts representing categories and subcategories. These codes were related to each other (axial coding). The open and axial coding phases were sufficient to understand the students' perceptions. We asked for permission to record the discussion.

4.1 Aspects That Promote Immersion on the Gather.town

Immersion is one of the main aspects to consider in understanding if a specific experience in the Metaverse is pleasant for users. In our analysis, the promotion of Immersion in Gather.town is caused by the factors represented in the network provided in Figure 3. Two points are central: User-Platform Interaction and User-User Interaction. Both aspects have their characteristics and sub-characteristics.

User-Platform Interaction refers mainly to how users used the platform's features, as was the relationship and exploration with the virtual environment. The use is directly related to the Platform Characteristics, which encompasses the Design and Setting process, the Environment and Avatars Customization, and the Familiarity of Gather.town with other platforms. Finally, it also refers to the Gameplay dynamics used in our study, which aggregates the tasks users should do on the platform.

User-User Interaction refers to how users interact and communicate on the platform. The interaction and communication occurred mainly due to the dynamics of Proximity Chat and the use of Avatars. These factors led to a process of Socialization and Interactivity between users and provided a compatibility relationship with the Real World. Below, we'll discuss how we arrived at each of these factors using user insights gained through Focus Groups.

4.2 User-User Interaction Aspects

User-User Interaction happened due to two subfactors: the use of avatars and the proximity chat dynamics. We describe these factors in more detail below. **Avatar:** The avatar is a graphical representation of the user's character. It is not a playable character but focuses on how players engage and act as agents in a fictional world (Klevjer, 2022). One of the main features of Gather is the creation of avatars because they trigger some aspects (how the interaction) to provide the users with Immersion. The avatar allows people to move freely in and out of interactive environments. Furthermore, they allow conversations with other participants and explore galleries of digital objects such as videos and sound files.

The participants considered the idea of being represented by an avatar inside the platform positive, as it allows a sense of identity: "... when I was inside it seemed like my doll (avatar) was speaking". In addition, the participants indicated that they preferred using Avatar, showing that an avatar is a good selfrepresentation in Metaverse systems. "If there is an avatar in this Metaverse, I will want it, most people at least, will want to be known by their Avatar and not their video in the real world".

The preference for interaction through the avatar shows a positive aspect of the experience. The participants liked the different sensations that the avatar provided for interaction. First, the awareness of knowing that communication was through avatars made the experience more attractive: "Just thinking that a (sic) little person there who is moving is a person. For me, that makes it really cool" and "Not being other people for a while is good", referring to the fact that s/he feels like s/he is interacting with the avatars and not with other people. In addition, aspects corresponding to reality pleased the participants during the experience: "What I liked most about the interaction was being able to move fast, run fast, find the enigmas and manage to find the other partner quickly to being able to talk about the track".

We noticed other aspects related to Immersion in the participants' reports. For example, the Presence, which refers to the real feeling of being close to people and/or in the same place, even if mediated by some technology (see subsection 2.3), was quite noticed during the experience: "*There was even a funny situation where we, the dolls (avatars), were at a table talking. We debated who the murderer was, and there were people from another team*". Furthermore, another aspect we noted was Flow, which is related to the loss of the notion of being in a Metaverse or something parallel to reality: "I really liked the experience, *because of this feeling of running... I felt a lot. Even my heart raced. It felt like I was really running.*"

Proximity Chat. One of Gather.town's features is the ability for users to communicate with one another while their respective avatars are close to one another

³https://atlasti.com/



Figure 3: Immersion Factors Network.

on the website. The fact that communication is only possible when the avatars are close or in the same "room" within the Gather is a characteristic that refers to reality, to the way communication happens in the "real world." Without avatars, this communication dynamic would be the same as on any other platform.

