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**Meeting on the Management of Statistical Information Systems (MSIS 2012)**  
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Topic (iv): Collaboration

## **Collaboration methods and tools for effective multi-national collaboration activities**

### **Invited Paper**

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#### **I. INTRODUCTION**

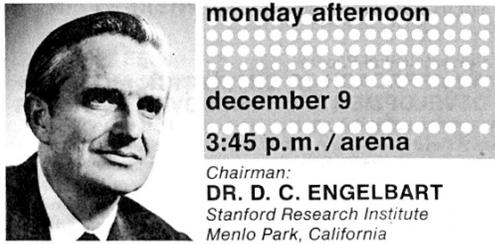
1. Any interaction among people with the aim of achieving a common goal, which does not involve exchange of goods or services, can be called collaboration. Collaboration in software development and software sharing among statistical organizations is nothing new, especially in today's global economy. Collaboration and data exchange between organisations (international and/or national) inspires and at the same time benefits from collaboration in software development and software sharing between these organizations. Using common software solutions results not only in savings in time and money but can enhance mutually the institutional knowledge and promote and enable the implementation of statistical standards. Different practices and models involving different statistical organizations already exist, as seen in many papers presented at previous MSIS meetings (see [5] for further details). The classical Video conference systems provide one possibility for communication but they are extremely complicated, need specially trained staff to support them, and are extremely expensive (for a gut system one should expect to pay much more than 10000 EURO). And at the same time these systems do not allow the exchange of content (in the form of files, presentations or applications). A much less expensive version is the so called "Web Conferencing" which allows to perform meetings, presentations (webinars), product presentations, trainings and many more. The meetings will be simply dispatched in Internet and the browser will be used as a communication media.
2. Web conferencing is becoming a common tool of interaction among employees of a company or organization, customers and data users or partners. The core web conference features are already a commodity, but the vendors of web conferencing services are working hard on development and bringing to the market of new features and specialized products. While conducting web meetings is

a standard way of communication in many cases the product can be specialized to perform trainings, provide online technical support or organize conferences or other online events.

3. We are looking for tools and services for Web collaboration which provide an organization with the capability to collaborate with customers, internally or with other organizations via the Internet in real time. A system for Web collaboration usually consists of Web-based tools hosted in Web sites with the aim to assist an organization (in general) in the area of sales, new revenue-generation opportunities, and to enhance customer satisfaction. Further application of the Web collaboration, which is in the focus of our interest, is the collaborative development of software and other related materials (documentation, guides, specifications, training materials, etc.). Web collaboration is essentially the back-end software or service that allows the team to share Web pages with customers or remote team members while offering voice and text chat communication or to conduct single or multi-user conferences and seminars. Web collaboration can be used in an Internet environment or can be integrated with an organizations' existing telephone infrastructure to provide the necessary assistance or collaboration sessions.
4. While the variety of Web collaboration tools and services available on the Web ranges from well established and powerful all-in-one services like [Cisco WebEx](#) to simple open source tools providing just a small set of functions, which one could install in his own infrastructure. Most of the information available on the Web is of marketing type, pleading for the use of particular software tool or service, hardly defining the function range of the product or specifying its position relative to other available and well known tools. In depth reviews of particular tools or services are seldom available, apart from the vendors' web sites or marketing white papers and if available these are usually outdated. Similarly, it is hard to find evaluation reports presenting and comparing several tools. In the Appendix will be listed some more or less useful online resources and pointers to review reports and evaluations.
5. The purpose of this paper is to review and evaluate one major area of collaboration tools: Web conferencing and remote desktop tools. Additionally a brief overview of other (stand alone) collaboration tools will be given (these can be usually found as components of a major collaboration platform) - collaborative document editing and reviewing, collaborative reference management, calendars, wikis, project management tools, etc.
6. In the first group, the web conferencing tools the market leader WebEx will be considered in detail and the discussion will be supported with the experiences gained by the work of SAB. Some of the rest the tools will be evaluated and described relative to WebEx and pointers will be given to available online resources

## II. HISTORICAL BACKGROUND

7. The American inventor Douglas Engelbart is considered the father of groupware, who first envisioned collaborative computing in 1951 thus pioneering computer supported collaborative work. In the beginning of 80s he proposed an integrated system NLS (oNLine System) which included computer-supported meetings and teleconferencing, shared files, author-id timestamps in source code and documentation, digital libraries, hyper-email, and online communities. Last but not least is the proposed mouse prototype. In 1968 he and his team presented a 90 minutes demo which remained in the history of human computer interaction. A complete description and details of the demo can be found in [3], paper published in 1984. It is interesting that almost all features described in this paper were operational already by 1968.



