

# Ubiquitous Computing

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# Ubiquitous Computing

1. **Edge Computing**
2. **Cloudlet**
3. **Fog computing**
4. **Internet of Things (IoT)**
5. **Virtual Conferencing**
6. **Virtual Events (3D, and Hybrid)**

# Ubiquitous computing

- Mark Weiser: Three basic ubiquitous computing devices:
  - Tabs: a wearable device that is approx in centimeters
  - Pads: a hand-held device that is approximately a decimeter in size
  - Boards: an interactive larger display device that is approximately a meter in size
- computing is made to appear anytime and everywhere
- any device, in any location, and in any format

Weiser, Mark. "The computer for the 21st century." *ACM SIGMOBILE mobile computing and communications review* 3.3 (1999): 3-11.

[https://en.wikipedia.org/wiki/Ubiquitous\\_computing](https://en.wikipedia.org/wiki/Ubiquitous_computing)

# Edge computing

- Distributed computing paradigm
- Computation and data storage closer to the user location
- Improve response times and save bandwidth
- Cloud computing operates on big data, whereas Edge computing operates on “instant data”
- Content Delivery Network or Content Distribution Network (CDN) (Refer to Unit 4)
- Akamai CDN (Refer to Unit 4)
- Akamai-Facebook’s Photo-Serving Stack (Refer to Unit 4)

# Cloudlet

- First coined by Mahadev Satyanarayanan (Satya), Victor Bahl, Ramón Cáceres, and Nigel Davie
- It is a mobility-enhanced small-scale cloud datacenter that is located at the edge of the Internet.
- It work as a *data center in a box* which *brings the cloud closer*.
- Support resource-intensive and interactive mobile applications by providing powerful computing resources to mobile devices with lower latency.

# Fog computing

- Architecture that distributes computing, storage, control and networking functions closer to the users along a cloud-to-thing.
- Fog computing is often erroneously called edge computing, but there are key differences.
- Fog works with the cloud, whereas edge is defined by the exclusion of cloud.
- Fog is hierarchical where edge tends to be limited to a small number of layers.
- Cloud computing deal with Big Data, whereas Fog computing deals with real-time data generated by sensors or users.

<sup>1</sup> IEEE Standard Association. "IEEE 1934-2018-IEEE Standard for adoption of OpenFog reference architecture for fog computing." (2018).

[https://en.wikipedia.org/wiki/Fog\\_computing](https://en.wikipedia.org/wiki/Fog_computing)

# Internet of Things (IoT)

- The network of physical objects —“things”— embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the Internet.
- Example:
  - “Smart Home” devices and appliances,
  - “Smart city” equipment and facilities,
- Real-Time Data Analytics
- *Information explosion or Data Deluge*
  - due to *data flood* or *information flood*
  - ever-increasing amount of electronic data exchanged per time unit
  - unmanageable amounts of data growth V/S power of data processing

# Virtual Conferencing

- Teleconference: Phone lines, Landlines or Cellular devices
- Video conference:
  - Webcam, Microphone, Speaker, Internet
  - hardware, software, devices is dedicated for this
- Web Conference: Internet and Cloud supported
  - Web 2.0
  - Well-Known: Google Meet, Skype, and Microsoft Team
  - Multi-Communications from Many sender to Many receivers
  - Webinars ("web seminars"), Webcasts (live media presentation), Podcast (audio presentation), and web meetings
  - **Virtual Events**




# Virtual Events

- An online event involves people interacting in a virtual environment on the web, instead of physical meeting.
- Multi-session online events often feature webinars and webcasts.
- Aim to create similar experience as physical meeting.
- Live-streaming the event online or on-demand video.
- Issues
  - Echo of voice
  - Audio and Videography logistics
  - Network Bandwidth of conferencing server and users

# 2D Virtual Event: Live Streaming

← Leave

**VIRTUAL** HEIDELBERG LAUREATE FORUM  
TRaversing Separation  
SEPTEMBER 21-25 2020

 **Animesh Chaturvedi**  
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Stage/Livestream

My Sessions

Poster Gallery

Exhibition | I AM A.I.

