



**Centre for International Research on  
Communication and Information Technologies**

**Research Report  
No. 28**

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**E-mail for All**

**by Alistair Tegart and David Prater**

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**The Centre for International Research on Communication and Information Technologies** is a research centre at the Royal Melbourne Institute of Technology.

CIRCIT was set up in 1989 to provide independent research and education on information and communication services. The aim is to create new knowledge that is relevant to the community, industry and government so as to increase the social and economic wellbeing of people in Australia and other parts of the world.

The CIRCIT research program is structured around three main themes:

**1. Use and Users of Information and Communication Services**

The research focuses on the use of information and communication services by residential users, small businesses, corporations and government. It covers the broad area of communication in activities such as payments and finance, work, health, education, entertainment and government services.

**2. Policy and Regulation of Information and Communication Services**

Policy and Regulation of Information and Communication Services focuses on national strategies and objectives, competition, and issues of access and equity.

**3. Information and Communications Industries**

Information and Communications Industries research deals with developments in information technologies and services, industry policy and infrastructure issues.

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## Preface

The availability of Internet services is rapidly increasing the access to useful information, the ability to publish information and the ability to purchase goods and services electronically. Much attention has been given to World Wide Web pages, and electronic commerce services in recent years, but one of the most significant Internet applications has been largely undervalued. The main communication tool of the Internet, e-mail, is a valuable communications tool in its own right, enabling electronic communication between individuals and organisations – either one-to-one or one-to-many.

We see e-mail as an essential communications service that should be available to all, as a public and domestic channel with equivalent status and usage to postal mail and telephony. Obviously, there is a long way to go before e-mail penetration is at a similar level, and a number of things need to be pro-actively completed before this vision becomes a reality.

We hope that this project highlights the potential and real disadvantage arising from lack of access to this communications channel, and suggests some real paths for development towards ubiquitous e-mail services.

I would like to thank the many participants who gave freely of their time in the series of workshops held at the Interactive Information Institute, and particularly to the members of the project steering committee.

This project has been made possible through the generous support of the Interactive Information Institute at RMIT and Australia Post.



Interactive Information Institute



Australia Post

Terry Laidler

Director



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## Executive Summary

The use of e-mail for personal and business communication is increasingly widespread. E-mail is identified in many studies of Internet use as the most used and most useful application of the Internet. E-mail applications include personal correspondence, workplace communications, support for electronic commerce, and dissemination of news.

CIRCIT's 'E-Mail for All' project has focused on identifying gaps in current market directions and government policy that may provide barriers to universal take up of e-mail as a domestic communications channel. The project was conducted from March to August 2000, with the assistance of participants from industry, government and academia. The project has been generously supported by the Interactive Information Institute at RMIT and Australia Post.

### A Vision

The following vision was adopted to provide a focus for analysis of user issues and technological and market development:

*E-mail is available to all members of society and able to be used as a public communications channel that enhances users' quality of life and promotes interaction within and between communities of interest.*

'E-mail' in this context incorporates existing Internet Service Provider (ISP)-based services, free Web browser-based services, mobile telephone short messaging services and future services for the transmission of data between individuals, either one-to-one, or one-to-many. The definition of 'all' includes special groups such as the aged, the very young, people with disabilities, people in remote areas, and people without the financial resources to purchase expensive devices.

We recognise that existing communications channels regarded as universal or ubiquitous are not necessarily used by all members of society, due to a variety of factors, including cost, location, physical ability to use the channel, literacy and other skills. We also recognise the limitations of the word 'all' in this context. A number of factors affect the universal applicability of e-mail as a communications channel, for example the varying levels of functional literacy in the community at large. A further distinction must be made between universal access to e-mail, and universal use of e-mail.

With these limitations in mind, an examination of this vision necessarily demands that the following questions be addressed:

- Should there be a public policy goal of universally available and effective e-mail?
- What barriers prevent e-mail from becoming as ubiquitous as postal mail or the telephone?
- What needs to be done to overcome these barriers?

These key questions have formed the basis for this project, and have led us to conclude that:

*E-mail can provide a third communications channel of national significance, comparable to that of postal mail and the telephone.*

This conclusion provides the basis of the recommendations for future market and government action to address likely deficiencies in market developments. It recognises that exclusion of citizens from this vision will constitute a distinct disadvantage to their well being, a clear indicator of a public policy role for government. A number of recent state and national government policies emphasise the importance of participation in the information society and economy, but few have identified access and use of e-mail as a definite goal. For example, the Commonwealth “*is committed to ensuring that all Australians have open and equitable access to information available online*”.<sup>1</sup> As governments move to increase the availability of government information online and provide more interactive services, e-mail may become an important avenue of communication between government and citizens. It is in the interest of governments to investigate a facilitative role to broaden the use of e-mail as a communication channel.

### **Project Methodology**

CIRCIT utilised its existing body of knowledge on identifying user needs in carrying out daily activities to identify a broad range of issues relating to the use of e-mail. This focus was followed through a series of four workshops from a general examination of perspectives and prioritisation of issues, to detailed examinations of user needs, technological capabilities and designs, and policies, processes and market implications. The workshops used a focus on design as the bridge concept between use, production processes and the outside environment to identify issues and barriers to widespread e-mail use, to analyse gaps in existing market directions, and to develop recommendations for action.

The workshops were conducted between April and June 2000 at the Interactive Information Institute, Melbourne. Over 40 participants took part in the workshop series, many attending all sessions. The participants represented a broad range of stakeholders, including: the telecommunications and Internet services industries; marketing, management and useability consultants; rural users; academics specialising in software development, youth issues and adult literacy; and state and commonwealth government agencies.

### **International Context**

A 1995 Rand Organisation report<sup>2</sup> came to the following conclusions and recommendations on the technical aspects of provision of widespread or universal e-mail within the USA:

- *There are no fundamental technical barriers to providing universal access to electronic mail services;*
- *Universal connectivity among systems appears to be occurring through market forces although the portability of e-mail addresses and current regulations that*

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<sup>1</sup> A Strategic Framework for the Information Economy, Commonwealth of Australia (1998). See also Connecting Victoria, the Victorian Government’s Strategy for Information and Communications Technologies, November 1999.

<sup>2</sup> Anderson, Robert H., Bikson, Tora K., Law, Sally Ann, and Mitchell, Bridger M. *Universal Access to E-Mail: Feasibility and Societal Implications*, Center for Information Revolution Analyses (RAND), (1995).

*distort the prices among potentially competitive competition offerings are likely to remain an issue;*

- *There appears to be no need for governmental or regulatory involvement in the development, or centralisation of directories for universal e-mail addresses (both white and yellow pages) [as directories will be developed by market forces];*
- *The Web browser model of user-computer interaction should at least be considered a candidate for the minimum level of user interface for e-mail access as well as other hypertext access to information.*

Comparing these conclusions with the Australian scene in 2000, we concur that no fundamental technical barriers remain to providing universal access to e-mail services. An increasing number of devices are e-mail capable, supporting a variety of standards and providing virtually universal device-to-device connectivity, although not all facilitate attachments to e-mails.

Notably, the US prediction of market forces providing suitable global directories has failed to materialise over the past five years. An obvious market gap now exists within Australia in the provision of effective e-mail directory services that could be addressed through appropriate market and/or policy initiatives.

However, in light of the development of an increasing variety of non-PC devices and interfaces that are e-mail capable, and a recognition that current Web browser interfaces do not adequately address user needs across all categories of users, we do not concur that the minimum level of interface should be the Web browser model.

### **Recommendations for Action**

**1. There is a need to understand and quantify the characteristics of non-users and their reasons for non-use; the characteristics of ‘churn-users’ (i.e. users who stop using e-mail) and their reasons for doing so; and the use of e-mail amongst what are traditionally considered marginalised groups. These include the elderly, people with disabilities, Aboriginal peoples, the young and regional Australians. To achieve this, we propose the development of a national survey, involving the Commonwealth and State governments and any relevant research institutes.**

Significant community adoption of e-mail is unlikely without a thorough appreciation of the communication needs of current non-users and how these may be met by changes to the design of both services and access devices, coupled with changes to associated policies by industry and government. Increased understanding of e-mail use will contribute to development of broader online and communications initiatives, where e-mail can be used as a significant ‘back channel’ from citizens to industry and government, as well as providing a person-to-person domestic communications channel. Increased use by existing small business non-users may contribute to increased customer service and improved supply chain management.

**2. The entry and operation cost for non-users, in the combined impact of access device and network service, needs to be significantly lower than at present to encourage mass-market connectivity. A business model to subsidise or support a basic or standard service should be developed by the National Office of the Information Economy (NOIE).**

The cost of purchasing, accessing and operating the equipment necessary to provide personal access to e-mail is a significant barrier to widespread connectivity. Although communication access through mobile devices is becoming increasingly popular across all groups in society and their pricing plans are becoming more attractive, the level of functionality offered for e-mail is currently rather limited. Another possible universal access device could be via digital television and datacasting, although entry-level devices will need to be user-friendly, effective to use and low in both entry and ongoing access and use costs. Whilst natural economies of scale combined with increased market competition could partly alleviate this problem, the shortfall may have to be rectified by government and/or business either in a targeted manner involving means such as subsidies or lenient repayment schemes for low-income earners, or through a standardised form of industry wide basic service.

An Australia-wide response to this question needs to be resolved, from a perspective that includes both existing and future modes of communication. The appropriate Commonwealth agency to investigate this proposition is the National Office of the Information Economy (NOIE).

**3. Alternative means of access require outstandingly user-friendly interface design and service functionality; the requirements for useability and functionality should be initially scoped in terms of first defining a ‘basic’ model of an e-mail service or access device against which future designs can be benchmarked.**

For frequent users of e-mail, existing useability and functionality clearly do not pose a barrier to use – although shortcomings in these regards may limit the effectiveness of usage. However, for infrequent users and particularly non-users, one could suggest a basic or entry-level service or device(s), being the e-mail equivalent of the ordinary postal mail service for the average small business or residential person. The key features of such a standard model include:

- Service availability at a location convenient to the user, such that the following features are retained;
- A capacity to send and receive, store and reliably transfer messages, coupled with confirmation of message receipt;
- Easy access to comprehensive and accurate directories of e-mail addresses;
- Easy to use message authentication, as well as encryption for added privacy;
- In-built protection against spam or other unwanted messages; and
- A capacity to send attachments with a message.
- Technology neutrality or cross platform compatibility – voice:data, e-mail:postal mail, etc.

Taken together, the above features embodied in one or more physical representations of a ‘standard’ model of an e-mail service need to be in accord with a set of minimum standards and/or codes of practice accepted by major service providers and key user groups. It is particularly important for efficient and effective service transferability between network and/or service providers, as well as between alternative means of access, be available within the same service.

In the event that text-based electronic communication may not attract a significant proportion of current non-users, an alternative design characteristic could facilitate

multimedia e-mail, such that brief messages may also carry video and/or sound attachments.

**4. There is a need for comprehensive searchable e-mail directories, subject to trust, privacy and management considerations.**

Universal use of e-mail as a personal and domestic communications channel will not succeed without the provision of comprehensive directory services<sup>3</sup>. Existing commercial directory services are often out of date or are service provider specific, reducing the effectiveness of use. A gap clearly exists that could be filled by industry or government. Development of directory services for telephony provided a key component for near universal domestic takeup. A similar level of available functionality for e-mail could serve to increase usage in a similar manner.

However, as there have been no comprehensive industry initiatives to date, government could provide a co-ordination role (for example in the provision of meta-directories<sup>4</sup>). These directories should be electronic rather than printed, and the responsibility for updating could be devolved to service providers responsible for maintaining their own customers' entries.

Standardised addressing is seen as a secondary issue to provision of comprehensive directory services, although a centralised national approach to standardised addresses (whether used directly or only as 'aliases' for other e-mail addresses) could provide a solution to problems associated with the current directory 'system'. There are, however major management and privacy concerns with this approach, particularly the availability of mass e-mail lists for 'spammers' to exploit.

**5. The legal framework for e-mail needs to be as comprehensive as those for postal mail and telephony.**

A mix of government policy and legislative initiatives, coupled with superior service delivery performance of network and/or service providers, are required to address user concerns about privacy, security and overall trust that will assume paramount importance in a mass-market environment. Analogies can be drawn between the delivery of postal mail and e-mail that may be useful to apply to the rights and responsibilities of users, carriers and service providers.

Management of privacy and authentication may be more appropriate through a tiered system of regulation, including government regulation and industry self-regulation.

Confirmation of the common carriage status for ISPs is vital, in terms of transport of messages (as opposed to storage). Legal and other working requirements need to be widely appreciated by all types of users and service providers, such that all parties are aware of their rights and obligations.

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<sup>3</sup> This statement may be viewed as contentious, given the recent success of mobile telephony, for which limited directory support is provided. However, much of current mobile usage is supported by the existing directory services for fixed line telephony, including the addition of business mobile numbers in the Yellow Pages, for example. However, there is no existing basic directory service for e-mail.

<sup>4</sup> 'Directories of directories' that may have passed some regulatory test on their comprehensiveness, maintenance and currency.