## a research center for augmenting human intellect

This session is entirely devoted to a presentation by Dr. Engelbart on a computer-based, interactive, multiconsole display system which is being developed at Stanford Research Institute under the sponsorship of ARPA, NASA and RADC. The system is being used as an experimental laboratory for investigating principles by which interactive computer aids can augment intellectual capability. The techniques which are being described will, themselves, be used to augment the presentation.

The session will use an on-line, closed circuit television hook-up to the SRI computing system in Menlo Park.

Following the presentation remote terminals to the system, in operation, may be viewed during the remainder of the conference in a special room set aside for that purpose.



**Figure 1: The demo of Doug Engelbart in 1968. A poster announcing the demo on the left and a computer supported meeting (around 1967) [Source: <http://www.dougenelbart.org/firsts/groupware.html>]**

8. The predecessors of Web conferencing tools were early peer-to-peer desktop conferencing applications and simple client-server collaboration tools like chat and instant messaging. Main drivers for the development of the web conferencing tools were help desks and support centre which wanted to have control of the clients' desktops. Similarly, the sales departments of the companies wanted to be able easily to perform on-site product demos.
9. Computer support for cooperative work is known as groupware and it is very difficult to provide adequate support for the everyday cooperative work. Support for limited collaborative tasks only, or if the provided support is inflexible or if integration between the different groupware tools is missing will hinder the productivity of the cooperative work [2]. The requirements necessary to be fulfilled by successful groupware range, according to [2], between support of very different goals:
  - same-time and different-time cooperative work;
  - same-place and different-place cooperative work;
  - single, discrete media such as text or graphics, and multiple media
  - including continuous media such as audio and video;
  - much freedom in the actions of users (permissive support) and
  - coordination of the actions of users (restrictive support).

### III. WEB CONFERENCING AND REMOTE DESKTOP SOFTWARE TOOLS

#### A. Key Features and Requirements for Web Conferencing Tools

10. Web conferencing is often misunderstood and wrongly associated with other communication tools. Therefore in the following an attempt will be made to specify what we understand as web conferencing and what will be considered in the present work. Already for quite some time tools are available for PC based conferencing, like for example Microsoft NetMeeting which was delivered as a component of Microsoft Windows operating system since several major revisions of this operating system. There exist also conferencing applications based on the client-server principle. But in the recent years we can observe the trend to provide telecommunications and tele-

collaboration services running in a web browser. The definition of web conferencing, following [4] can be formulated as follows: “Web conferencing applications are technological basis for performing virtual conferences and meetings, which take place in real time and are used for the publication, exchange and viewing of information initiated through a web browser”. This definition distinguishes web conferencing from other asynchronous communication forms like discussion groups and team rooms. Web conferencing should further be distinguished from video conferencing which involves special rooms with special video equipment.

11. Nowadays web conferencing software offers a wide palette of capabilities that enable unhindered communication between presenters and audience members or between the meeting attendees. When performing a conference or an online meeting the moderator needs the following typical actions:

- Invite participants simply by sending a link to the conference
- Identify participants as they join and leave meetings
- Presentation using slides created in PowerPoint or other presentation software. While presenting one can highlight information on the slide in order to draw attention to specific topics;
- Live video display using webcam or digital camera;
- Real-time conversation with the session attendees through VoIP (it is necessary that all participants have headphones and speakers);
- Share files and other material, and run applications in real time
- Session recording for playback later. This is particular useful for presentations when not all attendees can be gathered together at the same time allowing those who were unable to attend the live session to view the recorded version at their convenience;
- Making notes or drawing diagrams on a whiteboard when necessary to further illustrate certain points. With some web conferencing tools it is even possible the presenter to give control to the whiteboard to an attendee to add their own notes or drawings;
- Use chat facilities to take and answer questions. The chat dialogues can be kept private between the moderator and the attendee or shared with all participants;
- Performing polls and surveys in order to gather information and feedback regarding the presentation;
- Sharing the desktop in real time;
- Integrate with email and calendars to schedule conferences (coming soon).

