VC Feedback Design: Capturing User Experience to tackle on-chip challenges.

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Abstract

In an era, where digitalization is growing rapidly, virtual channels have successfully bridged a gap between the information and accessibility. Virtual conference enables the user to collaborate in a cross time zone environment, increasing flexibility and reliability for organizations. However, with every usage there comes a conflict between expectations of the user and experience they encounter. The virtual feedback by the current AI system is pre-programmed for the challenges, logic, algorithms and satisfaction which in return shows a hindrance for the real time problems faced. The system proposed here is going to give the users a direct voice for the friction they face in a VC. With VC service feedback, we can make impactful product experiences and fulfill user needs in a conference. The 360° view helps us understand what the users ask for, what they want and what they do to be productive.

Keywords: User-centric design, virtual channels, real-time feedback, closed loop control system, live user experiences, SQL Database, Power BI Dashboard, API Connectors, Cisco Collaboration.

I. INTRODUCTION

The rapid shift to virtual connection globally has laid the foundation for key elements. Whether it is about communication, collaboration or even the workplace, they are finding their ways in a virtual environment. This has brought convenience - eliminating travel costs, connecting people across countries, allowing people to connect even during global issues such as pandemic or wars. The tools such as Microsoft Teams, Google meet, Zoom, etc. facilitates the people to connect via API connectors. This revolution has helped a lot of remote and hybrid employees to smoothly work in a virtual environment.

Beside being a strong helping hand in a virtual channel for any user, they frequently encounter challenges such as -

- Congestion in communication - Too much traffic in a server results in distorted audio.
- Latency hurdles - The movement of data from one chip to another takes longer duration.
- Starvation in Virtual Channel - Few of the data streams get delayed or blocked.
- Problem in Load Balancing - Few parts of chip are overloaded while rest are idle.

II. PROBLEM STATEMENT

As they say there are two sides of any coin, the same concept follows here. Though the transition in the digital era is very accessible, smooth and flexible, it also contains certain drawbacks for the users. The users may face a lot of difficulties such as- technical errors, distorted audio, connectivity issues, unclear video, interface frustration or maybe even some basic problems. This can be resolved if we get some feedback on virtual conferences happening on a regular basis. Besides AI being a prominent solution to a lot of problems

we face in our day to day life, it misses out the real time, and specific issues faced by a user. It works on generative patterns and sentiments based on limited programmed data, while the actual issue maybe highly situational and subjective, it still analyses and provides the same output data it has in its feed.

A. *VC User Feedback Service*

To tackle the real-time issue faced by the users, we have generated a VC user feedback service. It is qualitative and quantitative data from Users on their likes, dislikes, impressions, and requests about the Video conferencing service.

Collecting and making sense of this feedback is critical for the UC - Engineering team that wishes to make improvements based on what our users need. So rather than making assumptions and trying this or that until we encounter the real problem at hand, we are simplifying the procedure and asking the users directly about their perceptions - how is the experience of the UC service and what are the improvements we can implement for the growth and feasibility.

B. *Why do we need user feedback?*

VC service feedback from the users as well as the internal team is crucial because with the right feedback of any obstacle encountered, we can implement a specific cure. One can make impactful, data-informed decisions about what to build next and how to improve our user's need & product experience.

Building feedback analytics helps us understand the complete view of the user's. This will answer our doubts on what they ask, what they want and what they do, to be productive.

III. LITERATURE REVIEW

The literature for this paper was reviewed to explain the opportunities & challenges faced during every VC experience. Most meetings rely upon automated AI generated quality assessment. This system mostly ignores the real world issues such as hardware malfunction, complexity in user interface.

Research performed previously emphasizes the importance of contextual &real time feedback over delayed and generic reports. Dashboard, which specifically uses tools like PBI have a proven track record for effective statistical representation of user data. Though different organizations promote user surveys or technical review, few combine these and make a unified design for the same. THis gap is bridged by the proposed architecture, which introduces a well defined questionnaire for a consolidated result via SQL database monitoring.

IV. SYSTEM ARCHITECTURE

A. *User- centric Feedback Collection Framework*

The core aspect to be considered here is- How is the service going to work? The source for the VC User Feedback system in Company A is stated below:

At Company A Unified Communications offering is diverse at this point of time.

• Sip Rooms - Session Initiation Protocol are a type of conference room for a virtual background which uses SIP based communication that has high quality audio and video. This is suitable for a variety of platforms such as Cisco Webex, Zoom, Teams etc. Being so diverse in their nature they are appropriate for multiple users in large meeting spaces.

• Teams Clients & Rooms - Microsoft teams client deals with the software application on user system(mac, mobile, windows) to navigate the chats, conferences, collaboration. This makes a passage for the remote and hybrid users. These rooms are dedicated physical area with one touch join experience with certified hardware in the Teams setup.

