CONFERENCE MONITORING

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Abstract : This Paper explains the concept of monitoring the audio-video conferences. With the Conferencing software clients have an immediate and cost-effective way to help improve customer engagement and to make faster expertise-based decisions with people inside and outside their business without travel costs.

With the conference monitoring framework, we will monitor different parameters associated with an Audio-Video conference, such as Conference name, id, Service Provider, Start Time, no. of current users etc. and many more. This development will make people available with an efficient tool which will help them monitor, and in turn manage the ongoing conferences in their enterprise. The monitored data collected with the monitoring software guides the business processes in various decision making aspects.

KeyWords : Conferencing, PointToPoint, MultiPoint, REST, JMX, JSON.

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1. Introduction : With the introduction of relatively low cost, high capacity broadband telecommunication services in the late 1990s, coupled with powerful computing processors and video compression techniques, videoconferencing usage has made significant inroads in business, education, medicine and media. Like all long distance communications technologies (such as phone and Internet), by reducing the need to travel to bring people together the technology also contributes to reductions in carbon emissions, thereby helping to reduce global warming.[5] Video Conferencing is Conducting a conference between two or more participants at different sites by using computer networks to transmit audio and video data.[6]

Conferences may need to be monitored for various purposes including analysis, decision making and marketing.

2. Video Conferencing : Videoconferencing is the conduct of a videoconference (also known as a video conference or videoteleconference) by a set of telecommunication technologies which allow two or more locations to communicate by simultaneous two-way video and audio transmissions. It has also been called 'visual collaboration' and is a type of groupware.

Videoconferencing can enable individuals in distant locations to participate in meetings on short notice, with time and money savings. Technology such as VoIP can be used in conjunction with desktop videoconferencing to enable low-cost face-to-face business meetings without leaving the desk, especially for businesses with widespread offices. The technology is also used for telecommuting, in which employees work from home. One research report based on a sampling of 1,800 corporate employees showed that, as of June 2010, 54% of the respondents with access to video conferencing used it “all of the time” or “frequently”.

Videoconferencing differs from videophone calls in that it's designed to serve a conference or multiple locations rather than individuals.[1] It is an intermediate form of videotelephony, first deployed commercially in the United States by AT&T Corporation during the early 1970s as part of their development of Picturephone technology.

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to reductions in carbon emissions, thereby helping to reduce global warming.[2][3][4]

The core technology used in a videoconferencing system is digital compression of audio and video streams in real time. The hardware or software that performs compression is called a codec (coder/decoder). The resulting digital stream of 1s and 0s is subdivided into labeled packets, which are then transmitted through a digital network of some kind (usually ISDN or IP). The use of audio modems in the transmission line allow for the use of POTS, or the Plain Old Telephone System, in some low-speed applications, such as videotelephony, because they convert the digital pulses to/from analog waves in the audio spectrum range.

The other components required for a videoconferencing system include:

1. Video input : video camera or webcam
2. Video output : computer monitor, television or projector
3. Audio input : microphones, CD/DVD player, cassette player, or any other source of PreAmp audio outlet.
4. Audio output : usually loudspeakers associated with the display device or telephone
5. Data transfer : analog or digital telephone network, LAN or Internet
6. Computer : a data processing unit that ties together the other components, does the compressing and decompressing, and initiates and maintains the data linkage via the network.

2.1 Point To Point Video Conferencing

In a Point To Point AV conference, there are only two participants.

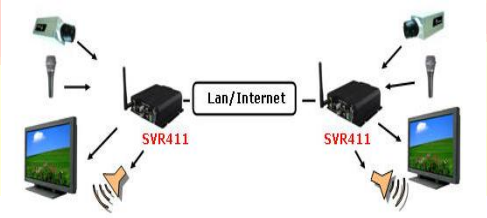

Figure 1 : Point To Point Conference

The video and audio signals are transmitted separately but remain synchronized with each other, with a small time delay between an event at a site and its display on the TV monitors at the

other sites. Both sites can control both main cameras, so people at either end of the call can potiion either camera. The video quality in point-to-point conferences approaches that of a typical broadcast signal.

2.2 Multi-Point Video Conferencing

In a MultiPoint AV Conference, there are more than two participants. Simultaneous videoconferencing among three or more remote points is possible by means of a Multipoint Control Unit (MCU). This is a bridge that interconnects calls from several sources (in a similar way to the audio conference call). All parties call the MCU, or the MCU can also call the parties which are going to participate, in sequence. There are MCU bridges for IP and ISDN-based videoconferencing. There are MCUs which are pure software, and others which are a combination of hardware and software.