Existing consumer legislation should be applied clearly to e-mail, particularly the laws governing ‘reasonable notification’ (for example, by a government department). USO-type policies may only be useful when a large majority (i.e., more than 90 per cent) of citizens already have access. It is important to distinguish the difference between universal access and universal service.

Although control of spam may be achievable, with technical solutions and market forces addressing the problem to some extent, there is also a need for a legislative option as a last resort, including sanctions for spamming with criminal intent.

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# 1 Introduction

## 1.1 Overview

The use of e-mail for personal and business communication is increasingly widespread. E-mail is identified in many studies of Internet usage as the most used and most useful application of the Internet. E-mail applications include personal correspondence, workplace communications, support for electronic commerce and dissemination of news.

CIRCIT's 'E-Mail for All' project has focused on identifying gaps in current market directions and government policy that may provide barriers to universal take up of e-mail as a domestic communications channel. The project was conducted from March to August 2000, with the assistance of participants from industry, government and academia. Information Institute at RMIT and Australia Post are generous supporters of this project.

## 1.2 Justification

“The detrimental consequences of lack of access to the basic communications tools of the age for an individual’s ability to participate effectively in economic and social life has become a key political issue of our times.”<sup>5</sup>

### Why Focus on E-mail?

E-mail is the most used application of the Internet. This in itself distinguishes it from World Wide Web browsing, file transfer, transaction processing and other applications. It is a communications channel, rather than an information channel. This distinguishing feature means that it can be discussed in terms of already existing communications channels, such as telephone and post, which are widely used at an individual level.

This analysis can then begin to examine the necessary developments that need to take place to enable the widespread adoption of e-mail as a ‘domestic’ communications channel that is used by individuals in the home, in parallel with other existing modes of personal communication.

As the use of e-mail becomes more pervasive, as more business and government information and transactions occur on-line, and particularly as the physical equivalents become less attractive or less used, those not using e-mail or not accessible by e-mail – for whatever reason – will become relatively disadvantaged.

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<sup>5</sup> Lloyd, R., *Sociodemographic Barriers to Telecommunications Use*, Communication Law Centre, National Centre for Social and Economic Modelling, Australian Council of Social Services, Canberra, August 2000, p.3

The Australian Bureau of Statistics reported that up to August 2000, 34 per cent of all Australian households had access to the Internet. International studies and market research indicate that e-mail is indeed the ‘killer’ application – that is, most (if not all) Internet users access e-mail.<sup>6</sup> But what of the large proportion of society for which e-mail is currently unimportant, unaffordable or otherwise unavailable?

The 66 per cent of Australian households without domestic access to the Internet (and therefore presumably without domestic access to e-mail) are more likely to be older, less educated, earn less, be unemployed, and/or have poor literacy skills than current users of e-mail services.

Issues of access, affordability and useability may be more amenable to a universal solution for e-mail than for the Web. The accessibility of much Web-based information depends largely upon bandwidth constraints. By comparison, e-mail, being predominantly text-based, allows for a much easier and speedy transmittal of information, regardless of connection speed. Additionally, alternative devices are more suited to the display of text rather than rich visual information (for example WAP enabled mobile phones). Compared to postal mail, e-mail is seen to be faster, more flexible and transmittable independent of time and the point of receipt. Unlike telephony, e-mail can be stored until accessed, maintains a record of the communication and effortlessly enables one-to-many dissemination if required. On the other hand, e-mail can raise concerns over privacy and the receipt of unwanted messages. Experienced e-mail users overwhelmingly appreciate these advantages, whereas casual users may be more influenced by the disadvantages or simply have little need to communicate electronically.

In general, e-mail provides for improved awareness and access to better quality and more timely information that can benefit personal decision-making and/or life outcomes. The appropriate use of e-mail also enhances participation in our democratic society through greater opportunities for citizen and group involvement in political processes.

We have chosen e-mail as the focus of this project for the following reasons:

- Issues of access, affordability and usability are more amenable to a universal solution for e-mail than for the Web. The bandwidth problems confronting many rural users impact mainly on Web applications. An ‘information economy’ can also develop via stimulated use of e-mail, not only directly but also as a means of introducing many people to the Web who would otherwise not take that extra step.
- Some problems that could be encountered without e-mail may include a lack of access to government services and information, decreased competitiveness in the employment market and social isolation. If there is a tapering off in the current level of growth of e-mail usage, and a proportion of the population does not have access to this range of applications, how will this impact upon those people without effective access?
- If this form of disadvantage is recognised as a negative, what incremental changes can be made in addressing it? If one postulates a future scenario in which there is no relative disadvantage between sectors of the population, and e-mail is freely

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<sup>6</sup> See for example *Falling Through the Net: Defining the Digital Divide*, US Dept. of Commerce, 1999.

used by all who may benefit from its use in daily activities and personal communication, what barriers can be identified between the current situation and achieving that vision?

Many recent state and national government policies emphasise the importance of participation in the information society and economy, for example the Commonwealth's statement that: "The government is committed to ensuring that all Australians have open and equitable access to information available online".<sup>7</sup> An examination of the implications and practicalities of this broad policy statement falls beyond the boundaries of this project. The difficulties in addressing all the issues raised across the scope of that commitment mean that analysis is better addressed to more specific areas of research, in this case encouraging ubiquitous domestic use of e-mail.

### 1.3 Research Questions

As an aid to focussing discussion during the workshops on issues relating to the user perspective, we formulated a hypothetical vision statement:

*E-mail is available to all members of society and able to be used as a public communications channel that enhances users' quality of life and promotes interaction within and between communities of interest.*

This vision can also be expressed as a series of questions:

- Should there be a public policy goal of universally available and effective e-mail?
- What barriers prevent e-mail from becoming as ubiquitous as the telephone or post?
- What needs to be done to overcome these barriers?

'E-mail' in this context incorporates existing Internet service provider based services, free World Wide Web browser based services, short messaging services and future services for the transmission of data between individuals, either one-to-one, or one-to-many. The inclusive definition of 'all' includes special groups such as the aged, the very young, people with disabilities, people in remote areas, and people without the financial resources to purchase equipment.

This project aimed to identify the feasibility of adopting e-mail as a ubiquitous public communications channel. It is intended to explore the possibilities, examine issues and identify barriers to implementation of a vision of 'E-Mail for All', and in doing so examine the desirability and feasibility of adopting such a policy direction.

The issues outlined in brief over the following pages are not an exhaustive list of all elements of Internet and e-mail policy, technology, and usage. However, these topics provide an *aide memoir* for discussion, and serve to indicate the breadth of issues that may affect the implementation of a vision of e-mail for all. This project may be extended to produce a longer report detailing all issues regarding e-mail usage in public and organisational spheres.

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<sup>7</sup> *A Strategic Framework for the Information Economy*, Commonwealth of Australia (1998). See also *Connecting Victoria, the Victorian Government's Strategy for Information and Communications Technologies*, November 1999.

Issues arising from any consideration of implementing a vision of 'e-mail for all' include:

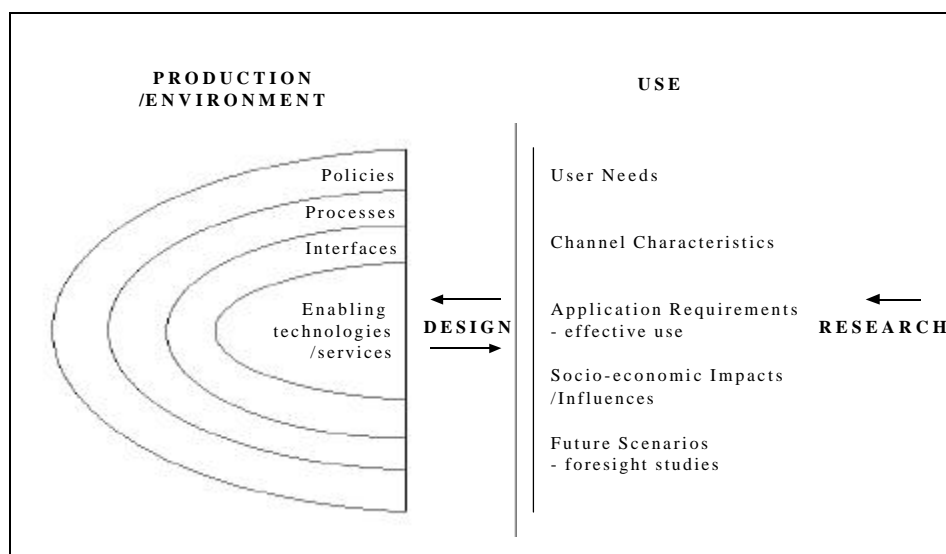
- Should there be a public policy goal of universally available and effective e-mail, rather than the present situation of the substantially market-led provision of access to the Internet (read 'World Wide Web') with its increasingly bandwidth-hungry applications?
- Should there be a unified e-white page directory?
- How can portable e-mail addresses be arranged?
- What cost-effective solutions are available regarding ISP offerings and user-friendly interface equipment?
- How can e-mail readily transform to and from voice and text/facsimile?
- What effective solutions exist for people with disabilities, or people with special needs
- How can privacy considerations be addressed?
- How can unsolicited mail (spam) be controlled?
- Can new interface designs readily incorporate message authentication suitable for the mass market?

## **1.4 Methodology**

CIRCIT utilised its existing body of knowledge on identifying user needs in carrying out daily activities to identify a broad range of issues in the use of e-mail. This focus was followed through a series of four workshops from a general examination of perspectives and prioritisation of issues, to detailed examinations of user needs, technological capabilities and designs, and policies, processes and market implications. The workshops used a focus on design as the bridge concept between use, production processes and the outside environment to identify issues and barriers to widespread e-mail use, to analyse gaps in existing market directions, and to develop recommendations for action.

The workshops were conducted between April and June 2000 at the Interactive Information Institute, Melbourne. Over 40 participants took part in the workshop series, many attending all sessions. The participants represented a broad range of stakeholders, including: the telecommunications and Internet services industries; marketing, management and useability consultants; rural users; academics specialising in software development, youth issues and adult literacy; and state and commonwealth government agencies.

Figure 1: Design Linking User Needs and Environment to Technological Development



### 1.4.1 Workshop 1

The first workshop canvassed a series of issues under the heading of 'Usage'. This involved assessing how communication channels (including telephones, postal services and e-mail) fulfil these needs. It also involved an assessment of demographics and possible future developments in communications technology.

The broad headings of the key issues identified by the workshop group carried through to the next workshop were:

- Advantages and disadvantages of e-mail
- Functionality and useability of e-mail
- Language, literacy and user group perspectives

### 1.4.2 Workshop 2

From the perspectives gained in Workshop 1, discussion here focused on user needs in context. Needs were identified across a range of user types, from high-end experienced users, to those that had never used e-mail or computers. The issues that were highlighted as impacting most on all classes of users were broadly:

- Spam
- Privacy
- Authentication
- Non-PC devices
- Interface design
- Directories and addressing

### 1.4.3 Workshop 3

The third workshop canvassed a series of technically related issues. This involved assessing the ways in which hardware and software, interfaces and devices fulfil the identified needs of users, and address issues of importance to non-users. This included an assessment of useability and functionality and possible future developments in communications technology. The following were highlighted as major technical issues to address from a policy, or a whole of market, perspective:

- Spam
- Standards and quality assurance
- Legal issues, including legal status of e-mail
- Smart cards for public access
- Directories
- Bundled service offerings
- Interconnect agreements

### 1.4.4 Workshop 4

The final workshop in the series addressed issues raised in the user and technical workshops, examining gaps in current service offerings and usage patterns from market and policy perspectives. Participants examined potential gaps and analysed market drivers and possible responses to these gaps in terms of market action and possible government policy development. A series of recommendations to enable 'e-mail for all' were established, and form the basis of the recommendations at the conclusion of this report.

The four broad headings under which issues were examined were:

- Advantages and disadvantages for non-users
- Improved useability and functionality
- Directories and addressing
- Legal and regulatory

The workshop series was not intended to provide an exhaustive discussion of all things e-mail, rather they were designed to identify and prioritise the main issues in examining the 'E-mail for All' proposition. There was extensive discussion around many more topics than those covered in this report, including adult literacy, organisational e-mail policies, community organisation use, electronic voting and many others. Excerpts of the transcripts of these discussions have been used, unattributed, within the body of this report.

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## 2 E-mail as a Communications Channel

Many communications channels are used in everyday life. We are all familiar with voice for face-to-face communication, telephone for one-to-one distance communication or tele-conferencing, television for broadcast and postal mail for physical deliveries of messages. E-mail has emerged as a new channel of communication for both residential and business users. It is important to investigate the advantages and disadvantages of e-mail alongside existing channels such as post and telephony.

### 2.1 Characteristics of Communication Channels

#### 2.1.1 Matching channels, activities, audiences and meanings

People mix traditional and online channels of communication for different activities to communicate with various audiences. E-mail is an increasingly important channel for communication, although face-to-face interaction, the phone, mail and fax continue to be important ways of communicating. To understand the mix of communication channels, we ask: Why does an individual choose one channel to communicate for one activity and another channel for another activity? The answer from our qualitative study of small business and electronic commerce (Singh and Slegers, 1998) showed the choice of communication channel was influenced by the fit between:

- The characteristics of the channel;
- The requirements of the activity;
- The communication choices of the audience; and
- The social and cultural meanings associated with the activities and channels of communication (See Figure 2).