Participants found the idea of communication "to imitate" reality interesting. As they move further apart, the tone of voice decreases, reflecting what happens in reality. This idea is reinforced in the report of some participants: "I found (interesting) that the chat tried to imitate reality because when we got closer, we talked, and the fact that they moved away also diminished [voice volume]". In addition, communication being similar to reality causes the illusion that the participant is interacting in the real world. This feeling is positive for Metaverse platforms, where often the main goal is really to cause the illusion that the person is in the "real world". Such illusion contributes positively to Immersion in the Metaverse reaching the level of Presence when people feel together to the point of feeling like they are in the real world: "On the platform, you are obliged to get closer to the person to speak, which theoretically gives you the illusion that you are in a real environment".

We noted that the similarity with reality was one of the main characteristics pointed out by the participants for the proximity chat to promote Immersion in their experience: "... for those (people) outside (of the conversation), it works as if you were approaching a group at a table in a public space, and then you stop talking". In the view of the participants, Immersion was understood as this close relationship with what happens in reality: "... I literally invaded the conversation of others. This is very immersive".

As we pointed out in Avatar's analysis, the prox-

imity chat was also a feature in which we noticed important aspects of Immersion. For instance, we identified the Presence in the participants' reports. They felt so close to reality that they felt together in Gather.town, to the point of "forgetting" that they needed to be together to communicate: "About having to be close to talking - we started talking and forgot that we had to be close, then suddenly - "Wow, we have to go back to be able to talk to the person". Analyzing this quotation, the moment when the participants felt so immersed in the Gather.town happened when they reached Presence and Flow, the latter characterized here by the fact that the participant "forgets that he had to be close".

Interestingly, the level of Immersion in this experience occurred as the platform promoted other aspects, such as Presence and Flow. Besides providing features that bring the experience in the Metaverse closer to reality, it is necessary to investigate whether such features manage to involve users to the point that they reach levels of experience that allow achieving the necessary Immersion to make the experience pleasant. Promoting the Presence, Flow, and consequently, Immersion is what makes the feature interesting: "It was really cool, this proximity chat I also found very interesting" and "because there is a component that this tool has that the MMO (Massively Multiplayer Online) do not have, that broke a glass inside my head, the proximity chat".

Therefore, we noted that both the Avatar and the Proximity Chat were features that brought innovation to the platform and allowed participants to reach different levels of Immersion during the experience. We identified the levels of Immersion through the sensation of Presence and Flow at different times. These levels of Immersion are why the experience was perceived as very close to the real world and how people interact outside the Metaverse (see Figure 3). In addition, both features also allowed socialization and interactivity between people within the platform. In the following subsection, we will present aspects of user interaction directly with the Gather.town platform that also enabled the promotion of Immersion.

4.3 User-Platform Interaction Aspects

The platform features established user-Platform Interaction with some of its exclusive features and Gameplay Dynamics that promote Immersion.

Platform Techinical Features. Gather.town have of features for videoconferencing, such as screen sharing, and some differentiated features. The avatars and proximity chat are the resources that provide communication and interaction between users. It also has some exclusive features. For instance, Private Spaces permit a meeting within the main conference to those in the same place. Interactive objects (Embedded Objects) allow video streams, images, and interactive websites to be embedded in any object in the Gather.town space so that users can interact.

The first level of Immersion is Engagement, described as the user's initial interactions with the experience they are participating. Therefore, the platform's characteristics must be pleasant for the user from the beginning of the experience to encourage user engagement. In this sense, the main aspects that caught the participants' attention were the customization of the environment and avatars, the design and setting, and the familiarity with other tools.

One of the factors that characterize the systems for the Metaverse is the ambiance of the spaces. For example, the "murder at school" enigma, which takes place in a school, needed an environment close to the characteristics of a school to make the experience of solving the enigma on the platform more immersive. The ambiance ensured approval from the users: "*I also liked the customization of the space. Ours, for example, was a school and had a meeting room. We would gather in the meeting room and talk: now everyone is going to explore, but let us meet in the meeting room in five minutes*".

