

Introduction

Welcome to the final Vconnect Newsletter. The project is now coming to the end and we are seeing some of the most exciting outputs of the project, setting in place the lasting impacts and legacy of the Vconnect project. In a first of its kind, Vconnect supported a theatre production of Shakespeare's *The Tempest* in September of this year with actors situated at two different locations, acting a single performance together, with local and remote audiences being able to experience the immersive play. Outside of the realm of artistic performance, Portugal Telecom rolled out a prototype implementation of a Vconnect video conferencing system embedded within their educational social network SAPO Campus. Large groups of users are being offered the opportunity to use Vconnect's video conferencing technology capable of supporting many users simultaneously. Vconnect is also making its presence felt in the dissemination of its valuable knowledge and expertise into the wider community. Collaboration with performance groups like CultureHub and Miracle theatre is spreading Vconnect ideas through the wider creative economy, whilst work in standards communities like ITU is cementing an enduring legacy.

A new kind of theatre

The Tempest – a world first

After a huge collaborative effort between artists, technicians, developers and researchers, on September 9th 2014, Vconnect achieved a world first.

An innovative performance in Cornwall of Shakespeare's 400-year-old play "The Tempest" explored how Vconnect technology can change the way we experience theatre and it is, we believe, a world first.



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Actors from Cornwall-based Miracle Theatre Company performed the play at two different locations to two audiences linked together using an advanced video system powered by superfast broadband.

Unmanned cameras at each location captured the performance and streamed it live over the superfast connection to screens at the other location and to audiences at home, watching on the Internet. It is believed to be the first time in the world that a production performed at two locations in this way has been transmitted over the Internet to people at home.

The performance took place at the Discovery Quay in Falmouth with six actors acting their roles at the Maritime Museum whilst another two performed at the nearby Doghouse, the headquarters of creative production studio, Dogbite.

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Marian Ursu, Professor of interactive media and scientific director of the Vconnect project, said: "Fast broadband connections are enabling new forms of theatrical experience. In this production we are using automatically controlled cameras to link a single play, acted between two locations, each with its own audience and to simultaneously transmit it to an online audience. It's a world first and it is great to be doing it in the context of one of Shakespeare's finest plays."

Miracle Theatre Company has been bringing 'big shows' to little venues in the South West and beyond for more than 35 years.

Bill Scott, founder and artistic director of Vconnect partner, Miracle Theatre Company, said: "This year, Miracle celebrates 35 years of touring into the heart of communities who often have little or no access to quality theatre - it's at the core of what we do. This project offered us a fantastic opportunity to stretch our creative brains and do something completely different with our production of *The Tempest*. Using the latest digital technology, we were able to re-create our island world in two different places. I am particularly proud of the cast, this project challenged so many aspects of how they traditionally perform, having to interact with each other both on the stage and on screen. We hope everything we have learned will not only feed into the successful development of Vconnect, but also Miracle's future. In the long run, we hope experiments like this will enable us to reach people in more places, and in completely different ways!"

Superfast Cornwall, a partnership between the EU, Cornwall Council and BT, supported the experiment with funding from Superfast Cornwall Labs, an initiative set up to push the boundaries of what is possible using superfast broadband and the benefits it can offer to Cornwall and Isles of Scilly.

Ranulf Scarbrough, Superfast Cornwall programme director for BT, said: "Shakespeare was a true trailblazer in his day, but probably even he would not have imagined how around 400 years later we'd be using technology like this to enable audiences to enjoy his work in this way. It is another great example of the huge opportunities for innovation offered by high-speed fibre broadband."



Collaboration with CultureHub

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Also in the remote performance space, Vconnect initiated a collaboration with CultureHub, an incubator for creativity situated at the intersection between art and technology. CultureHub connects artists from diverse disciplines and cultures and provides them with environments in which to collaborate, experiment and explore. Andrew Webb (PhD student from the Interface Ecology Lab at Texas A&M University) was granted a summer internship at Vconnect partner, CWI. During the internship Andrew interviewed, facilitated by CultureHub, performing artists, to gain a better understanding the perceived advantages and challenges of distributed performances.