The use of e-mail changes the nature of communication and redefines the nature of activities. CIRCIT research (Singh and Ryan, 1999, Singh and Slegers, 1998) shows that Internet communication needs to be more explicit than interpersonal communication to facilitate the comfort, control and caring essential for engendering trust.<sup>8</sup> This is because Internet communication lacks the implicit information conveyed through body language, voice quality, tone and actions in face-to-face interaction. Internet communication also lacks a sense of what is not being said. Hence the information intensity of an activity increases. Many activities change in nature, primarily becoming information activities.

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<sup>8</sup> The issue of trust is explored in greater detail in Singh, S. and Slegers, C. (1997). *Trust and Electronic Money*. Policy Research Paper No. 42. Melbourne: CIRCIT Ltd.

**Figure 2: Characteristics of Communication Channels and Activities for Small Business**

Characteristics of Communication channel and activity	Most appropriate -----Least appropriate					
	Mail	Fax	<b>E-mail</b>	Face-to-face	Telephone	Web page
Record	Mail	Fax	<b>E-mail</b>	Face-to-face	Telephone	Web page
Establishing relationship	Face-to-face	Telephone	<b>E-mail</b>	Fax	Mail	Web page
Reducing ambiguity	Face-to-face	Telephone	<b>E-mail</b>	Mail	Fax	Web page
Personal communication	Face-to-face	Telephone	<b>E-mail</b>	Fax	Mail	Web page
Speed (Written communication)	<b>E-mail/fax/</b> Web page	Mail				
Cost (Overseas communication)	Web page	<b>E-mail</b>	Fax	Mail	Telephone	Face-to-face
Accessibility – one to many (Over time and distance)	Web page	<b>E-mail</b>	Fax	Phone	Face-to-face	Letter
Manipulability (Data)	<b>E-mail</b>	Web page	Computer diskette by mail			

Source: Singh, S. and Slegers, C. 1998 (with references to E-mail changed to bold lettering).

Another way of conceptualising the characteristics of information channels is presented by Krol (1994) who compares the characteristics of three communication channels (See Figure 3).

To design these roles we need to understand:

- the mix of channels used by individuals in their communication;
- the connection between the mix of channels, the activities and the audiences;
- the social and cultural context of communication; and
- the way e-mail changes the nature of communication.

**Figure 3: Characteristics of communication channels**

	<b>Telephone</b>	<b>Mail</b>	<b>E-mail</b>
<b>Speed</b>	High	Low	Moderate
<b>Synchronicity</b>	Yes	No	No
<b>Formality</b>	Varies	Varies	Moderate
<b>Accountability</b>	Low	High	Moderate
<b>Conferencing</b>	Small group	One-way only	Any to all
<b>Security</b>	Moderate	High	Low

Source: Krol, 1994.

To Krol's categories, we can add trust, access, skills, anonymity, availability of directories, cost and usage as major issues that need to be addressed to satisfy a vision of e-mail for all.

**Figure 4: Additional Characteristics of Communications Channels**

	<b>Telephone</b>	<b>Post</b>	<b>E-mail</b>
<b>User trust</b>	High	High	Low
<b>Public access</b>	High	High	Low
<b>User skills</b>	Low	Low	Relatively high
<b>Anonymity</b>	High	High	Moderate
<b>Directory services and consistent addressing</b>	Yes	Yes	No
<b>Cost</b>	Relatively low	Low	Relatively high
<b>Current usage</b>	High	High	Low

The social and cultural meanings associated with the activities and channels of communication in a particular context are also important in matching channel characteristics and activities. This is where our approach has a greater similarity with the social theory of information rather than the "information richness" theory.<sup>9</sup>

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<sup>9</sup> The information richness theory has been used in prescriptive, descriptive and explanatory ways in the organisation and information sciences. This theory stipulates that channels have inherent characteristics which make them rich or lean. Face-to-face interaction is the richest media as it allows the opportunity for immediate feedback, conveys multiple cues tailoring messages to personal circumstances and offers language variety. Similarly, oral media – face-to-face and the telephone – are richer media than mail and written reports for they provide immediate, multidimensional feedback (Markus, 1994).

The information richness theory presupposes a transmission approach to information, seeing information in input and output terms. It also pre-supposes actors who rationally match medium to activity.

The social theory of information emphasises the "sense-making" dimension of information. Instead of the "bucket" approach where information is seen as a commodity that is transmitted, Dervin sees information as a construct of the user (Dervin & Dewdney 1986). There is no information unless it has been communicated and understood. Seeing information as a user construct leads to the focus on information as the user's way of making sense of new and unfamiliar situations.

In Dervin's work the social and cultural context is a given. Markus (1994) and Ngwenyama and Lee (1997) however have argued that the choice of media is influenced by the social context and meanings ascribed to activities and channels. Markus, Ngwenyama and Lee argue to broaden the information richness theory particularly as e-mail is both a "rich" and a "lean" medium, straddling telephone and written communication.

## 2.2 Advantages and Disadvantages of E-mail as a Channel

In the 1993-95 US study *Universal Access to E-Mail: Feasibility and Societal Implications* the Rand Corporation identified the following advantages of e-mail:

Over phone:

- Elimination of phone tag
- Ability to maintain record of communication
- Ability to use e-mail for more reflective, deliberative communication
- Ability to communicate one-one or one-many

Over post:

- Speed over delivery
- Flexibility and independence of time and location of receipt

And over both:

- Ability to incorporate rich multimedia content
- Ability to communicate with all in a universal system, not just selected groups

These advantages are those likely to appeal to both novice and experienced users. A survey conducted by the Pew Research Centre, *Tracking Online Life: How Women Use the Internet to Cultivate Relationships with Family and Friends*, (Pew Internet and American Life Project, May 2000), focused heavily on the advantages of e-mail as a family communications tool. It identified that the frequency of contact had increased, in many cases significantly, with close family members, more distant relations, and friends. Additionally, many respondents identified that the quality of their interaction with friends and family had improved. The study found that these observations were more prevalent for women than for men.

Anderson, Bikson, Law, and Mitchell (1995) also identified the following disadvantages in a universal e-mail scheme:

- Message overload at the individual user level
- Enabling 'undesirable' communities to communicate electronically
- Inequality between users of different skill levels
- Increased transparency of cross border commerce and communication (for some)

Another disadvantage is that e-mail communication becomes potentially public. Moran and Hawisher (1997) say,

*The crucial difference between e-mail and postal mail (p-mail) – and, indeed, all earlier forms of communication – is the ease with which e-mail can be stored, retrieved, and copied ... A second difference between e-mail and p-mail is e-mail's speed of transport and resultant rhythms of response. (p 84)*

E-mail is not as secure as p-mail. It has no envelope, which we trust nobody will open. E-mail –

*...is even more open to others' scrutiny than the p-mail postcard. The postcard can be read by anyone in the send-and-deliver process, and by anyone in the recipient's household, but that is still a relatively small potential audience. The audience for e-mail is, potentially, the world. (Moran and Hawisher 1997, pp. 84-85)*

Despite this lack of privacy, e-mail “as a medium can create the illusion of intimate, private communication”. (Moran and Hawisher 1997, p. 88) The privacy is heightened by a sense of immediacy because of the speed of e-mail transmission and potential response. (p. 89)

Hawisher and Selfe, 1997 say that:

*In writing to a screen, writers may at times lose the sense of an audience and, with that, the constraints and inhibitions that the imagined audience provides...Research in various fields, moreover, has suggested that the lack of paralinguistic cues such as one's appearance, tone of voice, and facial expression also invites participation on networks from those who do not normally speak frequently in face-to-face contexts (pp 8-9).*

These qualities of the medium also further blur work and personal boundaries.



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## 3 Non-users of E-mail

A distinction must be made between citizens who are already using e-mail and those who have not yet made use of this technology. The distinction is an important one because it goes to the heart of what is commonly referred to as the 'digital divide'. Non-users must be the primary focus of any universal e-mail system, as it is this group of citizens who would, arguably, benefit the most from such a system. Below we explore: the statistical problems encountered when attempting to 'discover' non-users; character profiles of 'typical' non-users; the disadvantage experienced by non-users of e-mail; barriers to non-user take-up of e-mail; and finally, non-user requirements to be met to achieve a universal e-mail system.

### 3.1 Who are non-users?

Australia lacks statistics on non-users of e-mail. For example, the Australian Bureau of Statistics' (ABS) *Use of the Internet by Householders* survey<sup>10</sup> does not convey the make up of the majority of Australians who do not use e-mail, for whatever reason. This means that any conclusions about non-users must be inferred rather than statistically calculated.

Further, the statistics from which we infer non-user data are themselves problematic. This is due to the fact that use of and access to e-mail is not specifically surveyed by the ABS.<sup>11</sup> Notably, the ABS data *assumes* Internet access and e-mail access to be one and the same, yet there is no statistical basis for such an assumption in the Australian context. One must look to international studies for justification of e-mail as the 'killer-application' – that is, the one most commonly used in Internet-based systems.<sup>12</sup>

However, the ABS figures, while not relating directly to e-mail access, suggest that the number of Australians with *potential* access to e-mail is growing. Thirty four per cent of all Australian households have on-line accounts; this figure is expected to rise to nearly 50 per cent by February 2001 (based on householders' spending intentions over the next 12 months). This positive outlook must be tempered with the observation that home PC ownership has plateaued somewhat over the last two to three years, and now is at 53 per cent of all Australian households.

A recent NATSEM report, 'Sociodemographic Barriers to Telecommunications Use'<sup>13</sup> commissioned by Telstra, utilising data from the ABS and KPMG studies, found that the key factors in differentiating levels of Internet usage were education, age, income and the number of children at home. These socio-economic factors were found to be

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<sup>10</sup> *Use of the Internet by Householders* (8147.0), Australian Bureau of Statistics, August 2000

<sup>11</sup> The fact that the Household Use of Information Technology survey is to be discontinued after November 2000 is also a matter for concern. Clearly, any replacement survey that included questions about e-mail use and access would be of great benefit to researchers and policy makers alike.

<sup>12</sup> See for example, *Falling Through the Net: Defining the Digital Divide*, US Dept. of Commerce, July 1999

<sup>13</sup> Lloyd, R., *Sociodemographic Barriers to Telecommunications Use*, Communication Law Centre, National Centre for Social and Economic Modelling, Australian Council of Social Services, Canberra, August 2000

more significant than regional differences, although lower incomes and educational backgrounds were associated with some regional areas.

Projections of domestic PC based Internet use were based on scenario modelling, with the most likely scenario projecting 71 per cent of Australian adults being connected within three years (compared with 37 per cent in March 2000). The optimistic and pessimistic scenarios respectively projected 81 per cent and 51 per cent of adults online at home in three years time. The study concluded that the recent focus on infrastructure provision and other supply side measures would not be enough to 'bridge the digital divide' based on income and educational factors.

What can we infer from statistics such as these about citizens who are not online? We can state, for example, that 47 per cent of Australian households do not possess a computer. More pointedly, perhaps, we also know that 66 per cent of households do not have an Internet connection. These figures point to a very different situation than the one described in the media and by other commentators.

These data point implicitly to a digital divide in Australia. While the gap between those with access to information technology and those without continues to decrease, there is no sign that this process will continue to the point where, for example, every household will have e-mail.

We know that uptake of Internet technology is dependent upon such factors as household income, age, employment status and location. ABS data support commonsense expectations:

- Households with an income of more than \$50,000 are twice as likely to own a computer and almost three times as likely to have an Internet connection;
- Adults in employment are more than twice as likely to be Internet users (partly due to the fact that 32 per cent of these accessed the Internet from work);
- Younger persons are more likely to have accessed the Internet than older persons (compare 86 per cent of 18-24 year olds with 30 per cent of persons over 55);
- Adults living in metropolitan areas more likely to access the Internet at home than their rural counterparts.

These figures suggest a quantifiable advantage being conferred upon citizens who are more financially secure, employed, relatively young and living in cities (where the rollout of fibre optic cable, for example, has been the most intense). At the same time, they confer a relative disadvantage upon those who do not have the means (or the motivation) to purchase expensive devices.

Without further quantifiable research, we can infer that non-users of e-mail are:

- More likely to be older;
- Less likely to be employed;
- On lower incomes; and
- More likely to be rural.

However, it is the unquantifiable nature of this group of citizens that casts doubts upon the arguments about the democratising effects of Internet and e-mail technologies. We know quite a lot about e-mail users; the fact that the same cannot be

said for non-users further reinforces the ‘digital divide’ between technology haves and have-nots.

This fact was best expressed by the US Department of Commerce report, *Falling Through the Net: Defining the Digital Divide*. While its findings reflect the American situation, the report emphasises the general effects of exclusion from beneficial technology. Relying on 1998 American census data, it argues that the digital divide has increased dramatically in recent years, with ethnicity, income level and education being the most important contributing factors.<sup>14</sup> The NATSEM report identified socio-economic factors, especially income and education as the most important factors in determining online access.