## **B. How to Choose a Web Conferencing Tools**

12. On the market can be found a number of web conferencing tools which provide different feature sets and are based on improved technology. The selection of the features and capabilities of the wanted tool depends mainly on the purpose of its usage – what types of presentations are to be given, what types of online meetings and virtual teams are to be supported. On the other hand there are several features that no web conference/webinar software should miss. Most of the providers in the marketplace support these key requirements since they are vital for the success of the tools. When selecting a web conference tool one should carefully check that all these features are present – if some of them is missing better move to another option.

13. First of all will be considered the criteria for selection of a tool based on an analysis of the own needs i.e. the types of online meetings to be conducted (see also the review at <http://www.givemeareview.com/online-meeting/articles/buying-guide.html>):

- a) **Frequency of meetings.** It is important to consider if the meetings are conducted regularly or on-demand and if they are regular, how regular. If we can answer this question we will be able to decide on whether it is more practical to acquire software that comes with a per use subscription or a monthly/annual subscription;
- b) **Average number and type of the participants:** are they always the same people or do they regularly change and how many participants on are average to expect. Some tools require that the participants also register and pay, while others limit only the number of participants per session;

- c) **Level of interaction:** are the meetings such that one presents and the other listen or it is expected that the participant interactively work on the documents (comments, highlights, etc.). This issue will determine the type of interaction the selected tool must support, e.g., whiteboard, sharing of desktop and applications, etc.
  - d) **Confidentiality:** this is to determine how confidential the meetings are and is it necessary to record the meetings in order these to be played back later. This issue will determine the level of security and the necessity of support for recording.
14. Next we will consider the features which the selected tool must have as a minimum. A detailed review of the must have features for web conferencing software is provided in [10], here will be presented a brief overview
- a) **No software installation or downloads necessary.** It is very important that the attendees of a webinar or an online meeting have a very easy access to the even and do not need to install any special software. Fortunately almost all providers of web conferencing software leverage the Internet to manage presentations. The benefits to the organizer of the event are ease of set up and ease of distribution of information. Similarly, the benefits to the participants are ease of use and no additional effort for installation and set up. No more than accessing the provided URL through a web browser and entering a required access code is necessary, everything after that runs automatically. If a webinar is concerned, where we want to bring as many as possible attendees and prospect customers, this is the simplest and safest way to ensure great attendance.
  - b) **High quality video streaming.** This criterion seems to be out of discussion, but it is necessary mentioning it since it can be very embarrassing to perform a presentation in front of many interested attendees and than suffer image freezing and pixelated video which characterize a poor quality video streaming. Of course this can happen with every service provider but it is worth testing the software in advance. A service provider with many servers and clever load sharing is the preferred choice.
  - c) **Reliable and fully integrated audio and video.** Similarly as for the video streaming the quality and reliability of the audio feed is important. The attendees need only headsets installed in order to fully participate. To provide the audio feed through the voice over IP protocol is another common nowadays feature which eases the communications by avoiding the use of telephone lines.
  - d) **Slideshow presentation.** This is an absolutely necessary feature which allows the presenter with minimum effort to bring out the main points of the presented topic. All other materials, documents, spreadsheets, etc. can be provided outside of the online meeting. Of course all providers support one or another form of slide show presentation, it is important to choose the most appropriate. Apart from the technically available features, one should be careful about how to present the material (i.e. to avoid the so much hated PowerPoint syndrome, characterized by a series of bulleted slides).
  - e) **Sharing of documents.** Apart from the presentation in a form of slideshow it is necessary to provide additional documents. This should be done either in advance or after the presentation. Furthermore the system should be able to track who has downloaded which documents in order to analyse the interest in the presentation and the appropriateness of the invited audience.
  - f) **Chat tools.** A key component of a presentation is the communication with the audience and the feedback received. In a conference presentation always questions will appear which are necessary to be answered. The chat can be private or public, controlled by the moderator.