In addition to the ambiance, the user must be able to interact and, as is typical of experiences in the Metaverse, represent himself in various ways: "One of the things that I liked the most at first was the customization of the stick figures. It had a lot of cool options. Including, after I found out I had a wheelchair, I had fun with the wheelchair (laughs)". Customization and ambiance can be considered fundamental to provide a high-quality immersive experience: "The fact that it is a customizable, interactive, amazing environment, and the proximity microphone too. That was the turning point for me".

The customization of the environment was a positive factor. However, it does not exclude that a Metaverse platform must be attractive to the user in terms of design from the beginning. The user's first contact with the platform needs to be positive, as this will influence the desire to use it: *"For me it was something that blew my mind when I got there, I was very interested in this platform."*. The freedom of customization of the avatars promoted interest among the participants, thus, a greater engagement to explore.

According to the participants, a metaverse platform needs to provide a balance between simplicity and sophistication. Simplicity is not a negative factor as long as the platform delivers what it proposes with high quality and in a simple way, providing different elements to interact: "*The setting is beautiful, I found the game beautiful like that, even though it's simple*". One participant concluded that the sum of the platform's characteristics was the determining factor for him/her to consider the experience positive: "Anyway, I think it was an exciting experience, even with my reservations, (referring to some points of Immersion break, like the external pop up) it was an exciting experience this simulation of the work environment for us to solve the enigmas there was really cool".

Another key feature identified for Immersion is familiarity with other platforms. Several times, participants pointed out that Gather resembled other games and immersive experience: "I think the interaction I liked the most is because the game is very similar to an RPG, a game that we are already used to".

Gameplay. Gameplay happens during the playergame interaction, and this interaction aims to provide a motivating, entertaining experience for the player. (Nacke et al., 2010). Involves practicality of use, such as commands, controls, and Storytelling. Gameplay is affected by two factors: the features of the platform and the established dynamics. In our study, dynamics refers to Enigmas, which involve the arrangement of clues and the relationship with the environment.

Making good use of the platform's features interferes with the experience and the quality of the enigmas, consequently affecting the Gameplay. For instance, making a good relationship between the proposed enigmas and the elements available on the platform can cause positive experiences in users, as pointed out by a participant in the "Murder at school" enigma: "Ifound it very interesting and when I found tombs. I opened the tomb. In front of the small school, I found the victims. I found it super funny". Using platform elements as an inherent part of storytelling is essential for increasing Immersion, as reported by another participant: textit"At some point, I thought I was going to die (laughs). When I went to test it, I saw some cars. When I started playing, I thought a car would appear and kill me at some point, and the other team would win. I had that feeling all the time".

In addition, since the platform has many different features, some participants created expectations. Using few resources frustrated users, as they expected a much more interactive environment, regardless of the arrangements and tracks. One of the participants pointed out that s/he saw a vast potential in the platform that could be better explored: "I found it a little easy, although I got wrong the enigma. However, I found the enigmas too static. I saw a big potential to make creative enigmas in that platform".

A specific aspect of Gather.town that participants reported was the fact that some interactive features led to an external link. Participants suggested that to be more immersive (i.e., not break Immersion), the platform could embed all the interactive elements within itself. In this sense, the users do not experience a broken experience: "Many things we had to answer could be part of the platform itself instead of opening a pop-up. I think it could have an internal poll within the game itself". Other participants agreed, indicating that the experience would be more immersive.

The aspects presented above of low Immersion level are directly related to how the Gameplay was developed, how the interactions were established, and related to the enigma storytelling. The strategy adopted to encourage using and provide a good experience on the part of the participants is an essential aspect when talking about Metaverse.