Connecting across the world – Vconnect trials scale up

Service Aware Network Tests and Trials

In our last newsletter we described our work about building a Service Aware Network, our proposed solution to the challenge of supporting communication across the Internet between ad-hoc groups based on optimising the traffic across the network. The service aware network is able to dynamically build a network of linked nodes with different functionalities that effectively mediate group based video communications. The emergence of recent trends such as cloud based computing and network function virtualisation has given us the options to instantiate network functionality at a distance. Our work in this area is demonstrating how such trends can allow the intelligent dynamic setup of network topologies that support group based video communications.

In order to test whether audio routing functionality could be instantiated using cloud based computing infrastructure, a proof of principle was carried out using 6 endpoints located across Europe and linked using multipoint control units (MCU) instantiated on a cloud computing platform at locations determined by assessing network delay measured between the end points on establishing the call.



We have also achieved the first deployment of video routers on a commercial cloud based computing platforms (Amazon's EC2 platform). This is a significant milestone towards the practical implementation of the Service-Aware Network. By implementing RTCP monitoring and firewall traversal within the prototype Vconnect platform components, it was possible to set up a distributed network of Video Routers in data centres across the globe. These Video Routers acted as interconnected relays for video streams in a group chat session, and the whole system was configured to automatically maintain a high Quality of Experience (in this case by maintaining a low delay) while reducing the transmission cost (by splitting the streams out to each client as close to the destination as possible).

Large scale SAPO campus trials in full swing

An important aspect of the Vconnect vision has been the adoption of high quality video conferencing as a medium for mass communication within communities, realised by the integration of Vconnect technology into social networking services.

Feedback gathered from controlled lab experiments in November 2013 enforced the validity of the approach of embedding Vconnect functionality within social networks. Users complained about the separation between the videoconferencing and the rest of the social network functionality i.e. they demonstrated a wish to be able to use the video-chat functionality while carrying out their normal

social network activities and demonstrated an interest in a tighter integration between SAPO Campus groups and video-conferencing.



Our latest trial is based on an improved design that we think meets these requirements and will enable a large sample (100+) of regular users of SAPO Campus to use the platform for a period of over a month. Our ultimate goal is to evaluate the influence of seamless integration of social network features and videoconferencing functionality on the user experience of video communication. The guiding principle is that in this field trial people will use the system as they would in a real setting and we will let them explore conditions and parameters of the system as they please as much as possible within reasonable limits. This experiment will be a proper field trial in which participants will use the system as they would in a real scenario with a sufficiently representative sample.

Orchestration – Showing the Users what they Really Need

The SAPO Campus trials are also enabling us to showcase some exciting new technological developments. Enabling video communication for large groups is not merely a problem of networks and integration. As the number of people in a video communication session increases, traditional models of screen layout and audio video transmission no longer work. For example, it is practically impossible to show 100 people on a monitor all at the same time, especially on smaller mobile devices. This is where orchestration technology comes in. The Vconnect architecture includes a component called the Orchestration Engine that can be regarded as an automatic decision making process, controlling the visual presentation of video streams on the screens of the individual participants of the group videoconference.

The project reported recently on its work on screen layouts in the View Mode Experiments (see [Vconnect Newsletter October 2013](#)). This evaluation suggested that different view modes could support different types or contexts of interactions, for example, a tiled screen layout might be better suited to fast turn taking and maintaining a group cohesion

The user centred work described above fed into a new technical design for the engine which enabled the automatic control, not only of the layout of the videoconference interface, but also of which people receive which video streams (using layout templates). The input into this decision making module is what is known as the conversational context. Audio cue information is 'lifted' from basic cues to be interpreted as different conversational events – e.g. a turn, cross talk, simultaneous start and silence. This information is then used to calculate a conversational context e.g. heated discussion or monologue. With this information the engine can then decide which layout might work best, e.g. a single full screen of the person concerned during a monologue or a story being told.

It also needs to deal the fact that the number of participants in a session can become much larger than the number of windows, of meaningful size, that can fit on a screen. For this reason it is equipped with logic that chooses the most meaningful participants to display at any point. This logic tries to comply with two requirements: (i) capturing activity and (ii) providing overall awareness. To that end, the Orchestration Engine, selects for display the participants that have been most active, based on the conversation metrics, while at the same time tries to ensure that everyone will be displayed for a decent amount of time. We are excited to discover in the Socialization Trials how an extended user base perceives this new functionality.

