Creating New Opportunities for SOHO

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This paper discusses advances in multimedia network technology which offer the opportunity to improve business services for multimedia systems in both local area and wide area. It indicates how these services can be used to improve SOHO access. The benefits of ATM are discussed.

Alan Chaney is managing director of a new high technology start-up, Telemedia Systems Limited, which has been formed to provide commercial exploitation of ATM systems solutions developed by Olivetti Research in Cambridge. TSL has extensive expertise in ATM, multimedia and networks.

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Introduction

There are three important components in Information Technology for modern businesses. They are:

Computing;

Communications; and

Content.

The advent of cheap but powerful desktop computers, together with the progressive introduction of broadband wide-area communications networks is enabling a new method of working—SOHO, or Small Office/Home Office.

This may well radically alter the perception which people have of their working environment.

This paper presents the advances in multimedia technology which will allow massive improvements in both local and wide area communications. The ATM network provides an ideal way of distributing multimedia data together with generalised computer networking services.

Small Office and Home Office

There are demographic, environmental and social reasons for the widespread adoption of SOHO over the next few years, particularly within large, highly developed, societies like Europe and North America.

As population densities near major commercial and business centres increase, it is becoming increasingly difficult to provide adequate transport services between employees dwellings and their place of work. Also, many people would prefer to live away from inner city and commercial areas. The cost to the environment of daily commuting is significant, especially in those countries which do not have a well developed public transport service.

Modern technology means that people can now have powerful computing services in their own homes. To fully benefit from this, it is also necessary that these services can communicate swiftly and effectively with corporate central services.

It is human nature to require good visual and audio contact when negotiating with other human beings. As such, SOHO benefits enormously from effective multimedia communications services.

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Methods of working

The minimum communications services for SOHO are represented by data exchange services, such as can be provided by a modem. These have been available for many years, and many people, especially in academic circles and the computing industry, have been used to working with data which is held on remote file servers.

E-mail is used extensively to communicate between remote locations.

In recent years the Internet has developed into a global communications system which is unparalleled in the way in which data can be made instantly and readily available.

All the major computing platforms now provide Internet services, and, more recently, the introduction of the World Wide Web and Java has made it possible to disseminate information globally.

As this technology spreads into normal business use, it is important that the services provided map readily into the requirements of the typical business activity. Generally, this means that people expect at least to be able to talk to each other, and additionally visual communications can be of great benefit.

Any desktop video conferencing solution for SOHO usage must provide more than simple point to point usage, as the normal business needs include the ability to involve a number of individuals in conferences.

A system which allows for the dissemination of a wide range of multimedia data is invaluable. In many business activities, especially where information and media management services are being provided, and as part of distance learning schemes, it is important to be able to distribute TV. Normally, this will be done by compressing the data into standard formats such as MPEG storing this on video file servers and then retrieving the data.

The requirements for the communications infrastructure

Video compression techniques can be used to reduce the amount of network bandwidth. These compression techniques are not cheap, either in terms of CPU bandwidth or specialist silicon. Although a reduction in cost can be expected over the next few years, a careful balance must be made between the cost of compression and the cost of distribution.

Also, compression techniques are not without their drawbacks. For example, MPEG provides near VCR quality video for less than 2Mbps bandwidth, but can provide delays in the order of seconds.

Motion JPEG (MJPEG) is expensive to decode in hardware, due to the relatively small volumes (less than 1%) of the current market. It can offer significantly better latency than MPEG.

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In many cases, only audio is required. The bandwidth requirements for audio are far less stringent, and modern compression techniques can produce extremely good quality audio for bandwidths of only a few hundred kilobits per second.

Standardisation

Standardisation must apply at all levels. One problem which has always beset the computing industry has been the need to balance the requirements of formal international standards with those of the de facto industry standards which are adopted by users.

Standards include video data formats, video conferencing standards, network protocols, transport protocols and a wide range of possible features.