- g) **Host control.** The control of the attendees by the moderator is relatively new feature in the web conferencing software. Earlier it was only possible to monitor the participants but now the host can mute all attendees or control if the chat is private or public.
- h) **Recording.** This is also a feature which was not easily available in the earlier web conferencing systems. However it has numerous benefits. First of all the recording option can be used for training purposes of the presenters – everybody can learn from observing his own presentation. Further recorded presentations can be reused by publishing on the web site or distributing them otherwise. It is always difficult to get all attendees available at the same time and recording the session will give the possibility of those not present at the live session to look at it by their convenience.
- i) **Reporting.** When conducting a web conference it is important to know who participated. The reporting option can provide attendees lists, chat messages log, how much time each attendee was actually online, survey responses.
- j) **Desktop sharing.** This feature allows for a more interactive conference by moving from one person talking to many presenters. This will keep the attendees more engaged in the conversation and invite them next time again to a presentation. Of course in some cases this can be dangerous but the host still has the control as discussed above.
- k) **Application sharing.** The ability to share applications is not top priority for most of the meetings and webinars, but in many case can be advantageous and give much more interactivity to the presentation
- l) **Mobile support.** As already mentioned above it is almost always impossible to gather all attendees at the same time. The recording functionality is one way to deal with this, but the ability to handle mobile devices will give much more freedom to participate without being stuck in the office. The mobile phones become more and mores smarter which is a great potential for improvement.

#### IV. WEBEX AND OTHER WEB CONFERENCING TOOLS

##### C. About WebEx

- 15. WebEx backed by Cisco is currently a market leader in the web conferencing. WebEx was acquired by Cisco in 2007 in order to strengthen their audio/video conferencing hardware business. WebEx itself was founded in 1996 with a vision: to use the Web to bring people together from around the world to collaborate and work collectively on creative ideas and business. WebEx was used by Cisco to build an own platform for online enterprise communication to compete with Microsoft. Cisco integrates the WebEx products in its expanding portfolio of next-generation collaboration products and services which are based on Web 2.0 technologies. WebEx is a real time on-demand web service which third party developers can integrate into their own applications. WebEx applications are delivered as Software-as-a-Service (SaaS) over the Cisco Collaboration Cloud which is an own global network specifically designed for secure delivery of cloud-based applications.
- 16. WebEx targets individuals, small and medium- sized companies, as well as large enterprises across many industries – financial services, high tech companies, healthcare, pharmaceutical, communications manufacturing and government. Today 2.2 million registered hosts rely on WebEx to connect with colleagues, customers, and partners al over the world.
- 17. To investigate the features of the product and facilitate ones decision, WebEx provides a free 14 days evaluation. It includes unlimited number of meetings for 14 days with maximum of 25 persons participating. During this period one can enjoy WebEx training and support.

#### D. WebEx: How does it work

18. WebEx is probably the only one of the leading web conferencing tools which does not need any client intervention or adjustment in order to start a meeting. The only technical requirement is to have Java installed and cookies enabled. It is easy to start using WebEx for conducting meetings with anyone, anywhere in real time over the web, doing presentations and reviewing documents, demonstrating applications and sharing everything on the desktop. To do this the following three steps are necessary:
19. **1. Schedule or set up a meeting:** On the home page of the WebEx meeting centre, click on *Schedule a meeting* under *Host a Meeting* in the left navigation panel. Using the *Advanced Scheduler* one can enter the details of the meeting or with *Quick Scheduler* the meeting can be started immediately.
- Specify the meeting topic, set the meeting date, time (and time zones) and duration. If necessary specify the recurrence of the meeting.
  - To select the audio options one can choose among integrated VoIP, WebEx teleconference or personal conference number. The attendees can dial in or receive call back.
  - Invite attendees - add from the address book or type in addresses
  - Specify meeting details like registration, agenda and welcome, meeting options, attendee privileges, etc.
20. **2. Start the meeting:** simply go to WebEx and under My WebEx meetings locate the considered meeting. Select the meeting title and click Start Now button. Depending on the audio option that selected during meeting setup, a prompt to dial in or enter phone number for a call back will appear. If teleconference option was selected, the Audio Conference dialogue box will appear. Similarly, in case of VoIP option, one may change the Internet Phone options in the Internet Phone Options dialogue box. Now the meeting goes live.
21. **3. Share a presentation, document or desktop:** From the Quick Start window one can select the Present a Document option.
- Here one can make annotations, use a pointer to highlight text or graphics, save as a file, print it or synchronize all participants' displays with the host viewer content. At any time the host can grant attendees privileges that allow them to annotate, save, print, etc.
  - Similarly, when sharing an application one can select the corresponding options – control the attendees view, annotate the application, and give control of the application to attendee.
  - With *Share Your desktop* one can give all attendees complete view of the own desktop including any applications, windows and file directories that are currently open
  - If necessary, it is possible to record the meeting for later use.