The client layer is disbursed across different hardware platform, to elaborate further, services are deployed on:

Conference room Cisco Video Conferencing system

• Zoom meetings

• Teams meetings

• PSTN Services

• P2P Service (Limited between Cisco VC systems)

Users Machine(Mac/Windows/Mobile)

• Teams meetings

• Zoom meetings

• PSTN services

• P2P calling from Teams client

• Zoom client- Meetings only

Meta data of the deployed Infrastructure & its related information:

• A Feedback collection Macro code file

• Linux VM Hostname

• Py Flask Server code

• My SQL DB infra

• Power BI Dashboard with PBI Gateway

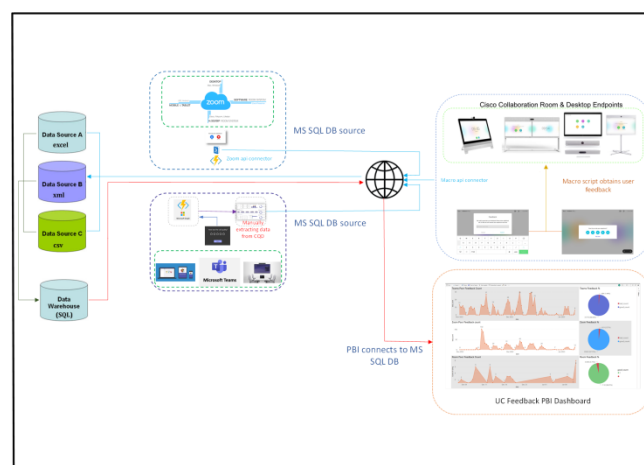*B. Layout of the Feedback system*

Fig.1 Prototype of the VC Feedback System

The model represented above (Fig.1) presents an internal architecture of a Network-on-chip (NoC) inside a modern GPU, particularly focusing on virtual channels for conference management.

Conferences occurring in Company A via different channels like zoom, google meet, Microsoft teams etc. are monitored via specialised systems. Just after completion of the ongoing virtual conference a pop up emerges for the feedback related to the feasibility or convenience of the meet. This feedback includes every type of problem encountered during a meeting and issues faced before joining the same. This data is then transferred to a secure server internally which distinguishes files based on their types like xml, excel or csv, which is converted into programmed source data for the server. This data is then transferred to a PBI which connects the feedback data to MS SQL Database.(The data warehouse). This database stores each feedback from the users for future comparison which answer the three questions for Company A - What was the issue faced, Why did this happen, and How are we going to rectify this issue for better performance of the virtual channels. The UC Feedback PBI Dashboard stores and represents the data via graphs for a better understanding for a period of time.

C.   Workflow of API generated Feedback service.

• Data Sources collection- The structured data from different sources (Excel, XML, CSV, etc.) Everything is integrated into a centralized storage – SQL Database.

• Virtual Conference Platforms- Teams include manual data extraction from Call Quality dashboard and API based Integration, Zoom API Connector is used for Zoom connectivity.

• Cisco Devices- A pop-up interface prompt for feedback is utilized which gathers the user feedback via macro script on the ongoing system.

• Feedback Storage for Utility- All source data is forced onto the MS SQL Database which acts as the core repository- Meeting Logins, User Feedback as well as Technical metrics.

• Visualization and Insights- PBI connected to the MS SQL Database draws all the structured and cleaned data for visual representation- feedback trends across platforms, charts are used for live data storage.

• Final Outcome- The UC Feedback PBI Dashboard makes use of source data and provides a system generated analytical review to detect trends and recurring issues. Also, it identifies which system or time is making hurdles.
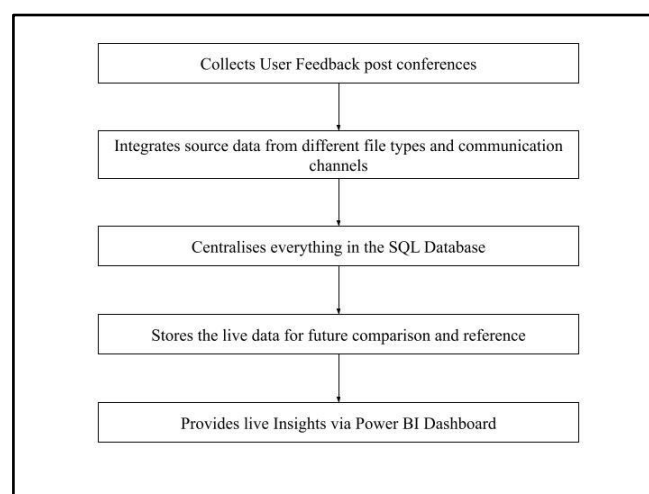

Fig.2 Flowchart of the VC Feedback Service

The goal for designing this system was to encourage users for a positive approach and honest review. This framework allows the users to rate quality, express concerns or tag specific difficulties without disrupting the session. This service argues on providing the users a proper platform for their unnoticed or unresolved issues to be rectified by the organisation.

Based on the complexity of our service offering described in source of user feedback section, we are simplifying the data collection based on these four questions:

1. What do our users think of X product or Y feature? And why?

2. What requests or issues keep surfacing repeatedly?

3. How can we address them?

4. Where do we have gaps in our product/ service offerings?

The UC Feedback PBI Dashboard is required for spotting the recurring errors, enhances user experience, tracks deterioration or improvements, targets the problematic systems etc.