Film | Secrets of the Surface


Exhibition | Remember M...


< Detail >



● Stage

**Dialogue: Hoare/Lamport**

09/21/2020 | 6:30 PM - 7:20 PM  
This session begins in your time zone on 09/21/2020 at 10:00 PM.


 **Tony Hoare**

 **Leslie Lamport**



as my career goal.

**VIRTUAL** HEIDELBERG LAUREATE FORUM  
Scientific Dialogue  
Sir C. Antony R. Hoare  
Leslie Lamport


 Comment...

1000 characters left

Send

2 Comments

chronologically

 Roy Levin

3 minutes ago

ACM recently published a substantial retrospective on Leslie Lamport's career and technical work as "Concurrency: The Works

# 3D Virtual Event: Live Video



# 3D Virtual Event:



# 3D Virtual Event: Poster Sessions

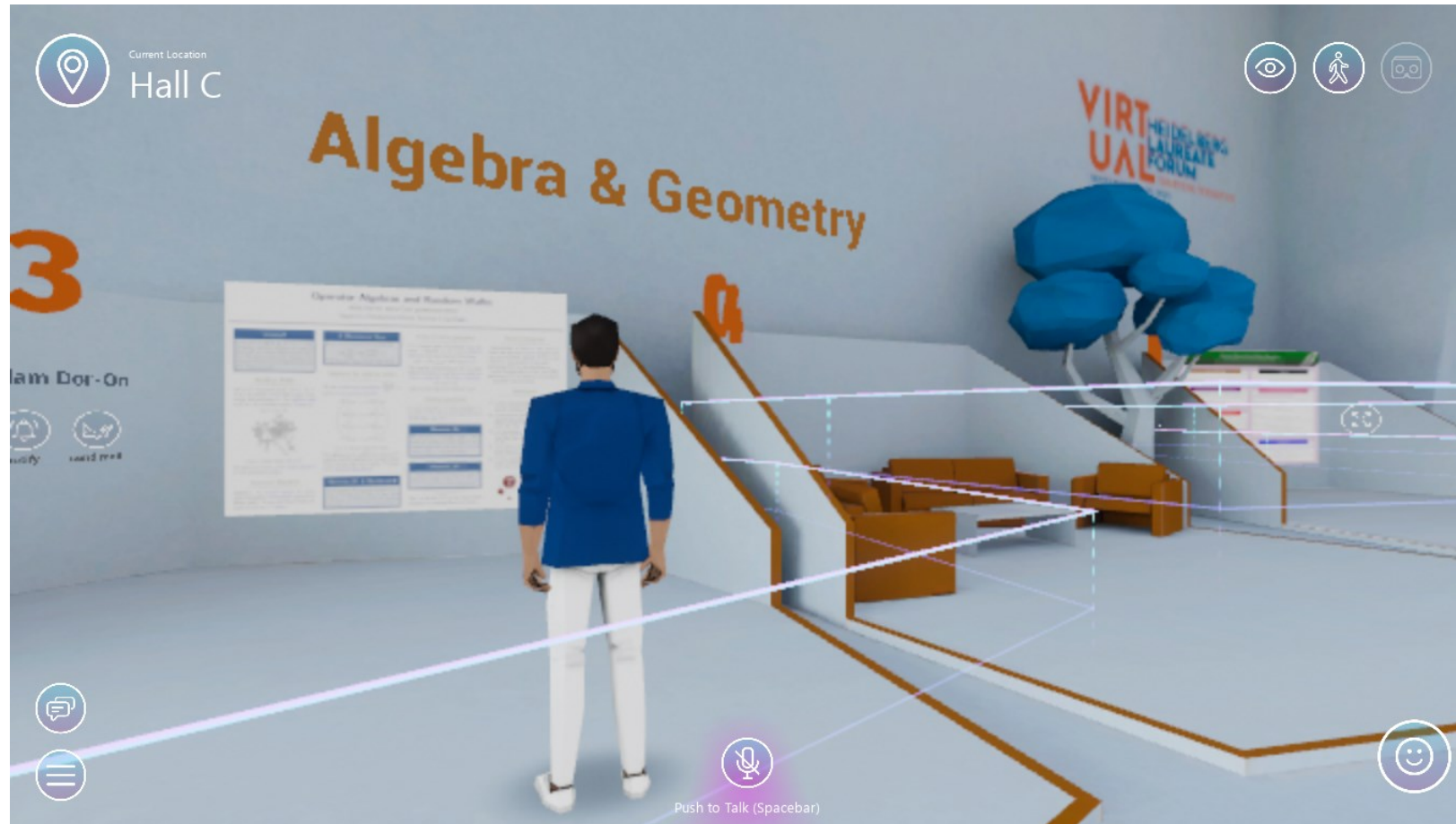




# 3D Virtual Event: Poster Sessions



# 3D Virtual Event: Poster