#### E. WebEx Software Technology

22. **Cisco WebEx Meeting Centre** is a solution for small and medium business cases. It is unnecessary to say that Cisco WebEx satisfy all the must criteria discussed earlier. It allows for high-touch service for customers, to deliver sales presentations and demos to prospects, and meet with colleagues across the world without leaving the office or simply using the mobile phone. It includes functionality for making presentations, sharing applications, and updating spreadsheets in WebEx online meetings with integrated audio conferencing and high-quality video. The service is provided on a subscription bases as on-demand service over private global and secure network. No hardware or software investment or installation is needed. Much more functionality and integration options are provided with the *Cisco Enterprise Solutions* and *Cisco Connect*.
23. **Cisco WebEx video modes:** The video of WebEx operates in two modes: Single-Point-Video und Multi-Point-Video:

- In **Single-Point-Video (SPV)** the service provides one video window in which all participants can be shown. The moderator determines during the meeting which participant will be shown. This mode is particularly useful for meetings in which independently of the number of participants only one is presenting most of the time.
  - In **Multi-Point-Video (MPV)** the service provides up to six windows in which up to six participants can be shown. In one additional video window appears always that participant which is speaking in the moment. Each user can scroll through the list of participants. This mode is useful in meetings where more or all participants are active. It is clear that the necessary band width for MPV is much larger than for SPV due to the number of video streams. It is possible during the meeting to switch between SPV and MPV.
24. WebEx uses the Cisco Collaboration Cloud which is an own global network specifically designed for secure delivery of cloud-based applications. The performance of a WebEx sessions depends on many factors. Many of these factors can be controlled by Cisco, but others are dependent on the enterprise network of the client or other infrastructure issues. The study [12] investigates these factors by defining scenarios of online collaboration and measuring the network traffic generated. The Cisco WebEx-Services optimize the usage of the band width in such way that the network traffic is minimized which in turn will improve the performance and the user friendliness of the system. The most important optimizations are:
- **Vector graphics:** all text and graphics data will be transmitted in vector format (simple lines, rectangular, text etc.) and not as bitmaps. This results in high quality images and at the same time reduces the quantity of the transmitted data.
  - **Compression:** All large data sets which have to be transmitted or uploaded are compressed. This not only reduces the network traffic, but also makes the data stream “coded”.
  - **Incremental updates:** Usually only parts of the screen of an application changes. The WebEx services update only the changed portions of the screen and of course these updates will be transmitted as vector graphics and not as bitmaps.
  - **Video compression:** In WebEx Meeting Center are implemented functions for compression and optimization of the video stream. The necessary band width for video transmission is directly dependent from frame rate and the size of the video.
  - **Selection of optimal protocol:** The WebEx-Services can pass all firewalls working on HTTP protocol. But the application first checks if it is possible to connect using TCP/IP which works on a lower level. This would reduce the network traffic with 10%. On secure SSL sites the WebEx services will use HTTPS.
25. For more technical details the user is referred to [12].

#### **F. WebEx Pricing**

26. WebEx services are sold both as stand-alone applications, and in packages that provide comprehensive solutions for a variety of situations. Detailed pricing information can be found at the vendor web site but in the following is given an overview:
- *WebEx Meeting Center:* includes application and document sharing as well as desktop sharing. Include up to 25 people in meetings with unlimited usage for monthly fee of \$49 a month.
  - *WebEx MeetMeNow* which is a quick and easy meeting solution for personal use and provides instant desktop sharing. This solution can include up to 10 people in meetings with unlimited usage for monthly fee of \$39 a month.

- *WebEx Pay-Per-Use* allows using WebEx Meeting Centre on an as-needed basis without minimum cost and no monthly commitment. The pricing is 33 c/minute per participant and integrated conferencing can be added for 20c/minute each.
- *WebEx PCNow* provides remote access to a PC which is secure and reliable for \$12.95/month.

#### **G. Other WebEx products**

27. Apart from WebEx meeting centre which was considered here Cisco provides several other products based on the same platform. These help for e-learning, remote support or organizing online events with up to 3000 participants.
28. **WebEx Training Centre:** allows delivering rich interactive classroom experience – online lectures, vocational training, tutoring and group study projects. It allows simulating training and group collaboration through virtual breakout sessions. The class effectiveness can be evaluated with integrated testing and polling and reports on attendance, attentiveness and more. A digital library of recorded lectures for supporting self-paced training can be built.
29. **WebEx Support Centre:** is a tool for minimizing costly on site service calls by viewing and controlling remote desktops and applications online for diagnosing and solving problems. Cisco provides different plans but all of them come with unlimited remote support sessions, integrated voice conferencing and video conferencing. It is compatible with Windows, Mac, Linux, Unix, and Solaris and is localized in 11 languages.
30. **WebEx Event Centre:** this is a tool for holding high-impact live or on demand online events for up to 3000 participants. Cisco provides different plans but all of them are with unlimited online events, high-quality video, integrated voice conferencing and the ability to record events for on demand viewing.