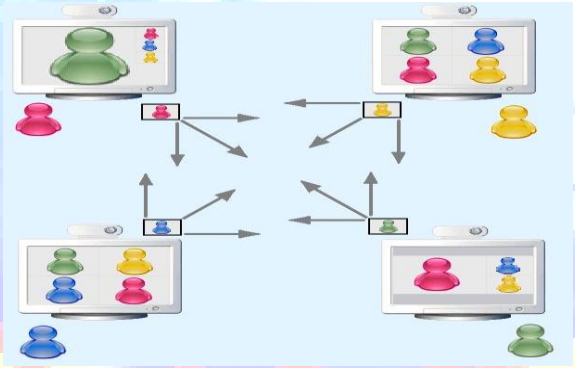

Figure 2 : MultiPoint Conference

An MCU is characterized according to the number of simultaneous calls it can handle, its ability to conduct transposing of data rates and protocols, and features such as Continuous Presence, in which multiple parties can be seen on-screen at once. MCUs can be stand-alone hardware devices, or they can be embedded into dedicated videoconferencing units.

The MCU consists of two logical components:

1. A single multipoint controller (MC), and
2. Multipoint Processors (MP), sometimes referred to as the mixer.

The MC controls the conferencing while it is active on the signaling plane, which is simply where the system manages conferencing creation, endpoint signaling and in-conferencing

controls. This component negotiates parameters with every endpoint in the network and controls conferencing resources While the MC controls resources and signaling negotiations, the MP operates on the media plane and receives media from each endpoint. The MP generates output streams from each endpoint and redirects the information to other endpoints in the conference.

3. Proposed Approach : The conferences can need to be monitored for a number of reasons such as analytical. The easy ways to implement this functionality ly in the concepts of REST and JMX architectural frameworks. With these frameworks, the monitoring application is to be developed using which the conferences and in turn many other parameters including the server health can be monitored. We make use of JSON, i.e., JavaScript Object Notation for sending the reply from server. Each of these concepts, i.e., REST, JMX and JSON are explained below.

3.1 REST: Representational State Transfer

REST is a style of software architecture for distributed systems such as the World Wide Web. REST has emerged as a predominant Web service design model. REST-style architectures consist of clients and servers. Clients initiate requests to servers; servers process requests and return appropriate responses. Requests and responses are built around the transfer of representations of resources. A resource can be essentially any coherent and meaningful concept that may be addressed. A representation of a resource is typically a document that captures the current or intended state of a resource.

REST facilitates the transaction between web servers by allowing loose coupling between different services. REST is less strongly typed than its counterpart, SOAP. The REST language uses nouns and verbs, and has an emphasis on readability. Unlike SOAP, REST does not require XML parsing and does not require a message header to and from a service provider. This ultimately uses less bandwidth. REST error-handling also differs from that used by SOAP.

Key goals of REST include:

- Scalability of component interactions
- Generality of interfaces
- Independent deployment of components
- Intermediary components to reduce latency, enforce security and encapsulate legacy systems

3.2 JMX: Java Management Extensions

JMX is a Java technology that supplies tools for managing and monitoring applications, system objects, devices (e. g. printers) and service oriented networks. Those resources are represented by objects called MBeans (for Managed Bean). In the API, classes can be dynamically loaded and instantiated. Managing and monitoring applications can be designed and developed using the Java Dynamic Management Kit.

JMX is based on a 3-level architecture:

1. The Probe Level
2. The Agent Level
3. The Remote Management Level

Applications can be generic consoles (such as JConsole and MC4J), or domain-specific (monitoring) applications. External applications can interact with the MBeans through the use of JMX connectors and protocol adapters. Connectors are used to connect an agent with a remote JMX-enabled management application. This form of communication involves a connector in the JMX agent and a connector client in the management application.

3.3 JSON : JavaScript Object Notation

JSON is a lightweight data-interchange format. It is easy for humans to read and write. It is easy for machines to parse and generate. It is derived from the JavaScript scripting language for representing simple data structures and associative arrays, called objects. JSON is a text format that is completely language independent but uses conventions that are familiar to programmers of the C-family of languages, including C, C++, C#, Java, JavaScript, Perl, Python, and many others. These properties make JSON an ideal data-interchange language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is used primarily to transmit data between a server and web application, serving as an alternative to XML. JSON is built on two structures:

- A collection of name/value pairs. In various languages, this is realized as an object, record, struct, dictionary, hash table, keyed list, or associative array.
- An ordered list of values. In most languages, this is realized as an array, vector, list, or sequence.

JSON is perticularly used for sending the response from the server to the client in the REST framework.

4. Conclusion : The live audio-video conferences may need to be monitored for various different purposes including management, decision making and marketing in a business enterprise. The REST and JMX frameworks provide an easy and efficient way to develop the monitoring application for audio-video conferences.

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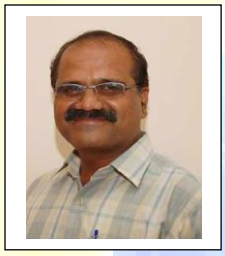

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