Sessions



# 3D Virtual Event: Poster Sessions





# 3D Virtual Event: Virtual Gathering



# 3D Virtual Event: Recreations



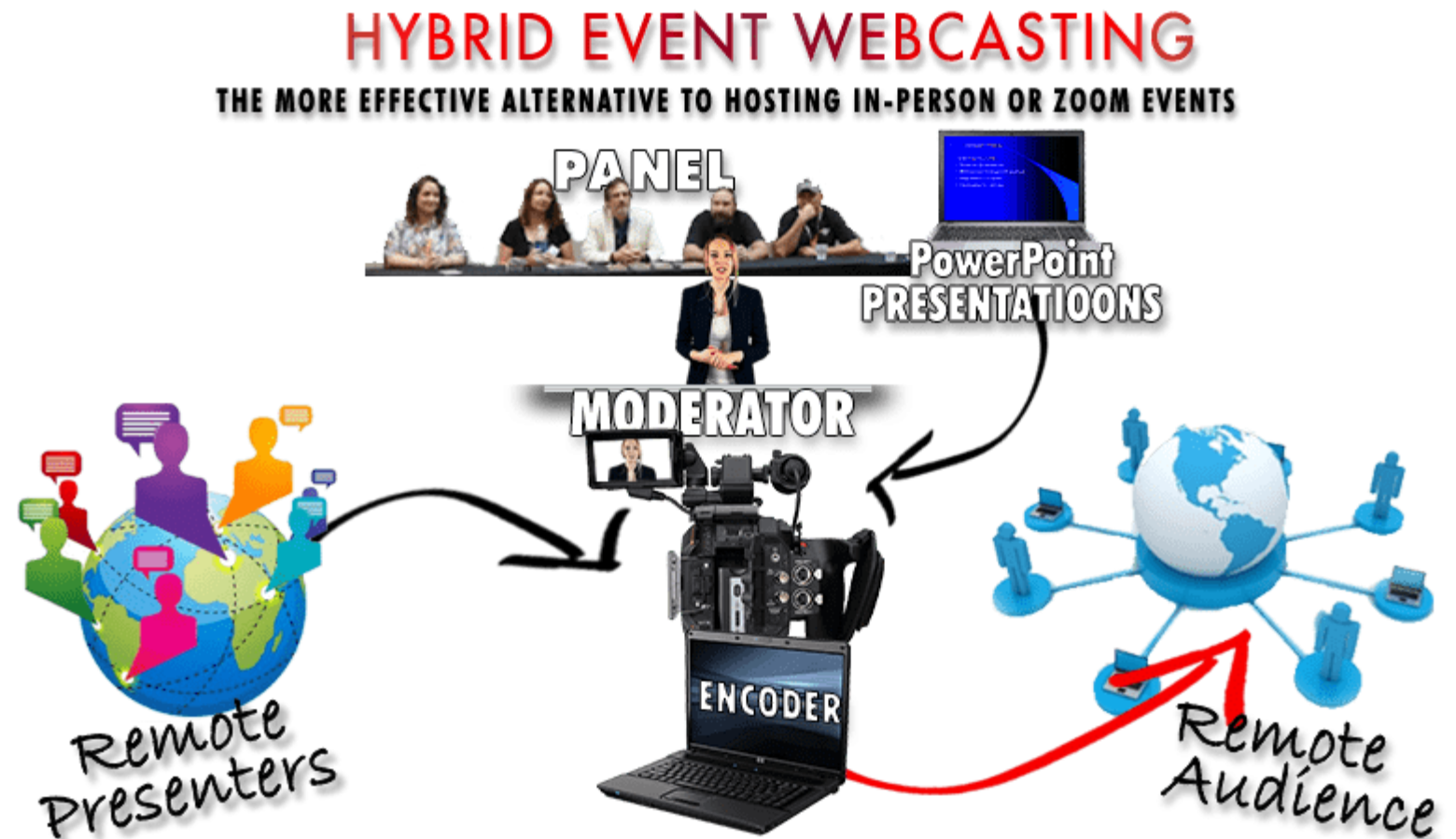
# 3D Virtual Event: Virtual Dancing





# Hybrid Event

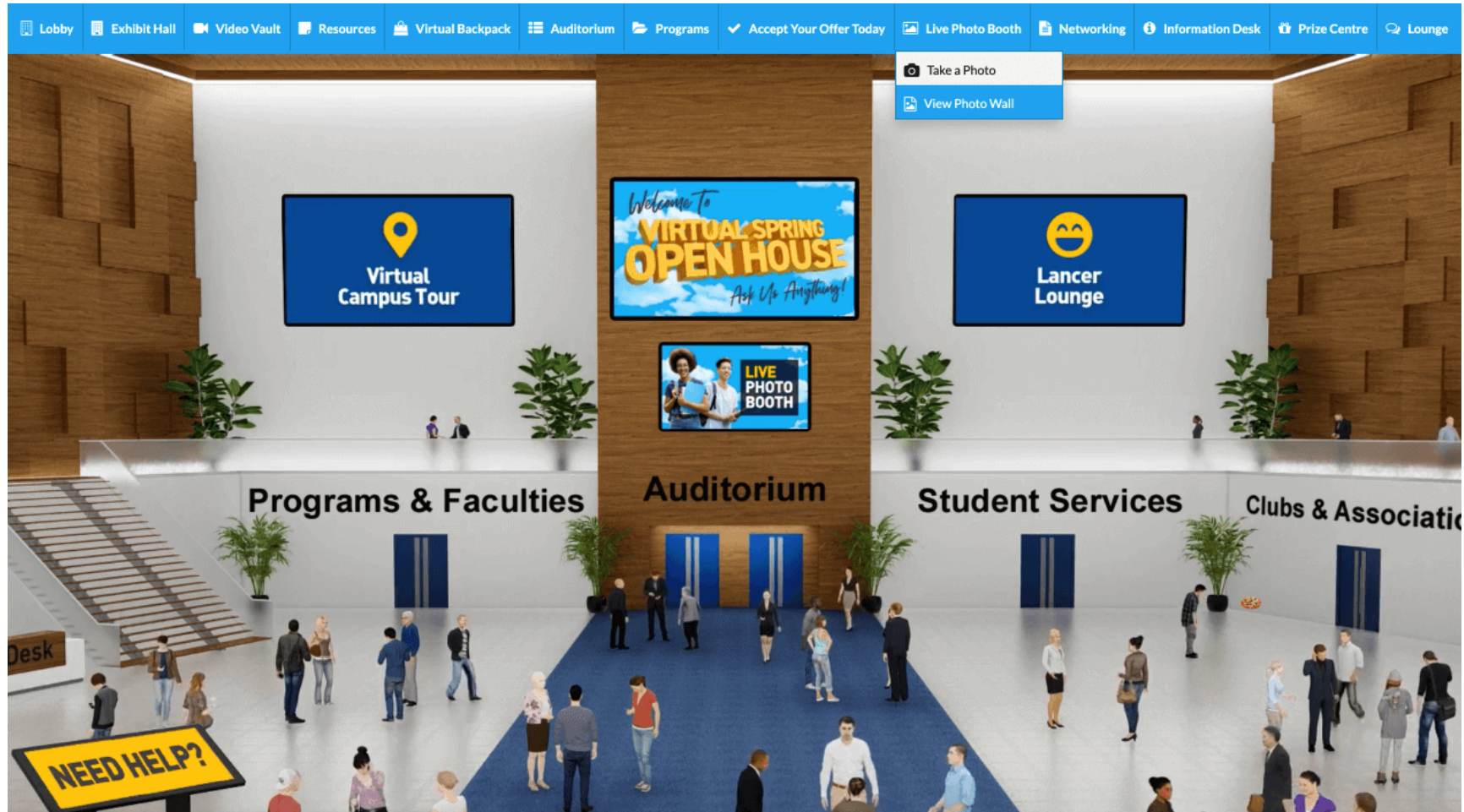
- Combines a “physical” in-person event with a "virtual" online component
- Tradeshow, Conference, Seminar, Workshop, Convocation