The US Department of Commerce report also surveys e-mail use in the American population. The report confirms that e-mail is indeed the ‘killer app’, that is, the application used by most Americans when they access the Internet. Nearly 80 per cent of Americans with Internet access at home send and receive e-mail. The report notes that this figure is consistently high regardless of factors such as race, income or education.<sup>15</sup>

The report distinguishes between those who use e-mail and the Internet, and those who have stopped using them. The latter constitute a third group, about whom little is known, especially in the Australian context. The report classifies this phenomenon as ‘Internet churn’. The most common reason respondents cited for discontinuing Internet use was the prohibitive cost of access.<sup>16</sup>

### 3.2 Quantifying disadvantage amongst non-users

The advantages and disadvantages of e-mail as a communications channel are discussed in another section of this report. Here, however, we are concerned with specific questions: Does lack of access to e-mail constitute a disadvantage? Is it possible to quantify this disadvantage, should it exist? Conversely, does use of e-mail confer an advantage upon users? Can this be quantified? These questions became a recurring theme of the workshop series:

*“...are there ways that you can quantify these benefits, are there studies that you can do which would give you some details about, especially if you can take similar socio-economic stratum of people that do or do not have, for example, e-mail access and try to quantify what economic impact that has had on them?”<sup>17</sup>*

*“Does [access to] e-mail constitute an advantage? For me, the answer is very, very clearly yes it does. If it does, then by definition those who do not use e-mail are disadvantaged, whether they realise it or not ... I know a lot of people who don’t use e-mail and don’t feel in any way disadvantaged but to my mind by definition they are advantaged if they don’t have at least the ability to access*

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<sup>14</sup> Ibid., p. 8

<sup>15</sup> Ibid., p. 40

<sup>16</sup> Ibid., p. 39

<sup>17</sup> Unattributed quote from a participant in Workshop 4, June 30 2000.

*e-mail on demand. Again, it has been touched on earlier but as access to e-mail becomes expected by organisations then that disadvantage will increase*<sup>18</sup>

One can argue that there is no specific disadvantage in not having e-mail, as some people are always relatively disadvantaged. Graeme Philipson recently expressed this argument in *The Age*:

*“While it may be a laudable aim to set up access points for low income earners to get on the Internet, this sort of social engineering rarely works and ends up favouring those who are already better off. If you have trouble getting enough to eat, going to the library will not help.”*<sup>19</sup>

Philipson’s point is that the real task for ‘social engineers’ is not increasing computer usage but “reducing poverty and economic inequality”. However, this serves to perpetuate a cliché: “the haves and have-nots”. As one workshop participant stated:

*“I would also like to point out that to my mind we have to remember that a lot of the people who do not use the Internet are not necessarily socially disadvantaged currently. I have got a lot of friends who are in the legal business or chefs in the community at large who simply do not know how to use the Internet.”*

Simplification of the debate fails to acknowledge the complexity and diversity of both users and non-users of e-mail; that a range of practical measures can be adopted to achieve greater parity in the information age; and that the existence of inequality in this area, while symptomatic of inequality in general, warrants a detailed consideration of policy action on the part of governments.

If there is a tapering off in the current level of growth of e-mail usage, and a proportion of the population does not have access to this range of applications, how will this impact upon those people who do not have effective access? For some, the greatest difficulty lies in ‘getting on the Internet’, or a lack of knowledge about what the Internet really is. This is a question of access, and is dealt with below. It also raises another important issue, namely, the perception that e-mail is the Internet:

*“There is a lack of knowledge about the Internet and there is also a perception that e-mail is the Internet. In fact, from my point of view I would argue that eventually e-mail, the Internet, the Worldwide Web will become pretty much irrelevant, it will become the one medium; I think it has to.”*

While there was some disagreement in the group on this point, the distinction between Internet and e-mail is an important one. Cost, or lack of knowledge about cost, is a major barrier to entry for non-users of e-mail. Poor support can also hinder uptake of e-mail amongst non-users who are unfamiliar with the technology.

### **3.3 Advantages to users and disadvantages to non-users**

One of the most important issues raised during the first and second workshops was the need to qualify the advantages of access to e-mail and the relative disadvantage of those without access to e-mail. What follows is a proposition of the advantages of e-mail to current users and the disadvantages for those who are unable to access e-mail as a communications channel, focusing on its utility as an essential social resource, in

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<sup>18</sup> Unattributed quote from participant in Workshop 2, 19 May 2000.

<sup>19</sup> “The Digital Divide Is Unfortunate But Inevitable”, *The Age* (IT), June 20, 2000, p2.

providing enhanced social capital and as an inherently useful communications medium. It should be noted that the workshop participants did not necessarily agree with these propositions unanimously. Nevertheless, it can be argued that:

- As the use of e-mail becomes more pervasive, as more business and government information and transactions occur on-line, and particularly as the physical equivalents become relatively limited, those not availing themselves of e-mail will become comparatively disadvantaged;
- In particular, e-mail will become increasingly important to those searching for job vacancies, telecommuting and/or accessing work-related information;
- In general, e-mail provides for improved awareness and access to better quality and more timely information that can benefit personal decision-making and/or life outcomes.
- The appropriate use of e-mail enhances participation in the democratic society through greater opportunities for citizen and group involvement in political processes;
- E-mail provides opportunities for more egalitarian, deliberative and reflective dialogs between individuals and within groups – the more so when contrasted against the general decline in letter writing;
- Increased access to and use of e-mail addresses the online disadvantage of those on lower income, with poorer education and/or living in rural areas.
- For the transfer of comparable content, e-mail is faster and generally more cost-effective than physical channels;
- E-mails enable added richness of communication via non-text attachments (video/sound);
- For plain text, e-mails are need less bandwidth and hence are not disadvantageous to rural users;
- Receipt and storage is independent of both physical address/location and time;
- E-mail systems inherently provide a time record of message content interactions;
- As access/use becomes widespread a ‘network effect’ ensures that the value of e-mail to both those already online and new entrants increases exponentially.

The advantages of e-mail as a communications medium, in a context of other channels for similar or different communications needs, provides a basis for further exploration of these propositions – particularly those who do not use e-mail.

### **3.4 Non-user requirements**

#### **3.4.1 Lower Entry Costs**

The costs involved in accessing telephone and postal services vary widely. The advent of competition in the telecommunications industry has led to some price reductions, especially in STD and international calls. Postage costs remain regulated but will be opened to competition, except for local post, in the near future.

The costs of e-mail access also vary, depending on a number of factors:

- The cost of purchasing or renting a device

- The cost of connection to a service provider
- The cost of the provider's services
- The cost of telephone calls

These costs may be bundled in a number of different ways. The home user may purchase a PC, use a modem to make local calls to their ISP via a telecommunications provider, and have an unlimited use monthly account with the ISP. On the other hand a casual user may pay per hour to use facilities at an Internet café or access their account for free from a public library.

From the point of view of direct marketers, mass e-mails are far cheaper than phone surveys or postal mail-outs. From a consumer perspective, e-mail circumvents a large proportion of the costs of STD and international telephone (and postage) services. In this sense, initial costs in setting up e-mail access are offset by (potentially) decreased phone bills and faster delivery.

Whether e-mail access is free or fee-based, costs will always be involved in the use and provision of e-mail services. These include the cost of purchasing a PC, wireless phone or other device; monthly access fees or hourly rate charges for consumers; the costs of provision of infrastructure (for example fibre optic cables); and the costs associated with setting up e-commerce.

Some of the costs incurred by free e-mail services are financed by advertising, whether it be banner ads appearing at the top of a screen, or direct marketing via e-mail. Increasingly, advertising is also proving to be a source of income for advertising 'guinea pigs' – consumers willing to accept advertising on their screens in return for financial incentives. Advertising on the Internet has many implications, not all of which can be discussed here in depth. However, they include the prevalence of spam, the privacy concerns raised by the tracking of a user's Internet habits and the resultant reduced attraction of the Internet for some sections of the community.

### **3.4.2 Improved User Skills**

When speaking of user skills it becomes important to differentiate between levels of use, and of users. In the case of telephone and postal services, the skills required to communicate usefully are at present seen as easy to learn: for example, dialling a number, or writing an address (although the latter does, admittedly, assume a level of literacy). The skills required of e-mail users, on the other hand, are necessarily more complex. Even a casual user, who uses e-mail to communicate with friends, needs basic keyboard and literacy skills. An employee of a large organisation that conducts the majority of its internal correspondence via e-mail needs to acquire further skills to perform his or her tasks effectively. At the other end of the spectrum, users who are highly proficient in the area of computing are arguably making the most effective use of e-mail communications. In general, however, the skills required of people who use e-mail are relatively high; and it may be that the lack of skills amongst those who do not use e-mail is hindering the achievement of access for all to e-mail services.

### **3.4.3 Improved Accessibility**

A key element in any effective e-mail service is its accessibility. For example, there is a gap between members of the community who have access to e-mail at home or work

via PCs and those who rely on public institutions (or commercial providers) for access to these services. Clearly, an emphasis on increasing PC ownership may not be the only (or most appropriate) solution to decreasing this technology-gap.

In Australia, most people take access to the post or telephone for granted. Anyone with a street address or a post office box (or even a name, as in *poste restante* services) can receive mail. The act of sending mail is as simple as dropping a stamped envelope in a street side mailbox (or in rural areas an RMS (roadside mail service), which performs both sending and receiving functions). In the case of telephony, public access is more straightforward in urban as compared to rural areas, although the provisions of the Universal Service Obligation do guarantee a minimum level of service provision to them.

Various factors hamper public access to e-mail. These include the costs associated with connection, the inappropriateness of e-mail to user needs (for example, the specific needs of users with disabilities) and a lack of knowledge and skills. Provision of public access terminals in libraries and other community spaces may only go part of the way towards the provision of ubiquitous, household access to e-mail:

*“My personal experience of highly connected societies is that they in fact tend to neglect public access and [these difficulties associated with lack of public access] tend to die away anyway. Two examples are Stockholm and Silicon Valley. I remember being in a situation of not carrying a laptop in Silicon Valley. We had to walk - nobody walks in California - up to [ ] which is a printing place to get access to a terminal we could rent. The hotels did not have public access terminals. In Stockholm there are three Internet cafes ... So when you actually look at these well-connected societies where it is into the homes, public access ceases to be either a marketable or in fact sustainable thing.”*

This assertion may or may not be borne out by ABS statistics, which show that in the year to August 2000 only 13 per cent of Australian adults accessed the Internet in a public library. Such statistics must be weighed against the fact that use of public library terminals is often constrained by limited time, a lack of privacy and a shortage of staff support for novice users.

*“In many other parts of Australia you actually pay even to use a public library for the purposes of sending e-mail and so forth. While the public library network is doing its best and groups like Skills Net in Victoria are doing their best to provide access to young, poor people and others, it’s still a very patchy situation.”*

### **3.4.4 Identification Of Differences Between User Groups**

Effective access to e-mail depends on literacy and language skills. A 1996 ABS report, ‘Aspects of Literacy: Assessed Skill Levels’ pointed to a serious lack of literacy within the Australian community. The report found that, assessed against three scales – prose, document and quantitative literacy – 44 per cent of Australians between the ages of 15 and 65 did not possess the literacy skills to cope with a varied range of material in their daily life and work. This surprisingly high figure was fairly consistent with other countries studied, including New Zealand and Canada.<sup>20</sup>

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<sup>20</sup> Aspects of Literacy: Assessed Skill Levels, Australian Bureau of Statistics (4228.0), 1996

Figures such as these put a potential ceiling on the percentage of users of e-mail at 56 per cent of the Australian (adult) population. Latest statistics indicate that in the year to August 2000, 48 per cent of Australians accessed the Internet. Is saturation point fast approaching? Again, it should be pointed out that what data exists is inconclusive. The data can be used, however, to illustrate the barriers some users may be faced with when using e-mail.

A correlation exists between low literacy and unemployment.<sup>21</sup> Further, measurement of levels of literacy is predicated upon the English language. ABS statistics reported elsewhere indicate that in 1996 16 per cent (or 2.5 million) Australia's population over the age of five spoke a language other than English at home. As one workshop participant put it:

*“At the moment we are a very English centric e-mail environment. I know some people who are working in Thailand and apparently they have great difficulty sending e-mail messages in Thai even between different brands of Unix; they can't set up their machine in the same way.”*

With the vast majority of web pages also being written in English, Western dominance of the medium is a cause for concern, especially in a country like Australia whose migrant community is large and varied. This is not to say that the future of e-mail communications is bleak for those who do not use English:

*“Handwriting recognition may solve our language other than English problem because we are not putting an English centric keyboard at a person's desk. There is no difficulty in recognising Greek or Thai letters if it is handwriting recognition because it is just another language; you can get the software that represents that language. It is just a different set of shapes.”*

However, the dominance of English does pose problems for users from non-English speaking backgrounds who are unable to access e-mail services in their own language. It also emphasises how important adequate literacy remains in the information age. On the other hand, the proliferation of new devices and software platforms may lessen the need for literacy. For example, voice mail services convert speech to e-mail in a variety of languages; and video e-mails enable users with low literacy to communicate without text. One foreseeable barrier to accessing these kinds of technologies is their (currently) high price. As has already been noted, those with low literacy skills are also more likely to be unemployed, making such applications unaffordable to them.