Architectures

The architecture for the exploitation of these systems must be:

standard;

flexible;

expandable; and

heterogeneous.

It is essential that standard interfaces are available to the integrator of the system. An effective architecture should support a range of network types, with a range of protocols. Even at the applications level, care should be taken to allow potential users of the system to work with standard applications packages.

It should be possible to redefine the size and configuration of the system to allow for changes in users requirements. This means providing a scaleable range of options.

The components of the system should not be restricted to a single computer architecture, network type or operating system. Different applications have different requirements and it should be possible to add in as many different components as possible.

For example, Telemedia Systems has developed an Open Media Toolkit architecture which can be used to build networked multimedia solutions which offer prospective users a wide choice of implementations to suit whatever solution they are trying to achieve. This architecture is applicable to both local and wide area networks, and it will be possible to provide a large virtual organisation with connections between components in the local area being indistinguishable from components in the wide area.

The diagram below illustrates some of the features:

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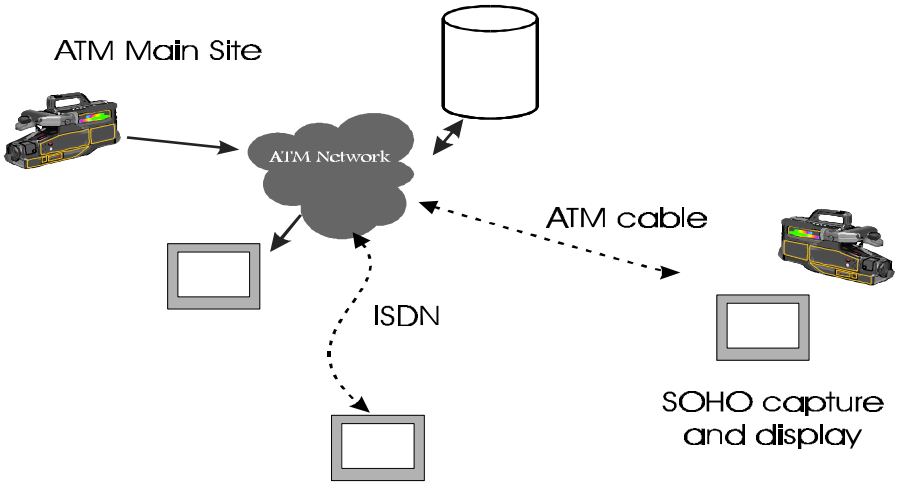

In the OMTK, there are three fundamental types of object:

Sources;

Sinks; and

Control Points.

Sources and sinks are the creators and consumers of multimedia data. The control point is used to

define the properties of the sources and sinks,

specify the connections between the sources and the sinks,

and control the flow of data along these connections.

The OMTK is currently implemented upon Microsoft Windows NT and Windows '95 platforms. It can be provided with both Visual Basic/Visual C++ interfaces and also

The sources and sinks are generically known as *Endpoints*. A wide range of endpoints can now be supported, including:

standalone MPEG capture modules directly connected to the ATM network,

PC displays,

capture devices fitted to PCs,

video file servers,

ISDN interfaces,

set top boxes,

and Network Computers.

The Network Computer represents a powerful and flexible endpoint.

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The benefit to the systems integrator of the OMTK is that it provides:

generalised control of multimedia streams

interfaces to standard application packages and environments

a flexible application platform, and

heterogeneous network support.

The ATM network provides an excellent fabric for the implementation of this architecture. It has ideal characteristics for the transmission of multiple, concurrent, streams of data, and controllable jitter and latency characteristics.

As the adoption of ATM grows, it will be possible to provide these services over larger and larger area networks. ATM can also provide "legacy" network interoperability.

The Future

The growth of wide area virtual businesses is driven by real need. This need requires that the methods of working within an existing organisation can be mapped into the virtual organisation. This will require sophisticated networked multimedia systems, which require the generality, performance and flexibility of the ATM network.

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