# Hybrid Event: Landing Page

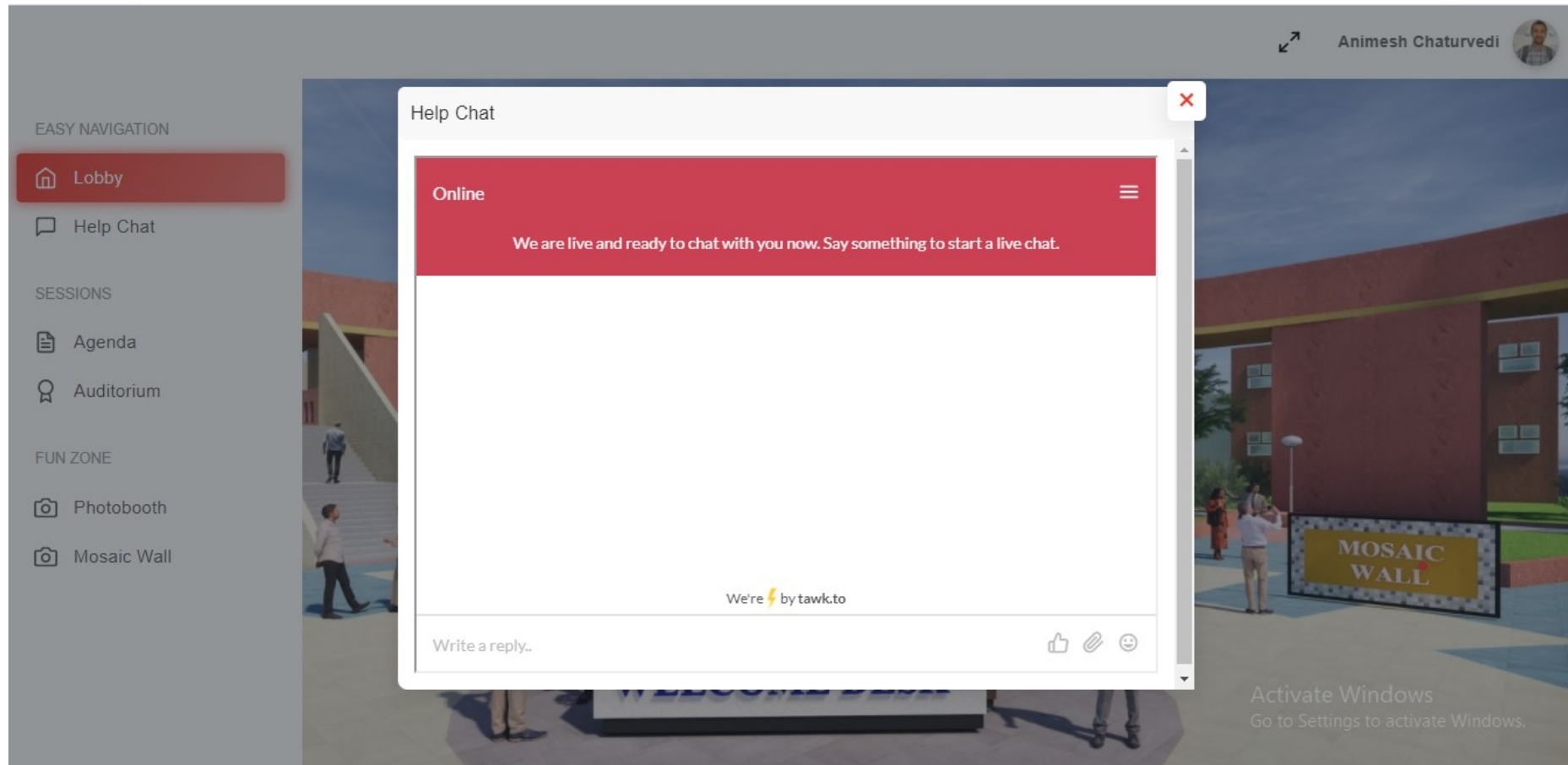


# Hybrid Event: Landing Page





# Hybrid Event: Help Chat FrontEnd



# Hybrid Event: Help Chat BackEnd

The screenshot displays a web-based chat interface for a hybrid event. The interface is divided into three main sections: a left sidebar, a central chat area, and a right sidebar.

**Left Sidebar:** Contains navigation icons for home, settings, user profile, and search. Below these are sections for "Groups" and "Direct Messages", each with a search icon. A list of chat thumbnails is visible at the bottom.