The special needs of young people are often overlooked when assessing the effects of technological change (see, for example, the ABS's emphasis on 'adults' in its household surveys). As one participant in the workshop series put it:

*“The poor young people we spoke to were acutely aware that they were not online. I did a focus group with six young people that were long-term unemployed and were also connected to the Children's Court and they said that they would never get a job because they didn't know how to turn on a computer. They know that there is this digital divide out there.”*

Recent studies by the Australian Institute of Health and Welfare<sup>22</sup>, the Communications Law Centre<sup>23</sup> and the Department of Education, Training and Youth

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<sup>21</sup> See P. W. Miller & B. R. Chiswick, “Literacy, Numeracy and the Labour Market”, Ibid. pp. 73-79

<sup>22</sup> Australian Institute of Health and Welfare (1999) *Australia's Young People: Their Health and*

Affairs<sup>24</sup> have provided a clearer picture of the causes and effects of technological disadvantage, from the perspective of young people.

For instance, today's generation of young people is the first whose whole life will be mediated by contact with computers and other communications devices. The 'extraordinary cultural shift' this entails (to quote the Executive Summary of the second of these reports, *Mobile Matters*) was also mentioned during the workshops:

*"Everybody has got a young relative or friend who has nearly bankrupted themselves with their mobile telephone bill and the anxiety I have about this extension of access that is there is going to be an extension of indebtedness and other social problems that go with it and somebody needs to be tracking that."*

Clearly, differences between user groups must inform policy debate about the process of working towards a universal e-mail system. For example, while use of computers in school has risen dramatically over recent years, the Real Time Study found that there is a digital divide between students who also have access to a computer at home (predominantly those from independent schools) and those who rely on access in the classroom (those from government and Catholic schools).

Government initiatives aimed at breaking down this kind of divide focus on 'the bush' (i.e. regional areas) as the primary location of interventions. Political rhetoric of this kind fails to recognise that disadvantage also exists in urban areas – i.e. the cities where the majority of Australians live. Regardless of this distinction, disadvantage is a product of racial and socio-economic difference. A recent study by the Australian Youth Foundation<sup>25</sup> found that the disadvantage experienced by Aboriginal people online is exacerbated by the systematic discrimination they experience in everyday life. This would presumably be true for Aboriginal people in remote as well as urban areas, thus complicating further attempts to make general statements about where disadvantage lies.

Our analysis of available literature and statistics suggests that there is not enough known about current levels of access and non-access to one of the most commonly used Internet applications. Most available quantitative studies of Internet usage focus on connectedness, access and transactions: too few have a communications focus.

### **Recommendation 1.**

**There is a need to understand and quantify the characteristics of non-users and their reasons for non-use; the characteristics of 'churn-users' (i.e. users who stop using e-mail) and their reasons for doing so; and the use of e-mail amongst what are traditionally considered marginalised groups including the elderly, people with disabilities, Aboriginal peoples, the young and regional Australians. To**

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*Wellbeing*, AIHW, Canberra

<sup>23</sup> Kate MacNeill, Andrew Funston (1999): *Mobile Matters: Young People and Mobile Phones*, Communications Law Centre, Melbourne

<sup>24</sup> Department of Education, Training and Youth Affairs & Australian Key Centre for Cultural and Media Policy (1999), *Real Time: Computers, Change & Schooling*, DETYA, Canberra

<sup>25</sup> Funston, A. Morrison, M and Galea, D (2000): *Investigating Gaps and Opportunities: Young people's access to IT in Australia*, Foundation for Australian Youth, Sydney (available in PDF at <http://www.ayf.org.au>)

**achieve this, we propose the development of a national survey, involving the Commonwealth and State governments and any relevant research institutes.**

Our understanding of currently available information suggests that there are a number of significant factors affecting the use of e-mail and the Internet, primarily income and education. While technology such as TVs and VCRs have enjoyed a high take up rate, the entry cost has fallen significantly over time. PC pricing, which has long dominated entry level devices, is significantly higher than other entry level devices, while used PCs fail to provide adequate functionality for modern software, including Internet applications. This leads to recommendation two:

**Recommendation 2.**

**The entry and operation cost for non-users of the combined impact of access device and network service, needs to be significantly lower than at present to encourage mass-market connectivity. A business model to subsidise or support a basic or standard service should be developed by the National Office of the Information Economy (NOIE).**

In the next section of the report, we explore features of e-mail that might constitute components of such a standard service.

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## 4 Key requirements for effective use of universal e-mail

Although there is overlap between useability, technical, policy and market issues, this section focuses on the extent to which technical product solutions already on offer (as well as possible future developments) satisfy identified user requirements in functionality and useability. Policy and market implications for government and industry follow in Section 5.

The 1995 paper produced by the Cross Industry Working Team (XIWT) of the US-based Corporation for National Research Initiatives (CNRI) 'An Architectural Framework For The National Information Infrastructure'<sup>26</sup> described three network layers (physical infrastructure, enabling services and applications) for functionality, trust and control. These broad definitions were applied to the categorisation of e-mail issues raised in the workshops:

### 4.1 Functionality

*Functionality describes each component's responsibility to the system as a whole. Directly or indirectly, each component must help users accomplish a task. Functionality suggests the interfaces, useability, and localization required for each functional component.*

#### 4.1.1 Devices

E-mail has been traditionally seen as a PC-based application. However, there is now enormous growth in the number and diversity of other devices providing similar functionality. The market for devices, including palm top units, screen phones, WAP enabled mobile phones and games consoles with Web access is growing rapidly. Applications development is also bridging the gap between voicemail, e-mail, fax servers, text services to voice. Broadly speaking, devices and applications can be broken down into hardware and software groupings:

##### Hardware:

- **Desktop devices:** includes PCs, Macs and other operating systems. Characterised by large and established academic and business markets. 53 per cent of Australian households have a desktop computer. Advantages include relatively large storage space and the potential for other applications. Disadvantages include cost and complexity.
- **Hand-held devices:** includes mobile phones, e-mail specific devices (Pocketmail) and other small multi-function devices such as the Palm Pilot, E-Fone and I-Mail (Japan). Short Messaging Service (SMS) enables the sending of short messages between mobile phones (and possibly between PCs and mobiles). The Wireless Application Protocol (WAP) enables Web pages to be converted for viewing on mobile phones using Wireless Markup Language (WML). Advantages include portability, relatively low cost and ease of use (compared with a PC).

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<sup>26</sup> 'An Architectural Framework For The National Information Infrastructure'  
<http://www.xiwt.org/documents/ArchFrame.html>

Disadvantages include inability to deal with attachments or printed copies and the smallness of physical interfaces. Australia has more than 6 million mobile phone services.

- **Kiosks:** includes commercial and not-for-profit e-mail access points. For example, Telstra's Big Pond offers Internet and e-mail access from small booths located in shopping centres, post offices and the like. The charge is relatively low (between \$1 and \$10 per session). Internet and e-mail access in Victorian public libraries is free but limited by time allocation, lack of privacy and availability of terminals.
- **Non-PC domestic devices:** apart from the novelty devices, including screen fridges and e-mail enabled toasters, this category includes Sega Dreamcast (a games console with e-mail/ Internet access), iPhone (a small-screen device which enables sending and receiving of e-mail), Open (an interactive digital satellite TV service) and digital television (with datacasting). The latter service has potential to offer e-mail attractive to many consumers who are otherwise unlikely to access the Internet.

## Software

- **PC applications:** includes Outlook, Explorer, Notes, Eudora and other applications, as well as ISPs (OzEmail, Big Pond) and downloadable e-mail programs (Easymail). Prices for ISP accounts vary, depending on the features and services used. Stand-alone applications such as Easymail may carry some restrictions, for example a limited number of messages or no Internet access.
- **Internet/Web applications:** refers to Web-based e-mail access such as Hotmail and Yahoo!, characterised most often by their low cost (but ubiquitous advertising). Levels of service vary – for example, Hotmail users may not be able to send attachments, depending on their browser. However, these services are accessible from wherever there is Internet access. In addition services such as ThatWeb provide location independent access to POP server accounts.
- **Services:** refers to the range of services available either through the Internet or via other communications channels. For example, Mail Call allows users to call a (US) toll-free number and have e-mails converted to voice – other hybrid mail services provide conversion from e-mail to fax, fax to e-mail, and handwritten messages to e-mail (Shanghai Post). Filtering services such as Bluetail and Mail Robustifier screen out unwanted spam and sort incoming messages into folders. This category also includes encryption and authentication services, translation, virus scanning and other services. InTether software can impose rules on the recipient's use of a message and will destroy the message if rules are violated, protecting communications once they are received and/or decrypted.
- **Directory Services:** services which allow you to look up a person's name and find their e-mail address, for example BigFoot, whowhere.com, MESA (Meta E-mail Search Agent). The shortcomings of current e-mail directories are discussed below.

Separate third party vendors and/or service providers often provide many of these features. For example, there is no one supplier of an e-mail package that provides encryption, translation, useful directory access, filters, hybrid mail, and message

protection. Also, there is a need for many of these services to remain active but invisible to the user, a model that is not often followed by vendors.

It is clear from the above (albeit limited) discussion that the proliferation of devices could lead to problems of inter-operability, redundancy and incompatibility. This may well be a driving factor in a person's decision not to access e-mail. Confusion in the community about appropriate models for individual needs, the highly competitive computer hardware market and its emphasis on packaged applications, as well as the wildly varied costs associated with devices and PCs could be regarded as serious barriers to uptake.

### **4.1.2 Interface Design**

E-mail programs, largely designed solely for PC-based access, have varied user interfaces. Older e-mail programs, such as Eudora, rely on relatively simple menu driven text-based interfaces. Newer, more complex systems, for example Microsoft Outlook or Lotus Notes, incorporate rich graphical user interfaces with calendar, schedule, contact management and workflow functions. Web based e-mail services, particularly those with no subscription fees, range widely in the degree of functionality offered, and in interface design. Often these services are subsidised by advertisers through 'noisy' flashing banner ads. The proliferation of applications requires users to adapt to a greater variety of interface designs. Additionally, many of these interfaces assume much about the skill level of the user, as well as their background, by employing office-based metaphors for interface design. Little consideration is given to universal design concepts.

The work being done by the W3C consortium is a good example of the propagation of universal standards based on the functional needs of low-level users. Good interface design benefits both current users – who may have had negative experiences with more than one e-mail interface in the past – and non-users, whose concerns for this unfamiliar technology may be greatly lessened.

### **4.1.3 E-mail with other than text**

The availability of attachment options (to append a file to an e-mail) increases the practical uses of e-mails. The incorporation of video, sound and other attachments can add to the richness of communication, and increase the breadth and value of interaction between parties. The degree to which basic literacy can prove to be a barrier to take up of e-mail services may be diminished by the increased use of sound or video files. The reduction of potential miscommunication through additional context in messages could also prove to be an advantage.

However, the incorporation of these facilities may present some barriers to use – large multimedia files may be difficult to view on certain devices and slow to download with low connection speeds. Additionally, the use of attachments can also increase the possibility of virus transmission, through attached macros. In general, applications providing sound and vision need to be functional and useable. This depends on a variety of factors, including compression algorithms, the ability to download, bandwidth constraints and the capacity of the user's computer. While a detailed examination of this kind of e-mail application is beyond the scope of this project, it

will be interesting to see whether such applications become more workable in the future.

Elsewhere in the world, notably in India, video e-mail booths are proving extremely popular amongst populations whose languages are not catered for in computer programming, or whose literacy remains low. Ironically, the adoption of video technologies by these communities could lead to greater enthusiasm for information-rich e-mail in what are traditionally regarded as more 'advanced' countries. Hence, these applications could become a positive incentive for non-users of e-mail to become users.

## 4.2 Trust

*Trust has three major sub-elements: security, integrity, and assurance of performance. Security describes a system's ability to ensure adequate protection, accessibility, and integrity of information. Integrity includes such concepts as graceful degradation of performance in the event of failure, recovery after failure, and fault tolerance. In some environments, not meeting required performance levels is equivalent to failure. Requirements for performance must also consider issues such as acceptable performance and cost.*

### 4.2.1 Privacy

Questions of privacy have become more pressing since the advent of e-mail and electronic communications. Computer messaging systems give users and administrators the ability to obtain personal data about others in a way unparalleled in other communication forms. For example, a person wishing to obtain information about a product from a retailer can do so in various ways – by telephone, inquiring in person, or reading a brochure. None of these methods enable the retailer to access personal information about the inquirer beyond what they can physically observe by hearing or seeing. The same cannot be said for e-mail.

E-mail addresses and content can provide information about a person that may form the basis of judgements on their employment status (use of a work e-mail address vs. use of a free e-mail address), their actual name and a return contact address. (Although caller ID can provide this return 'address' via telephony, other information needs to be volunteered by the caller.)