Dissemination

Vconnect contributes to ITU



Vconnect has contributed to the ITU (International Telecommunication Union) as part of its standardization strategy. The inputs, based on the knowledge acquired from experiments, have been directed to the relevant ITU-T Study Group 12 (Question 10/12) on "Conferencing and telemeeting assessment". During the duration of the project, Vconnect participated in three ITU meetings, provided a number of input documents, and is collaborating in the writing of an output document (P.DTM: "Effect of delays on the telemeeting quality"). Vconnect collaborators (Marwin Schmitt and

Pablo Cesar from CWI, Peter Hughes from BT) have been key in the new standardization activities about QoE carried out by ITU. .

IEEE STCSN E-Letter featuring Vconnect published

In June, the IEEE Special Technical Community on Social Networking published its quarterly E-Letter, and this edition was dedicated entirely to the Vconnect project, featuring 5 articles from project partners. It is available publicly online (<http://stcsn.ieee.net/e-letter/stcsn-e-letter-vol-2-no-2>) and can also be downloaded in PDF format. Rene Kaiser (ed.), "Integrating Social Media with Video Communication", IEEE Computer Society Special Technical Community on Social Networking E-Letter, vol. 2, no. 2, June 2014.



CWI 2014 Lecture day on Socially-Aware Multimedia

CWI organized its 2014 lecture day about "Socially-Aware Multimedia". The lectures celebrated the areas of multimedia systems, human-computer interaction, and hypermedia. Eight internationally recognized speakers, including Marian Ursu, Andries van Dam and Loretta Anania,



highlighted past achievements and reflected on future possibilities for new research challenges. The lectures were organized in recognition of Dick Bulterman's tenure at CWI, after 25 years of research at CWI.

Socially-Aware Multimedia workshop Series



The workshop on socially-aware multimedia held in conjunction with the main conference in multimedia, ACM Multimedia, whose main organiser is Pablo Cesar, has reached its third edition and is now an established event at ACM MM. The workshop was very popular with around over 30 attendees. It promoted the basic principles of the Vconnect project, discussing about multimedia applications and services, in which social interactions are considered as important as the characteristics of the content. The workshop program included two keynote talks by Karrie Karahalios and by Mor Naaman.

Vconnect co-hosts WSICC at ACM TVX

At this year's ACM TVX conference in Newcastle, the second edition of the International Workshop on Interactive Content Consumption (WSICC'14) took place, co-organized by the Vconnect project, represented by Rene Kaiser of JOANNEUM RESEARCH. It drew considerable interest, with about 30 participants over the course of the full day event. The workshop's aim was to shed light onto the latest developments in the research landscape behind the workshop's scope, and to externalize ideas where interdisciplinary institutions could aspire collaboration. WSICC's keynote was given Vconnect's scientific coordinator Prof Marian F. Ursu, which presented highlights of this research. This both insightful and entertaining talk triggered lots of interest, follow-up questions and discussions from and amongst the audience. The workshop's format further consisted of talks, a poster and demo session, and two rounds of a *fishbowl* discussion. During the demo session, Wolfgang Weiss of JOANNEUM RESEARCH showcased the *communication orchestration* features of Vconnect's Socialization client. As expected, the workshop participants embraced the *fishbowl* discussion format very quickly and engaged in intense and insightful discussions.



Vconnect: Hacked off at Codebits?



Vconnect published its API for web conferencing to 800 developers during Codebits, a three-day hackathon in Portugal, see <https://codebits.eu/>. Codebits is organized by SAPO and is a vivid and colorful event in which hackers compete in a programming contest: After 48 hours of non-stop development, each team has to present its project in 90 seconds. Participants can also enjoy interesting keynotes, free food, and technology demos. Vconnect demonstrated videoconferencing in SAPO Campus, the social network of SAPO, and presented its API to interested developers.

The pros and cons of WebRTC vs. Vconnect were discussed after the presentation, leading to new insights and contacts. On this occasion no one at Codebits chose to develop against our API. Were we hacked off? No; the preparation of the event helped make our API more robust and improve our documentation and makes it easier for other to develop with our code in the future. This made the whole event worthwhile; besides it was fun for all participants.

About Vconnect

Vconnect is a “Specific Targeted Research Project” (STREP) of the ICT (Information and Communications Technologies) Work Programme under the European Community’s 7th Framework Programme (FP7). It addresses objective 1.5 (“Networked Media”) under challenge 1 (“Pervasive and Trusted Network and Service Infrastructures”).

The project is partly funded by the European Commission. Its overall budget is about 5.5 million euro.

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