**Central Chat Area:** Shows a chat history for a contact with the ID V1605950166179364. The messages are as follows:

- hi (16:25)
- hello (16:25)
- hi (16:25)
- Amazing work (16:25)
- Bye! (16:25)
- Visitor closed the popout window (16:25)
- thanks 🙏 (16:25)
- Visitor left (16:27)

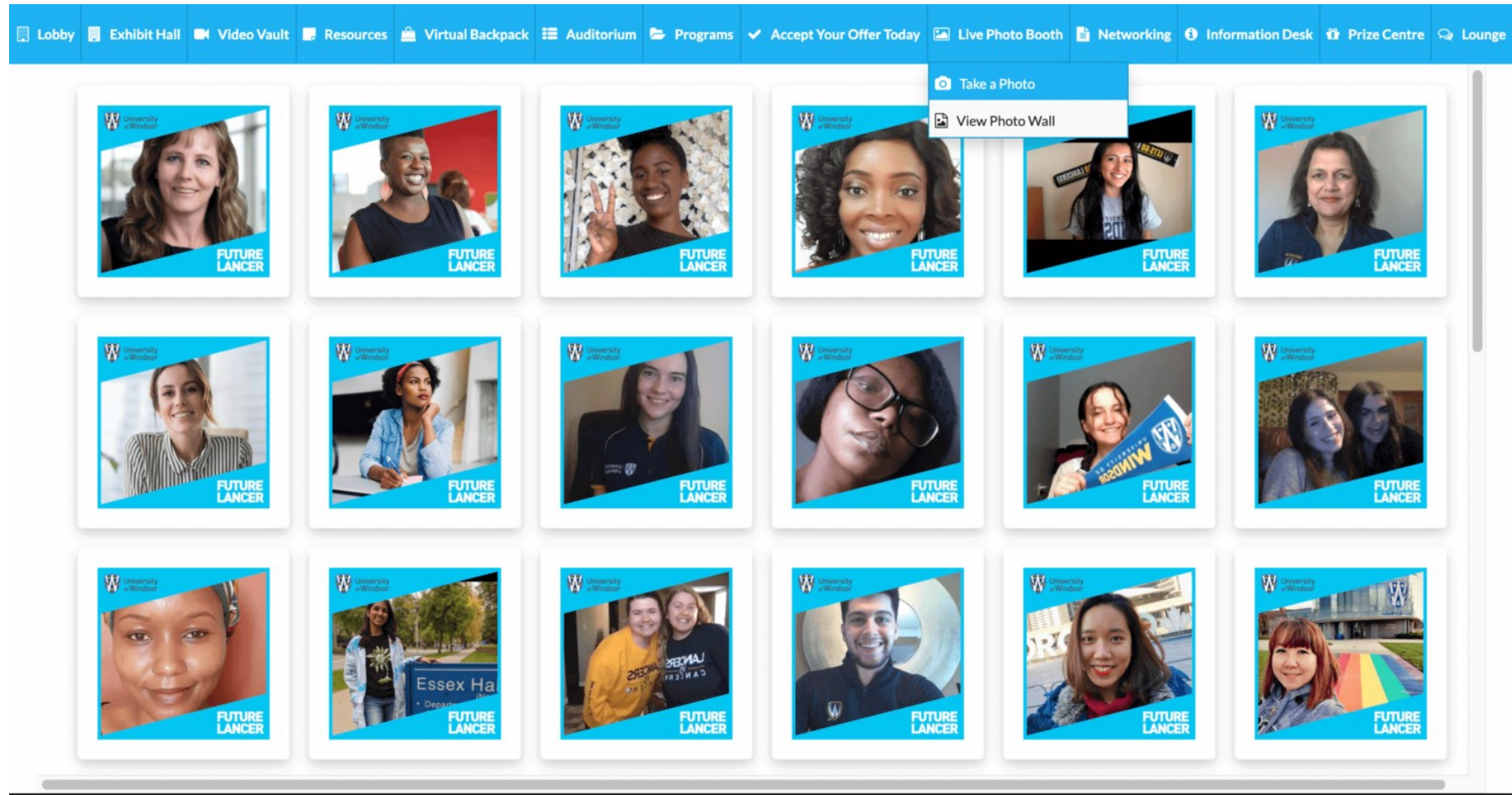
**Right Sidebar:** Displays user information for V1605950166179364, including a "Visitor Email" field and a location "Balotra, India" with a timestamp "4:27 PM". Below this is a summary bar showing "00:02:24 57m 1 chats". A list of chat events is shown at the bottom:

- 16:27 Chat ended
- 16:25 Visitor closed the popout window
- 16:25 Chat started

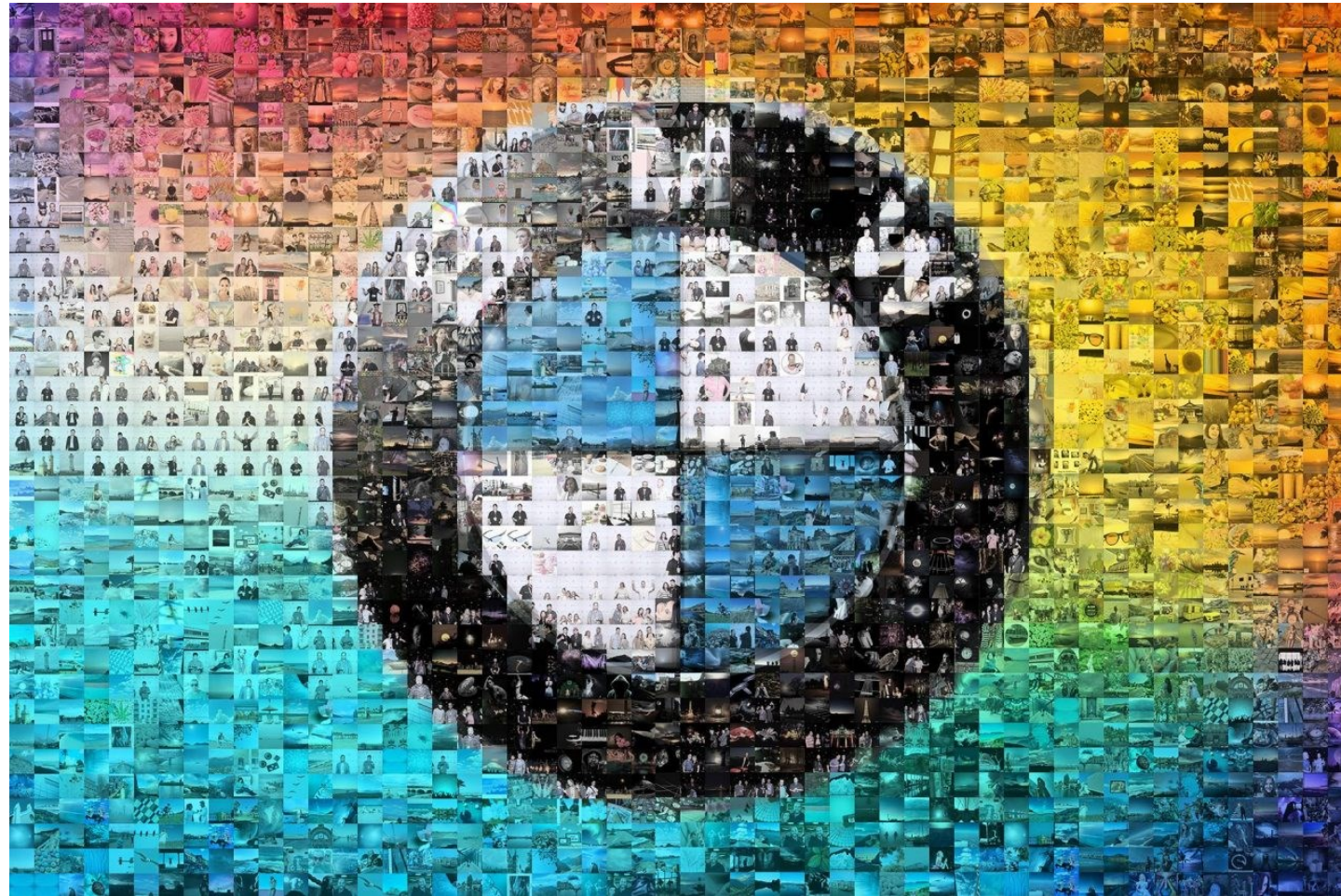
The interface includes a top navigation bar with a search icon, a notification bell with a red "4" badge, and a "Active Chats" button. The bottom of the chat area has tabs for "Message" and "Whisper".



# Hybrid Event: PhotoBooth



# Hybrid Event: Mosaic Wall



<https://www.youtube.com/watch?v=BSwJCRKvmPc>



# Hybrid Event: Blowing Flower Effect



# Hybrid Event: Virtual Address





# Hybrid Event: Remote Connectivity



# References

- Weiser, Mark. "The computer for the 21st century." *ACM SIGMOBILE mobile computing and communications review* 3.3 (1999): 3-11.
- [https://en.wikipedia.org/wiki/Ubiquitous\\_computing](https://en.wikipedia.org/wiki/Ubiquitous_computing)
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- <https://en.wikipedia.org/wiki/Cloudlet>
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- [https://en.wikipedia.org/wiki/Fog\\_computing](https://en.wikipedia.org/wiki/Fog_computing)
- [https://en.wikipedia.org/wiki/Virtual\\_event](https://en.wikipedia.org/wiki/Virtual_event)
- [Virtual HLF 2020 - Heidelberg Laureate Forum](#)
- [https://en.wikipedia.org/wiki/Hybrid\\_event](https://en.wikipedia.org/wiki/Hybrid_event)

תודה רבה

Hebrew

Ευχαριστώ

Greek

Спасибо

Russian

Danke

German

Merci

French

धन्यवादः

Sanskrit

நன்றி

Tamil

شكراً

Arabic

ಧನ್ಯವಾದಗಳು

Kannada

Thank You

English

നന്നി

Malayalam

Grazie

Italian

ధన్యవాదాలు

Telugu

આભાર

Gujarati

多謝

Traditional Chinese

Gracias

Spanish

ਧੰਨਵਾਦ

Punjabi

धन्यवाद

Hindi & Marathi

多谢

Simplified Chinese

<https://sites.google.com/site/animeshchaturvedi07>

Obrigado

Portuguese

ありがとうございました

Japanese

ขอบคุณ

Thai

감사합니다

Korean