The potential for unwanted e-mail messages or spam to inconvenience users is very real. It routinely clogs in-boxes and costs end users time and money (either directly, through paying for downloads, or indirectly, through increased ISP costs to manage spam).

Private information, whether it be personal details or records of transactions or communications, is valued differently by different individuals. Many people are willing to make a trade off between privacy of personal information and what they perceive as value in the provision of tailored or free services. The dollar value of personal information, whether it be as simple as a valid name and contact address (in this case, an e-mail address), or more informative data, such as lists of purchases, birthdates, family details etc., is likely to be higher to a marketer or retailer than to the consumer.

Release of personal data is often beyond the control of the consumer: who originally consents for a specific purpose. Mail lists are released for profit, for one off mailouts or for on-going use; companies merge or liquidate their assets. Given the dynamic nature of the industry, providers of free Internet services may easily transfer domain name ownership or management to other service providers, including users registering at those domains.

A current Senate Inquiry<sup>27</sup> has addressed, peripherally, issues of privacy in relation to e-mail. The level of protection offered to personal data should, as a baseline, address the needs of users who do not wish to make the trade off between privacy and services or rewards.

Standards applying in this area include current and pending Commonwealth legislation (the Privacy Act 1988 and the Privacy (Private Sector Amendment) Act 2000) and the National Privacy Principles. While the changes to the legislation were, at the time of writing, still going through the parliamentary process, we note that privacy issues for e-mail are likely to be largely unresolved. This is likely to be a major concern for current users.

#### **4.2.2 Spam**

Early definitions of spam referred to the inappropriate use of USENET and other mailing list or discussion group facilities to send mass e-mails to many users at a time.<sup>28</sup> This can be expanded to incorporate a variety of inappropriate uses of e-mail including:

- Unsolicited legitimate commercial e-mail, the electronic equivalent of postal junk mail from legitimate businesses (regardless of whether the industry adopts an opt-in or opt-out approach);
- Unsolicited illegitimate e-mail, propagated by proprietors of ‘get-rich-quick’ schemes, pornography sites and hoaxers;
- High volumes of forwarded e-mails (jokes, cartoons, etc.) from known sources.

A variety of techniques can be used to limit spam – some technical, some legal. The technical ways include user-based and ISP-based intervention. Users can utilise filtering software with pre-programmed rules to avoid viewing spam, or create their own delete rules in e-mail clients. However, this does not avoid one of the major problems with spam – that users pay for the receipt of unsolicited, useless messages.

ISP intervention can occur in multiple ways:

- by blocking traffic from known spammers, discovered through lists circulated by groups such as [netabuse.org](http://netabuse.org);
- by providing rules for sending mail into, through or from their domain, such as limiting the number of recipients a single message can go to;
- breaking large address lists into smaller components;
- delaying transmission of such messages.

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<sup>27</sup> Senate Select Committee on Information Technologies Inquiry on e-Privacy, Public hearings held week of 21-25 August.

<sup>28</sup> See for example <http://www.matisse.net/files/glossary.html>, or <http://www.jargon.org>.

Compliance with these rules can be at an individual ISP level, or at an industry-wide level, through the enforcement of legislation or industry codes of conduct.

The Coalition Against Unsolicited Bulk E-Mail (CAUBE) presented a submission to the Senate Standing Committee on Information Technology's recent Inquiry into e-Privacy,<sup>29</sup> detailing a range of measures designed to block spam, to varying degrees of success. Their main argument was that the only way to effectively reduce the economic benefits enjoyed by spammers by sending millions of e-mails at extremely low cost is to endorse 'opt-in' schemes, where advertisers may only send to users who have actively selected inclusion on a particular company's mailing list.

E-mail services which refrain from passing e-mail addresses to direct marketing companies and/or allows users to screen out spam (unwanted mail of a commercial nature) are highly regarded. Benefits are passed on to both service providers and users in terms of less unwanted traffic in messaging systems (leading to faster e-mail delivery) and less clogging of in-boxes with junk mail.

At the time of writing, amendments to the Privacy Act had not received royal assent. In any case, any such changes would not come into force until at least late 2001. Nevertheless it is worth noting that the amendments are likely to favour an 'opt-out' model for unsolicited bulk e-mail, whereby a marketing company is allowed to send unsolicited e-mail to users on a single occasion, after which the user has the option of 'opting-out'. This may be a cause for some concern amongst users who value the integrity of their personal information. It may also detrimentally affect the number of current non-users who are likely to access e-mail services. Attitudes towards privacy could be measured through the survey of non-users detailed in Recommendation 1 of this report.

### **4.2.3 Message Authentication**

Methods for authentication of e-mail messages are an important stepping-stone to increasing the use of e-mail for personal use, particularly when linked with payments or sensitive information transactions. Formal authentication can be provided by encryption and digital certificates used in combination to produce digital signatures. The use of digital signatures (where appropriate law supports them) in conjunction with public key encryption provides not only authentication of the sender of a message, but also guarantees message confidentiality and integrity, and non-repudiation by the sender (that is, a sender must disprove that it was they who sent the signed message). A public key infrastructure managed by a certification authority can provide a 'root' for trust relationships between parties that have no prior relationship. Depending on the purpose for which digital certificates are exchanged, or documents digitally signed, a certification authority can issue certificates that are for the purpose of validating identity, authority or membership. A web of trust model (used in such products as Pretty Good Privacy (PGP)) provides verification of the users' identity or other attributes through the (digitally signed) support of other users.

Informal authentication can be provided to e-mail users through other methods. The inclusion of personal details of the sender, which the receiver may already know, provides a basis for making a judgement on the veracity of a users' claim to an

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<sup>29</sup> Submission number 3 to Senate Select Committee on Information Technologies 2000.

identity. Additional contact details, such as a phone number, business details (such as an ABN) or address provide other avenues through which someone can verify a senders' identity. Additional details need to be provided to establish credibility and reliability of a user.

For a formal public key infrastructure to work, a receiver must be able to check a senders' public key certificate in a directory provided by a trusted third party. This is technically feasible, through the use of scalable X.500 directories, but raises many of the same issues as discussed above in the context of e-mail directories.

#### **4.2.4 Affordability**

Whether e-mail access is free or fee-based, costs will always be involved in the use and provision of e-mail services. These include the cost of purchasing a PC, mobile phone or other device; periodic access fees and possibly also usage charges.

Some of the costs incurred by free e-mail services are financed by advertising, whether it is banner ads appearing at the top of a screen, or direct marketing via e-mail. Increasingly, advertising is also proving to be a source of income for advertising 'guinea pigs' – consumers willing to accept advertising on their screens in return for financial incentives. Advertising on the Internet has many implications, not all of which can be discussed here. However, they include the prevalence of spam, the privacy concerns raised by the tracking of a user's Internet habits and the resultant reduced attraction of the Internet for some sections of the community.

Existing pricing plans vary. Some ISPs charge a flat rate for access to an e-mail account. Others charge fees based on the number of hours a user spends on the Internet (this applies to users of web-based e-mail services). Therefore, while an e-mail service (such as Hotmail) may be free, the cost of accessing one's e-mail may be quite high. Monthly fees for Internet access can range from zero to \$40 or \$50. When this is added to the cost of a telephone line (approximately \$16 per month, excluding call costs) and the cost of purchasing a device, the overall costs can be prohibitive, especially for users on low incomes.

Recent initiatives aimed at providing low-cost access to computers and the Internet (for example, the Virtual Communities project) greatly reduce the amount of money required up front, thus making e-mail a more attractive medium for some users. Possible problems that may be encountered through these schemes include eventual possession of a redundant machine or device; exposure to unwanted advertising and a limited ability to change ISPs. The consequences of this can only be speculated upon at this point in time. The point remains, however, that Virtual Communities and others are acting to fill gaps in the provision of e-mail (under the broad scope of Internet access) at a relatively low cost.

Low-cost access to e-mail must be seen as being advantageous to both users and non-users. For users, it is an incentive to remain connected (as opposed to becoming a 'churn' user). In general, also, the value of a network increases in accordance with the number of users networked. For non-users, low-cost PC ownership removes the financial hurdle of initially outlaying large amounts of money.

#### **4.2.5 Vulnerabilities of e-mail**

The spread of viruses and denial of service attacks are two of the unsavoury sides of e-mail. Distributed rapidly via electronic messaging services and unknowing users, viruses can destroy software programs and files in computer systems. Although usually intentional and malicious, a denial of service attack can sometimes happen accidentally. This type of attack is a security breach on a computer system that does not usually result in the theft of information or other security loss. However, these attacks can cost users a great deal of time and money.

A denial of service attack deprives an organisation of a resource they would normally expect to have. In the worst cases a Web site accessed by millions of people can be forced to temporarily cease operation.

The most common kind of denial of service attack is simply to send more traffic to a network address than the programmers who planned its data buffers anticipated. One of the better-known attacks based on the buffer characteristics of a program or system include sending e-mail messages that have attachments with 256-character file names to Netscape and Microsoft mail programs

A mail bomb is the sending of a massive amount of electronic mail to a specific person or system. The mail may simply fill up the recipient's disk space on the server or, in some cases, may be too much for a server to handle and may cause it to stop functioning. In the past, mail bombs have been used to 'punish' Internet users for violations of 'netiquette' – abuse of mail lists and spamming. Unknowingly, users replying to all recipients of mailing lists, rather than the creator of a particular message, can create spam.

There is a real risk to the ongoing usability of a universal e-mail through sheer traffic volume. Assuming that incremental increases in the availability of bandwidth are able to cope with an increasing number of users, models need to be generated to estimate the number of messages that users may send to fully appreciate demand. One factor that could be addressed to reduce unwanted traffic, or accidental spamming by inexperienced users could be to ensure that senders confirm that they want to send a message, rather than accidentally sending a message that is incomplete. Poor interface design can add to confusion for new users.

#### **4.2.6 Storage**

Different e-mail services store messages in different ways, ranging from solely Web based systems (such as MSN Hotmail) to ISP based systems (for example, OzEmail), where mail is downloaded from a central server to individuals' own storage systems (hard disk, floppy). Capacity of storage varies between service providers, although current offerings from free services are about 2Mb, and ISP hosted services upwards of 5Mb of storage for each postbox. Limitations also exist for storage periods for unread or uncollected mail – typically around 90 days.

Clear legal responsibility for the storage of users' messages needs to be established, particularly when public terminals are being used. The need for a legal framework for e-mail is discussed in greater detail in section 4.4 below.

## 4.3 Control

The CNRI definition of **Control** includes four major sub-elements: manageability, serviceability, measurement, and adaptability. Manageability involves controlling the component or system under normal situations. Serviceability deals with being able to recover and fix things when they break or to protect them from breaking. Measurement includes performance statistics and descriptions of component states, as well as accounting functions. Adaptability covers a component's ability to evolve with a new technology in a predictable way to meet changing demands.

### 4.3.1 Addressing

In many circumstances, phone numbers can be transferred and mail redirected when you move house, but should you choose to change ISPs, or if companies merge or go out of business, you must obtain a new e-mail address. E-mail may be redirected to a new address but the procedure is complicated, even for an experienced user of e-mail. It is possible to obtain a multitude of e-mail addresses for different purposes through Web-based e-mail services that may be in constant use or may swiftly become redundant or forgotten. Conceptually, it may be difficult for some users to understand that a single e-mail address can be used on multiple occasions from multiple sites – 'I don't want to receive e-mail, I only want to send it'.

The issue of retention of e-mail addresses across ISPs can be solved by subscription to a so-called 'vanity' e-mail domain (for example, yourname@yourname.com) from a Web-based provider, as an alias for one or many other accounts. However this does not address the issue of name formats. Many variations exist in e-mail addresses, dependent upon organisational IT policies and standards, software rules, higher level domain names, etc.

Proposals for universal e-mail addresses that are transferable between service providers range from providing local street addresses as part of the electronic address, or using full names and birthdates, to provide unique e-mail addresses for each person. This obviously raises questions of privacy, adequacy and national uniformity.

The RAND Organisation's conclusion in 1995 was that:

*A simple e-mail address provision scheme should be developed giving every US resident an e-mail address, perhaps based on a person's physical address or telephone number.*

The US Postal Service recently announced its intention to investigate an implementation of this idea, with a view to extending e-mail services by proxy to residential consumers. E-mail received in a post office hosted e-mail box could be printed and sent to residential addresses by ordinary mail. Additionally, e-mail arriving at a post office based account could be forwarded to customers' other e-mail addresses. The addressing structure for post office based e-mail boxes is yet to be determined, with the USPS averse to linking physical addresses with e-mail addresses.

An alphanumeric address created by the postal service and linked to a customer chosen address offers an alternative. This option, an 'alias' address, provides a better solution from a customer's point of view. A potential sender to the e-mail address would be able to decipher no further information about the person, but would be able

to contact them electronically. For example, a hypothetical post office e-mail address could serve as a clearinghouse to multiple other addresses (provided by Internet service providers, free e-mail providers or business organisations). Increasing concern by employers' regarding non-work related e-mail could be alleviated by the use of addresses provided by an independent address provider. A national e-mail address option would remove associations made by recipients based on assumptions about people's employment status, income or other factors insinuated from the use of an employer-provided address, an ISP address, or a freeweb based address. Use of standardised, centralised addressing would facilitate the creation, maintenance and use of large-scale directories.