In this study, we adopted an enigma-based strategy, which the teams should unravel. Naturally, a crucial factor that occurred during the experience was the competition. The study's purpose was for users to explore the platform. However, the competition was very present, and this caused some negative points. Factors such as the rush to solve the enigma prevented participants from focusing more on the Gather.town experience and better exploring the environment we created: *"What participant so-and-so said, which there was no time to explore, I think because we competed, this rush stuff. Just trying to find the clues did not give me time to focus"*.

The element of competition is closely related to digital games. Considering that the participants in our study were undergraduate computing students, the familiarity with these games is high. Therefore, when faced with the points described above about the break in Immersion caused by the competition, some participants reported several suggestions that would help improve the experience. For instance, they indicate the existence of a moderator who could help with particular parts of the platform, making interaction easier for users in addition to moderation, they indicated using mini-games can help improve Immersion.

We can see that the purpose of using a platform for the Metaverse needs to be very clear. Clarity prevents a reversal of objectives and differentiates what is a conference, a workspace, a game. All these software tend to follow the same path towards Immersion.

5 DISCUSSION

We seek to understand in our research, from the user's perspective, which aspects promote Immersion or how the Immersion aspects could be on the platforms for the Metaverse. Thus, we used Gather.town, which aims to be part of the Metaverse ecosystem, and is currently an up-and-coming tool.

A Metaverse of the type Mirror world, as Gather.Town, has a lot of potential because it somehow depicts the real world as though it were reflecting in a mirror. That is why it is important to consider the Immersion aspects. Through the liveiness and clarity perceived by users, the increase in perceived realism triggers the feeling of being there, representing Presence, which means total Immersion. These aspects increase user satisfaction (Shin, 2019).

In our study, we identified two central factors that collaborate to stimulate Immersion: user-user and user-platform interactions. The first one is mainly characterized by the Gather.town features that provide communication: avatars, and proximity chat. These two factors contribute to socialization and interactivity between participants, in addition to providing a relationship with the real world, which is precisely one of the main characteristics of platforms for the Mirror world type of Metaverse. The avatar was one of the most commented aspects by the participants during the Focus Group, proving to be one of the main aspects of the experience, being preferable to the video. Proximity chat is a consequence of using avatars. Combining the avatar with proximity chat was the main stimulus for the Presence and Flow.

The user-platform interaction is mainly characterized by the Gather.town's features. We highlight the customization, whether of the environment or the avatars, in addition to the platform design and environment. Familiarity with other tools is an essential factor for quick and easy acceptance. The Gameplay dynamic established for the environment's utilization is crucial in producing a positive experience.

Many platforms for online meetings, conferences,

or online classes create static environments for large groups (McClure and Williams, 2021). Platforms like Gather.town stand out for presenting features that provide a more vivid sense of Immersion, promoting a more satisfying experience for users.

This research contributes to understanding the participants' experiences regarding Immersion within a platform for the mirror world-type Metaverse. Additionally, our findings served as a means of disseminating information regarding the use of Gather.town and provided a basis for future studies on various facets of Immersion in Metaverse systems.

6 CONCLUSION AND FUTURE WORK

This paper presents an empirical study to verify factors promoting immersion in the Metaverse. We use the Gather.town as the basis for the immersive experiences promoted to the participants. In our study, participants accessed the Gather.town and experienced its interactive features. After users' immersive interactions on the platform, we conducted a Focus Group session for a deeper discussion about their experiences. We transcribed participants' statements during the focus group and performed a qualitative analysis to identify factors that promote Immersion in platforms designed for the Metaverse.

Our results showed that most participants reported several positive aspects of the Gather.town experience. The sense of Immersion perceived in Gather.town in our study was a direct consequence of a set of factors involving the proximity chat, avatars, and the design and ambiance of the platform. Our study showed that participants felt socially connected while using Gather.town. Interaction features helped participants feel like they were in a real environment.

We hope our results stimulate interest in further research on different Metaverse platforms to investigate more immersion factors. We intend to replicate this study on other platforms similar to the Gather.tow proposal to compare the results obtained and promote further discussions concerning the Metaverse.

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