V. RESULT

Performance Dashboards such as Power BI can be utilized to improve the execution of any plan in an organization. Here, this database is used for storing the variety of ratings, feedback, reviews, queries, doubts, etc. in any type of virtual connectivity. This framework allows Company A to work accordingly on their system, setup, rooms and technical areas as per the requirement and possibility in the environment. This improves the future use of different virtual tools, eradicating recurring issues faced by multiple users during ongoing mandatory conferences. This will allow the system to smoothly conduct and create a virtual environment for businesses as well as cater academic meetups. As a result it will improve organization growth and institutional development as a whole.

Fig. 3a & b : Graphical Representation of the Poor Feedback Count over a specific period by the users.

The graph presented above (Fig. 3) tracks the number of poor feedbacks from the different VC rooms in Company A as a source data for SIP based VC systems on a regular basis. The graph is a statistical representation of the performances of struggles encountered during a Video Conference. The x-axis

represents the date or the time duration and the y-axis represents the Poor Feedback count covering a defined period of time. The exponentially downward graph indicates the improvement, fewer user responses, and poor ratings on a monthly basis.

The pie chart illustrated above shows the overall quality rating of the VC rooms. The green area explains that most of the feedback is positive but there are certain zones which require improvement and attention of the company.

Date	Name	IP	Rating	Comments	SIP ROOM Search
2025-02-27	Room 8	10.21.25.37	Satisfactory	Allgood	
2024-09-22	Room 17	10.4.170.17	Unacceptable	Audio echo issue reported by fellow parti	ROOM SELECTOR
2025-01-09	Room 5	10.20.228.56	Unacceptable	Audio not working	ROOM 1
2024-08-26	Room 6	172.17.136.236	Poor	Audio was choppy	ROOM 2
2024-11-11	Room 12	10.21.102.50	Unacceptable	Awful sound breaking up	ROOM 3
2024-09-24	Room 10	10.112.89	Unacceptable	Bad	ROOM 4
2025-01-08	Room 19	172.16.136.119	Unacceptable	Bad	ROOM 5
2025-02-05	Room 17	10.12.71.131	Unacceptable	Bad	ROOM 6
2024-10-08	Room 23	10.2.230.11	Unacceptable	Bad audio feedback loop	ROOM 7
2025-01-21	Room 25	10.112.105	Unacceptable	Broken	ROOM 8
2025-03-06	Room 3	10.118.39	Unacceptable	Brpken	ROOM 9
2025-01-03	Room 2	10.112.116	Unacceptable	Cannot admit people	ROOM 10

Fig.4 VC Feedback Ratings of Specific room selector

This dashboard defines the user feedback in a precise tabulated format. It also combines a CSAT quantitative analysis with a qualitative comments.The details in this repository explain the entry date of the feedback, room no, I.P address of the specific systems, rating(satisfactory/ poor/ unacceptable), comments on the virtual conferences - whether it was good or bad and the variety of hurdles they had to encounter during the virtual meetup - such as bad audio or distorted audio. To get an instant review of any room we have incorporated a SIP room search bar which helps us get a proper result & review of any specific room for a fixed duration of time.

This repository helps us identify which room needs severe improvement on an urgent basis, which server or system is causing a technical error during the call. Eventually this would enhance future performance of the virtual conferences which covers a large portion of our professional connectivity.

VI. CONCLUSION

Indeed Virtual Communication has enhanced as well as made our lives more comfortable. From Google meet to Microsoft Teams, each one of the professional communication platforms help the user to mould their professional / academic environment seamlessly. AI based feedback systems are time saving as it encourages faster response but it falls short when problems are more specific and real-time. This research represents a more dynamic approach to this issue catering a versatile architecture. The data effectively connects different platforms, consolidates user feedback into a centralised SQL data warehouse and visualises area through PBI Dashboard.

This setup not only spotlights the key problem but also provides the internal team to make data driven decisions to enhance system performance and also user satisfaction. Focusing on the live user issues rather than the generic. AI predictions, helps the organisation to improve reliability on virtual communication.

In future, this blueprint can be further expanded via integrating NLP(Natural Language Processing) to explore open source feedback, incorporating predictive analytics, user sentiment analysis for tracking potential service disruption. This feedback can also be enhanced via real-time alerts & automated resolution. Ultimately, this process builds strong substructure for User- centric VC Ecosystem.

REFERENCES

1. VajirasakVanijja and BudsakolSupadetvivat, "An Online Virtual Classroom Using SIP," Lecture Notes in Electrical Engineering, vol. 157, pp. 387–393, Jan. 2012, doi: https://doi.org/10.1007/978-3-642-28798-5_52.

2. M. Chen, "Design of a virtual auditorium," Oct. 2001, doi: https://doi.org/10.1145/500141.500147.

3. Y. Kanada, "Multi-context voice communication in a SIP/SIMPLE-based shared virtual sound room with early reflections," Jun. 2005, doi: https://doi.org/10.1145/1065983.1065996.

4. "Virtual Auditorium - TU Berlin," Tu.berlin, 2025.https://www.tu.berlin/en/ztg/research/projects/current-projects/virtual-auditorium.