### 4.3.2 Directory Services

Existing communications systems work well because of the basic directory infrastructures that support them. Phone users can use existing printed or telephone-accessed service directories (013 and similar services, including call connect) to discover unknown numbers, based on knowledge of name and approximate location. White and yellow page directories also provide exact street addresses for paper mail sent through the postal system. There is currently only limited support for similar information searches to track down e-mail addresses.

The ability of users to find other known users, or to identify the addresses of previously unknown users, is an essential utility of any communications system.

Existing e-mail directory services are generally limited to organisations and service providers. E-mail search engines incorporate a number of these directories, but are limited in their utility in providing up to date information, due to requirements on users to maintain their own entry or entries. Unless an e-mail address is known, it is difficult to discover what it might be, although educated guesses can be made on the basis of organisation specific formats. The lack of standard address formats combined with the proliferation of e-mail addresses for single users makes compilation of useful directories difficult.

Some solutions include:

- the maintenance of e-mail contact addresses as part of traditional white and yellow pages entries;
- the development of meta-directory search engines which search multiple directories for single entries.

The implementation of directories as a wide spread service is dependent on the use of standards such as X.500 for directories, and DAP and/or LDAP for directory access. Directory products are becoming increasingly sophisticated, providing multiple levels of access control to directory entries and fields.

The RAND Organisation's conclusion in 1995 was that:

*There appears to be no need for governmental or regulatory involvement in the development, or centralization, of directories for universal e-mail addresses (both white and yellow pages).*

However, the usefulness of e-mail is proportionate to the number of other users an individual can contact. Existing directories rely on self-identification to the directory

and are not a standard feature of most services. For a novice user to identify known parties is not a simple undertaking. Reliance on friends, family and colleagues to provide e-mail addresses of shared acquaintances is the main way unknown addresses are discovered. This is evidently a limitation to increased usage of e-mail.

The introduction of centralised directory structures, managed through a directory portal, would provide additional functionality to existing users of e-mail, as well as increasing the value proposition to engage new users.

The question of who should provide and maintain such directories is addressed in the next section of this report.

### 4.3.3 Standards

A variety of e-mail standards have been established over the past two decades, including:

**SMTP** (Simple Mail Transfer Protocol) – a TCP/IP protocol used in sending and receiving e-mail. It is used with one of two other protocols, POP3 or IMAP, as SMTP has limited ability to queue messages at the receiving end. SMTP is used for sending e-mail and either POP3 or IMAP is used for receiving messages that have been sent to a local server.

The **X.400** series is the messaging standard specified by the ITU-TS (International Telecommunications Union – Telecommunication Standard Sector). The X.400 series provides an alternative to the more prevalent SMTP e-mail protocol. X.400 provides a number of possible address characteristics that SMTP does not, so X.400 addresses can be long and cumbersome. It is an official standard whereas SMTP is a 'de facto' standard. This gives products with X.400 implementations more rigorous test capabilities than products with SMTP implementations. Additionally X.400 offers more capabilities than SMTP. However, many of these capabilities are seldom used.

**MIME** (Multi-Purpose Internet Mail Extensions) is an extension of SMTP that allows exchange of a variety of data formats: audio, video, images, application programs, and other kinds, as well as plain text.

**S/MIME** (Secure Multi-Purpose Internet Mail Extensions) is a secure method of sending e-mail that uses the RSA encryption system. S/MIME is included in the latest versions of the Web browsers from Microsoft and Netscape and has also been endorsed by other vendors that make messaging products. Both S/MIME and an alternative encryption format, PGP/MIME, have been proposed as standards to the Internet Engineering Task Force (IETF).

**IMAP** (Internet Message Access Protocol) is a standard protocol for accessing e-mail from a server. The user (or e-mail client software) can view the heading and the sender of the letter and then decide whether to download the mail. The user can also create and manipulate folders or mailboxes on the server, manage messages, or search for certain parts or an entire note. IMAP requires continual access to the server during the time that you are working with your mail.

A less sophisticated protocol is **POP3** (Post Office Protocol 3). With POP3, mail is saved in a mailbox on a server until it is read, when it is downloaded to the local computer and no longer maintained on the remote server.

Other standards relevant to the transmission of e-mail include communications protocols such as HTTP, directory standards, such as X.500, directory access protocols such as DAP and LDAP.

From the point of view of an e-mail user, standards should be consistent but invisible, forming the basis of the 'mechanics' by which e-mail is sent and delivered. Differences in standards become an issue for users when, for example, attempting to access an IMAP e-mail account through a web-based (such as POP) server. Inconsistency between protocols is slowly diminishing; however with the arrival of new delivery platforms and devices, standards are likely to continue to differ. What this may mean for users of e-mail is yet to be seen. It would be unwise to conclude from the array of standards available that this will impact upon current non-users of e-mail.

#### 4.4 Legal Issues

The responsibility for legal certainty in e-mail transmission, receipt, storage, use and abuse clearly lies with the commonwealth government under section 51(v) of the Constitution.<sup>30</sup> Case law in Australia has rarely included substantial judgements relating to the use of e-mail. The discovery of documents particularly in electronic or e-mail form has been challenged (see *BT(Australasia)Pty Ltd v State of New South Wales & Telstra*). A recent decision in the Federal Court finding against Ansett related to the sacking of an employee for the distribution of union material via internal e-mail. The decision in *Australian Municipal, Administrative, Clerical And Services Union V Ansett Australia Limited* (7 April 2000) highlighted the importance of clear policy guidelines relating to the use of e-mail by employees in companies. It also raises questions of privacy in the workplace and the need for guidance in the use of company assets for non-work related activity.

A related legal issue is electronic formation of contracts. The doctrine of acceptance is clearly established in postal transactions, but may be challenged in electronic communications. Additionally, the legally binding nature of digital signatures is not enshrined in specific legislation, although the Electronic Transactions Bill 1999 provides for the legal recognition of electronic messages and signatures in specified Commonwealth Acts and Regulations. Separate Acts need to be enacted in each state to provide full Australia wide coverage.

The Broadcasting Services Amendment (Online Services) Bill 1999 specifically excludes 'ordinary electronic mail' from its ambit,<sup>31</sup> but specifies that postings to newsgroups are not included as 'ordinary electronic mail'. Internet service and content providers are required to follow codes of conduct about how complaints

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<sup>30</sup> "The Parliament shall, subject to this Constitution, have power to make laws for the peace, order and good government of the Commonwealth with respect to ... postal, telegraphic, and other like services"

<sup>31</sup> This amendment was made in the third reading to Parliament, after concerted opposition from free speech and privacy advocates to e-mail being included as Internet content.

arising from the transmission of unsolicited electronic mail about offensive sites are processed.

Workplace based access to e-mail may provide the stimulus for increased domestic use, however, the existing lack of clarity regarding personal usage of e-mail within organisations may provide a barrier to increased take-up. The use of policies on company standards for storage, receipt, and sending of e-mails is essential, as are clear statements on the level of monitoring or potential interception of personal e-mail.

Existing regimes for post and telephone have been built up over many years with a base of precedents for legal rulings on transmission, carriage and receipt. The lack of a legal framework for e-mail means that service providers and users operate in an environment fraught with uncertainty. Achieving clarity in the common carriage status for Internet service providers, for example, could result in a more efficient service being provided to users. Certainty of the law of contracts and e-mail would arguably increase the attractiveness of the medium to businesses and individual contractors. Comprehensive legislation dealing with spam would have the obvious result of decreasing the amount of spam in users' in-boxes, thus increasing the functionality of their use of e-mail.

#### **4.5 A Standard Model?**

Discussion at the four workshops revolving around issues of useability and functionality, in combination with an analysis of the 'E-mail for All' vision leads us to consider the elements of a standard model for widespread e-mail services in Australia. What would be the major requirements as impacting on access device capability, market offerings and policy settings? The following are posited:

- *The entry and operation cost for non-users, in terms of the combined impact of access device and network service, needs to be significantly lower than at present to encourage mass-market connectivity.*

Whilst natural economies of scale combined with increased market competition should go some way towards achieving this end, the shortfall may have to be rectified by government either in a targeted manner involving means such as subsidies or lenient repayment schemes for low-income earners, and/or via an extended universal service obligation.

- *Alternative means of access require interface design and service functionality that are outstandingly user-friendly.*

A prime design characteristic should be to facilitate the sending and receiving of text via electronic device interfaces by users with low literacy and/or with sensory or motor limitations. A single device design may not necessarily accommodate the full range of such requirements. Other design characteristics should recognize that not all users understand an office type format and that English is not first language of some users.

Regarding functionality specific to the service characteristics of primarily text-based e-mail (whether embedded in the access device or effected through the network or service provider), the design calls for:

- easy to use message authentication, as well as encryption for added privacy;

- secure, reliable and protected storage of messages;
- easy access to comprehensive and accurate directories of e-mail addresses;
- inbuilt protection against spam or other unwanted messages; and
- efficient and effective service transferability between network and/or service providers, as well as between alternative means of access within the same service.

However, since text-based electronic communication may not attract a significant proportion of current non-users, an alternative design characteristic should facilitate multimedia e-mail, such that brief messages may also carry video and/or sound attachments.

- *Legal and other working requirements need to be widely appreciated by all types of users and service providers, such that all parties are aware of their rights and obligations.*

A mix of government policy and legislative initiatives, coupled with superior service delivery performance of network and/or service providers, are required to address user concerns about privacy, security and overall trust that will become of paramount importance in a mass-market environment.

Using this ‘standard model’ linked with the E-mail for All vision as a starting point, we can begin to assess existing gaps in technical and legal infrastructures, and identify areas in which market forces may or may not address these gaps.

The following recommendations provide a basis for this analysis:

**Recommendation 3.**

**Alternative means of access to e-mail require outstandingly user-friendly interface design and service functionality; the requirements for useability and functionality should be initially scoped to first define a ‘basic’ model of an e-mail service or access device against which future designs can be benchmarked.**

**Recommendation 4.**

**There is a need for comprehensive searchable e-mail directories, subject to trust, privacy and management considerations.**

**Recommendation 5.**

**The legal framework for e-mail needs to be as comprehensive as those for postal mail and telephony.**

## 5 Policy and Market Issues

### 5.1 Current gaps in e-mail access and use

If one postulates a future scenario with no relative disadvantage between sectors of the population, and e-mail is freely used by all who may benefit from its use in daily activities and personal communication, what barriers can be identified between the current situation and achieving that vision? What incremental changes can be made in addressing it?

The following table provides an analysis of current and predicted market developments in relation to the recommendations provided above.

Issue	Gap (over 5-10 years)	Possible Action/Response
Establish relevance of e-mail to non-users	<p>ABS does not track e-mail per se, arguing that it equates to Internet usage.</p> <p>No studies are known of, or expected to be undertaken, about the future needs of non-users to communicate via e-mail nor about the relative disadvantage non-users may experience as increased e-mail usage is driven by key service providers.</p>	<p>Government programs that increase awareness of the advantages of Internet access, provide skills for use and provide points for public access.</p> <p>Initiate appropriate research that evaluates the needs for e-mail amongst different groups of non-users, coupled with an appreciation of likely disadvantage arising from increased opportunities provided to users.</p>
<p>Substantially improved useability and functionality of e-mail interface and service, via:</p> <ul style="list-style-type: none"> <li>• Lower cost of access and operation;</li> </ul>	<p>Despite proliferation of non-PC devices and rental packages with minimal upfront charges, high perceived costs still deter non-users.</p>	<p>Increased awareness and promotion, with subsidisation by industry and government as necessary, of schemes akin to 'Virtual Communities' and those of Ford and other companies providing low cost packages to employees.</p>

Issue	Gap (over 5-10 years)	Possible Action/Response
<ul style="list-style-type: none"> <li>Improved interface design.</li> </ul>	<p>New devices are being continually introduced, particularly wireless based, which embody new interface designs. However, industry standards are unlikely to evolve in such a competitive market and device complexity, particularly for PCs, continues to present a barrier to marginal user groups.</p>	<p>Widespread investment in wireless Internet-enabled devices will open new channels for rich multimedia e-mail services, but are likely to attract more high end users rather than low end and non-users.</p> <p>However, the advent of e-mail via Web TV may provide a more familiar and accessible interface for many current non-users.</p>
<p>Accessible and useful directories, plus common addressing scheme:</p> <ul style="list-style-type: none"> <li>Directories;</li> <li>Addressing.</li> </ul>	<p>No comprehensive, up-to-date or commonly known directory is available within Australia and there is no indication that market forces would achieve such. Existing directories both in Australia and overseas rely on user nomination and maintenance.</p> <p>Whilst 'personal' sub-domains are anticipated, use will attract ongoing cost and will be optional. Furthermore, standardisation of e-address format is unlikely, as is association with postal mail addresses. E-mail addresses will continue to be tied to ISP domains.</p>	<p>Government or market sponsorship is needed to provide overarching meta-directory structure. Reliance on user maintenance is difficult to avoid unless coupled with a universal addressing scheme maintained centrally.</p> <p>Common address structures are unlikely to develop (other than the use of '@' a particular domain name) without formal agreements on standards for directory entries.</p>
<p>Strengthened legal and regulatory environment that bolsters current use and encourages adoption by non-users:</p> <ul style="list-style-type: none"> <li>Enhanced privacy;</li> </ul>	<p>Codes of practice for consumer protection are</p>	<p>Initiatives such as P3P for web sites depend on</p>