#### **H. Alternatives to WebEx**

31. WebEx is not the only online collaboration product on the market; here it was used as an example to illustrate the features we would expect from such a tool. There are several recent reviews of other online meeting tools – see for example [6] and [13]. In the following only brief information about some of the tools will be given.
- a) **Adobe Acrobat Connect Pro:** Adobe Connect relies on web-standard Adobe Flash which guarantees strong performance and wide range of features. About everyone already has Adobe Flash installed on their computer (Flash 10.1 is required) but differently from WebEx, it is necessary each participant to install an Adobe Air add-on to join to a meeting. The user interface for starting a meeting is much more cumbersome than that of WebEx. It is necessary to specify a lot of details about the meeting, to identify the participants and provide their access rights. Adobe Connect is available both as SaaS and on-premises deployment modes. Pricing information is available upon online request (orientation pricing is USD 55 per month) and the options include software licensing, annual subscription, monthly and pay-per-use.
- b) **Citrix GoToMeeting:** GoToMeeting is known for its simplicity favouring usability over over advanced functionality. It is aimed at small and medium businesses. In order to use it, it is necessary to download and install a client application. This tool provides VoIP audio connection or standard teleconferencing or both. The subscription fee starts at USD 39 per month (annual plan) and allows meetings with up to 15 attendees per meeting. It is not necessary to purchase licenses for meeting attendees.
- c) **Microsoft Life Meeting:** This Microsoft's hosted web conferencing service is suitable for users of a predominantly Windows environment. It provides tight integration with the Office suite and allows for easy brainstorming on shared documents with annotation and white boarding. Live Meeting supports VoIP and PSTN, attendee-to-attendee IM, live and recorded video presentation, etc. It is offered as a part of MS Office product system, as an Windows application which has to be installed, but also as a SaaS. A 30 days evaluation license is

available. The standard licenses support up to 15 participants while the professional licenses extend the meeting capacity up to 1250 participants and feature unlimited storage of shared meeting recordings for 360 days. The minimum number of users is 5 and the minimum acquisition price is 15.42 USD per user per month with no on-time fees.

- d) **DimDim:** was founded in 2007 (offices in Lowell, Mass., and Hyderabad, India), with a focus on developing enterprise applications on a cloud-based communications platform. Its services allow users to host or attend live online meetings, create demos and conduct webinars using just a web browser. Recently DimDim has been acquired by [Salesforce.com](https://www.salesforce.com) which continues to serve existing customers but does not allow registration of new. It was developed as a clone of WebEx but has several advantages compared to the original: no installation costs, cheap enterprise version for only USD 99 per year, no monthly costs. There exists an open source alternative of DimDim.
- e) Other available tools which we are not going to consider are *Saba Centra*, *Yugma*, *VoxWire*, *ReadyTalk*, *Infinite*, *netviewer*, *Fuze Meeting Pro*, *iLink* and many others.

## V. SUMMARY

- 32. Collaboration is any interaction among people with the aim of achieving a common goal, which does not involve exchange of goods or services, i.e. collaboration is working together in a particular project. The definition of collaboration could be quite extensive. Nowadays collaboration is unthinkable without suitable collaboration tools, mainly based on Internet technologies. A suitable collaboration tool integrates various technologies into a single application that makes sharing and managing information.
- 33. The present study, after discussing the historical background of collaboration software (the so called groupware) and the wide palette of tasks to be covered by the collaboration software, focuses on one of the most important areas of collaboration - web conferencing. The key features of web conferencing software are investigated and a list of recommendations for selection a web conferencing tool is presented. As an illustration a particular software service, WebEx from Cisco, is presented in a detail and after that a brief overview of the landscape of web conferencing tools is given.
- 34. The study is considered a work in progress which will be further extended to cover the experience of emerging forms of collaboration between national and international statistical organization as well as the open source communities.

## VI. ACKNOWLEDGEMENTS

- 35. We would like to thank to all people that contributed to this study, especially the members of the [Sharing Advisory Board \(SAB\)](#) for provided information, comments and suggestions.

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