

# Access Grid Technology for Remote Collaboration

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The Access Grid offers a useful solution for social scientists to collaborate remotely, even when they work in institutions situated in different cities, countries or continents.

This paper will introduce Access Grid by describing what it is, how it is used and giving a brief history of the technology. It will go on to describe how the user experience is being improved through a structured support mechanism (the Access Grid Support Centre) and through various developments.

The Access Grid began as a concept of an advanced videoconferencing system. It aimed to enable effective group-to-group collaboration that was as productive as meeting face-to-face using: a very large display; multiple views of participants; natural, hands-free, full-duplex audio; and efficient use of bandwidth employing multicast networking. However, this definition of Access Grid (as a purpose-built high-fidelity designed space) has now been superseded by Access Grid as software.

The Access Grid was invented in 1998 at Argonne National Laboratory (ANL). The first event using Access Grid was the 1999 Chautauqua, which involved four Access Grid nodes: at Boston, New Mexico, Kentucky and ANL. This conference had no primary physical location; each of the four nodes hosted delegates and shared sessions. Following this event and other early usages of the technology, popularity of Access Grid grew rapidly as people saw its potential for effective remote collaboration. By 2003, there were over 200 nodes worldwide, with coverage spread beyond the United States to (particularly): the UK, Australia and China, with other nodes as far apart as Brazil and Korea.

The key concept of the Access Grid at this stage is that of the Virtual Venue, which offers a place to meet. Although Virtual Venues, like their physical counterparts, were also conceived as places in which to share virtual objects such as documents or applications, this was not fully implemented in the early years. The Grid in Access Grid was also at first an idealistic concept, with no tangible implementation except in the sense of the distributed collaboration of humans as opposed to the distributed collaboration of machines.

As Access Grid has evolved, a subtle shift of emphasis has occurred from that of a designed space to Access Grid as a piece of software. This has come with a fuller implementation of the concept of Virtual Venues, with functionality to allow document, application and service sharing. It has also meant more integration of core Grid technology, such as the use of certificates for authentication and authorisation. However, many in the community have become disgruntled with the software because of a perceived difficulty in use, installation and robustness (e.g. see <http://www-unix.mcs.anl.gov/web-mail-archive/lists/ag-tech/2005/01/msg00064.html>). There are some who see the architecture as too rigid and difficult to extend beyond strictly-defined limits, and there are also logical problems with the way certification has been implemented, which can lead to confusion when an Access Grid node is hosting more than one person, as is usually the case.

Alongside the growth of Access Grid as a research community, there has been the rise of inSORS Communications Inc. (<http://www.insors.com>), which is a commercial company supplying Access Grid-like systems. InSORS supply hardware and bespoke software that is very similar to the Access Grid concept. Their solution is fully interoperable with Access Grid and some elements, such as the Access Grid-H.323 Bridge, go beyond what is offered by the research software. With the perceived problems of later versions of the Access Grid software, inSORS' customer base has grown rapidly.

In 2001, the first Access Grid node was installed in the UK. This was followed by new nodes at each of the National and Regional e-Science Centres. Because the number of nodes was relatively small, support was not an issue. However, as these nodes were joined by others at the e-Science Centres of Excellence and various other installations, it became difficult to assure a high quality experience. Therefore, there was a need for a more formal support mechanism. A report into videoconferencing for UK e-Science ([http://www.nesc.ac.uk/technical\\_papers/UKeS-2002-04.html](http://www.nesc.ac.uk/technical_papers/UKeS-2002-04.html)) recommended the establishment of the Access Grid Support Centre (AGSC), the aim of which was to improve the experience of the technology for UK users.

The AGSC, which began operation in April 2004, provides support in a number of different ways:

- First and second-line support of Access Grid for technical operators and end-users
- The provision of a number of services to improve the experience of using Access Grid
- Quality Assurance (QA) testing of registered Access Grid nodes
- The promotion of good practice guidelines on the use of Access Grid through workshops and on-line documentation
- Advice on recommended hardware, software and configurations for Access Grid
- Help and advice for interoperation between Access Grid and other collaborative technologies (e.g. VRVS, H.323/H.320)
- Help implement recommendations of forthcoming reports and other developments
- Liaise with commercial providers of Access Grid technology.

There are a number of developments that promise to enhance the user experience of Access Grid still further. The quality of video on the Access Grid, whilst acceptable, does not match up well with current advances in more traditional videoconferencing. To address this, a group has augmented the video tool used in Access Grid to support MPEG4 (<http://vic.nhc.org.tw/>) and other groups are experimenting with Digital and High Definition Video formats (<http://netmedia.gist.ac.kr/agdv/>).

One frequently-cited drawback to Access Grid (e.g. see the survey conducted for the e-Social Science Training and Awareness programme at <http://www.ncess.ac.uk/resources/>) is that it is difficult to tell who is speaking, particularly in large, multi-site meetings when people do not know each other well. To address this, Boston University (<http://scv.bu.edu/~putnam/ag->

[audio/misc/poster.pdf](#)) are experimenting with both sound localisation to give audio cues to where on the screen a speaker's video window is located, as well as visual cues that highlight the relevant window.

The Access Grid software responsible for displaying video comprises of clickable thumbnails of each stream. Because of this, the layout at different nodes may vary considerably and it is necessary for a meeting participant or operator to manually position windows on the screen. To solve these problems, an application known as Video Presence (<http://if.anu.edu.au/SW/VP.html>) automatically arranges video windows according to the sending site.

Most use of the Access Grid is synchronous, but the 'memetic' project (<http://www.memetic-vre.net>), part of the JISC VRE programme, aims to develop robust software to enable asynchronous use. To do this, Access Grid recording software that is part of the suite of research software will be augmented to allow meetings to be recorded and integrated with software developed by CoAKTinG (<http://www.aktors.org/coakting/>). These recordings will be navigable via a variety of means, such as by who is speaking or by agenda item, etc.

Other developments, such as configurable video backgrounds, the use of bridges to enable Access Grid to be used in low-bandwidth environments, interactive whiteboards, and presentation sharing will also be considered.