Issue	Gap (over 5-10 years)	Possible Action/Response
<ul style="list-style-type: none"> <li>• Protection from spam;</li> <li>• Easy to use message authentication;</li> <li>• Service quality standards.</li> <li>• ISPs as common carriers</li> </ul>	<p>unlikely to be effective, as online consumer profiling becomes more profitable.</p> <p>Opt-out provisions in legislation only cover legitimate sources and hence are unlikely to be effective</p> <p>New electronic transactions legislation is untested. Commonwealth PKI (Public Key Infrastructure) initiatives are under development for specific user groups (e.g. ABN digital signature certificates).</p> <p>Currently free services are limited in scope for storage etc., and have strict terms and conditions associated with their use. Limited recourse for users.</p> <p>Common carrier status is directly undermined by the Broadcasting Services Amendment Act; unfortunately any action to address spam via ISPs also destroys common carrier status</p>	<p>industry compliance.</p> <p>Scope for ISP action (but undermines potential ‘common carrier’ status); NB: introduction (by legal &amp;/or IETF standards means) of concept of user pays – assuming that spam could always be technically identified.</p> <p>Widespread use of public key infrastructures and associated digital signatures will take time to implement at public level – associated directory issues.</p> <p>Could be addressed through industry codes of conduct or regulation.</p> <p>?</p>

Table 1: Assessment of likely gaps after 5-10 years in satisfying identified issues, and possible market and policy responses required to address these gaps.

## 5.2 Is there a case for government action?

Our analysis of current and potential future market developments suggests the identified gaps in current products, standards and policies will not fulfil the identified requirements of our ideal model. This leads to a necessary and complementary question: What can and should governments do?

The development of an 'e-mail for all' policy by any government depends upon:

- Acknowledgment of potential public benefits of instituting such a policy, at both social and economic levels;
- Acknowledgment of potential disadvantage to individuals falling outside the groups of current and likely future users through lack of knowledge, access or ability, backed up by strong quantifiable research;
- Vision of possible government application in improving accessibility to government services and agencies through, for example, online democracy initiatives; and
- Business case development to justify government action under such a policy.

If these conditions are satisfied, the degree of action required by governments in implementing an 'e-mail for all' policy is a political decision that can be approached in a number of ways:

- Government can choose to acknowledge market development as the primary force by which such a vision may be realised and leave development to that arena.; or
- Can provide incentives to, or other influences on, the market to achieve certain objectives; or
- Can choose to provide a basic level of service to supplement market directions; or
- Can explicitly provide a universal basic service.

The approach taken will lead to a variety of methods of implementation, whether it is market stimulation through awareness-raising (through exercises such as NOIE's Online Australia Year), through skills development (Victoria's SkillsNet, for example) or through public provision of access points (examples abound – Tasmanian Communities Online, Victoria's Libraries Online, Connecting Canadians initiatives, etc.). Many of these types of initiative are very successful in providing conduits for new users of e-mail and other online services.

The development of policies to address other identified issues, including some of those in the gap analysis table above, is less prevalent. The identification of clear government direction or action to address non-availability of public e-mail directories, for example, is problematic.

The following examples illustrate some of the different ways in which various state and national governments have addressed issues surrounding the use of e-mail by citizens (although in some cases they are not specific to e-mail, which is incorporated as a subset of Internet or 'online' access).

### 5.2.1 Australia

Recent federal government policies have emphasised the importance of participation in the information society and economy, for example the Commonwealth's statement that: "The government is committed to ensuring that all Australians have open and equitable access to information available online". (A Strategic Framework for the Information Economy, 1998).

The most recent policy announcement by the Victorian government in relation to e-mail services includes an undertaking to help "everyone who wants one to obtain an e-mail address" (*Connecting Victoria*, the Victorian Government's Strategy for Information and Communications Technologies, November 1999).

The Tasmanian government has created a free e-mail service (TASMAIL) for Tasmanian users of community access centres provided under the Networking Tasmania agreement between Telstra and the Department of Premier and Cabinet. TASMAIL is a state-based equivalent of free Internet e-mail. The Tasmanian government encourages TASMAIL's use as it has less negative impact on the performance of network services than similar e-mail services, because it does not download advertisements with each screen. The TASMAIL service is limited in storage capacity and duration, as most free services are. No plans are current to extend the current level of service to provide directory services or structured addressing (other than '@tasmail.com').

In August 2000, the South Australian government launched its *Information Economy 2002* policy, stating:

*As part of its drive to create an IT-literate, information-enabled society, the Government will make available to every South Australian resident, at no charge, a Web-based online presence, including an e-mail address.*<sup>32</sup>

This is the only domestic Australian policy statement that specifically provides for *jurisdiction-wide* (in this case, state-wide) e-mail addresses. The South Australian government recently issued a request for proposals to provide e-mail and personal web services, scalable to include all South Australians over the age of 15. The essential components of the proposed e-mail service cover many of the issues raised in this report, including a white pages style public access directory. However, a tension remains between the provision of limited storage capabilities and legal requirements for the retention of e-mails.

### 5.2.2 Canada

The **Connecting Canadians** and **Canada On-line** initiatives aim to encourage citizens' use of online services, through:

- the provision of 5,000 rural and 5,000 urban public access sites; and
- connecting all libraries and schools within Canada to the Web

Other initiatives include encouraging access in Aboriginal (for example, Inuit and other First Nation) communities and accelerating government online service delivery.

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<sup>32</sup> <http://www.ie2002.sa.gov.au>

### 5.2.3 Hong Kong

The Hong Kong government has launched a series of projects to promote the use of information technology within the community. These include:

- The launching of the Interactive Government Services Directory Web site which provides public information and services to the community over the Internet in an interactive manner;
- The implementation of a **Universal Free Electronic Mail Service** scheme, under which Internet Service Providers and information technology-related companies provide free electronic mail services to members of the public to encourage electronic communication in all walks of life; and
- The installation of computer facilities with Internet connection in District Offices and community halls/centres for public use.

### 5.2.4 New Zealand

“E-Government – A Vision for New Zealanders” sets out the Government’s vision for communicating with its citizens in an on-line world:

The purpose of e-government is to bring people together – not to push them apart. The Government must plan e-government in such a way that:

- conventional means of access to government are maintained for those people who need them;
- community access to the Internet is available for those people who, for any reason, can not access it from their homes; and
- educational and public information programs are used to help New Zealanders, young and old, in using the new technologies.

### 5.2.5 Singapore

Singapore Telecom announced late last year that it would be providing free Internet access and e-mail accounts to all its residential fixed-line customers (approx. 1.8 million in total through the ‘mysingtel’ portal (<http://www.mysingtel.com.sg>)).

### 5.2.6 Sweden

In Sweden the emphasis is on creating an information society for all, rather than targeting citizens’ access to e-mail. A 1999 government Bill states: **“The aim is for all citizens to be given the opportunity to benefit from IT – an information society for all. Broad-based public usage would necessitate enhanced accessibility, know-how and system security.”** The government regards the issue of accessibility as predominantly a market-driven one, with government only stepping in to fill gaps (for example, in regional access) left by market forces.

### **5.2.7 United Kingdom**

In 1997 the Blair government committed itself to putting all British school students over the age of nine online. As part of its 'Modernising Government' White paper, it also expressed the following:

“Society is not homogeneous. Government exists to serve those who feel excluded from developments in information technology just as much as it serves those who embrace the new technology. The information age should increase the choice of how citizens and businesses receive services, not restrict it. The Internet, interactive TV and touchscreen delivery should take their place alongside more innovative use of the telephone, the call centre and the paper document, not replace them; nor should face to face contact be replaced where that is what is needed. We will develop targeted strategies to ensure that all groups have proper access to information age government.”

### **5.2.8 United States**

The Clinton administration declared in 1997 that it supported a policy of e-mail for all in principle. Initiatives include providing e-mail addresses for all school students. Gaps in provision of service have been identified by the US Department of Commerce's report, *Falling Through the Net: Defining the Digital Divide*.

### **5.2.9 In Summary**

These brief descriptions provide examples of willingness of national and state governments to support the provision of online services including e-mail to citizens. However, there is little evidence that what we have characterised as current user issues are being addressed. The implementation of efforts to provide co-ordinated legal certainty, basic service standards and directory systems will benefit existing users of e-mail services as much as they will attract new users to the services. The evidence that e-mail is the most widely used Internet service among current users makes it one of the most likely attractions to non-users, if supported by extensive community connectivity, and perceived as a trusty and reliable form of communication.



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## 6 Conclusions and Recommendations

The investigation by CIRCIT staff of available technologies, discussion during the structured 'E-Mail for All' workshops, and subsequent analysis have led us to conclude that:

*E-mail can provide a third communications channel of national significance, comparable to that of postal mail and the telephone.*

From this conclusion, a number of clear directions for market development and government policy intervention flow. It is also clear that exclusion of citizens from this vision would be to their social detriment.

A number of recent state and national government policies emphasise the importance of participation in the information society and economy, but few have identified access and use of e-mail as a definite goal. For example, the Commonwealth "is committed to ensuring that all Australians have open and equitable access to information available online".<sup>33</sup> As governments move to increase the availability of government information online, and provide more interactive services, e-mail may become an important avenue of communication between government and citizens. It is in the interest of governments to investigate a facilitative role to broaden the use of e-mail as a communication channel.

A 1995 Rand Organisation report<sup>34</sup> came to the following conclusions and recommendations on the technical aspects of provision of widespread or universal e-mail within the USA:

- *There are no fundamental technical barriers to providing universal access to electronic mail services;*
- *Universal connectivity among systems appears to be occurring through market forces although the portability of e-mail addresses and current regulations that distort the prices among potentially competitive competition offerings are likely to remain an issue;*
- *There appears to be no need for governmental or regulatory involvement in the development, or centralisation of directories for universal e-mail addresses (both white and yellow pages) [as directories will be developed by market forces];*
- *The Web browser model of user-computer interaction should at least be considered a candidate for the minimum level of user interface for e-mail access as well as other hypertext access to information.*

Comparing these conclusions with the Australian scene in 2000, we concur that there remain no fundamental technical barriers to providing universal access to e-mail services. An increasing number of devices are e-mail capable, supporting a variety of

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<sup>33</sup> A *Strategic Framework for the Information Economy*, Commonwealth of Australia (1998). See also *Connecting Victoria, the Victorian Government's Strategy for Information and Communications Technologies*, November 1999.

<sup>34</sup> Anderson, Robert H., Bikson, Tora K., Law, Sally Ann, and Mitchell, Bridger M. *Universal Access to E-Mail: Feasibility and Societal Implications*, Center for Information Revolution Analyses (RAND), (1995).

standards and providing virtually universal device-to-device connectivity, although not all facilitate attachments to e-mails.

Notably, the US prediction of market forces providing suitable global directories has failed to materialise over the past five years. Australia now has an obvious market gap in the provision of effective e-mail directory services that could be addressed through appropriate market and/or policy initiatives.

Further, the increasing variety of non-PC devices and interfaces that are e-mail capable, and a recognition that current Web browser interfaces do not adequately address user all needs leads us to the conclusion that the minimum level of interface should not be the Web browser model.

**1. There is a need to understand and quantify current levels of access: by individuals to e-mail within organisations; access within institutions; domestic access; current non-users who don't want to use the technology or who can't afford it; and other likely user groups – the elderly; people with disabilities; the young; regional Australians.**

Significant community adoption of e-mail is unlikely without a thorough appreciation of the communication needs of current non-users and how these may be met by changes to the design of both services and access devices, coupled with changes to associated policies by industry and government. Increased understanding of e-mail use will contribute to development of broader online and communications initiatives, where e-mail can be used as a significant 'back channel' from citizens to industry and government.

**2. The entry and operation cost for non-users, in terms of the combined impact of access device and network service, needs to be significantly lower than at present to encourage mass-market connectivity. A business model to subsidise or support a basic or standard service should be developed by the National Office for the Information Economy (NOIE).**

The cost of purchasing the equipment necessary to provide personal access to e-mail is a significant barrier to widespread connectivity. Whilst natural economies of scale combined with increased market competition could partly alleviate this problem, the shortfall may have to be rectified by government and/or business either in a targeted manner, such as subsidies or lenient repayment schemes for low-income earners, and/or via an extended universal service obligation.

Although communication access through mobile devices is becoming increasingly popular across all groups in society and their pricing plans are becoming more attractive, the level of functionality offered for e-mail is currently rather limiting. Another possible universal access device could be via digital television and datacasting, although entry-level devices will need to be user-friendly, effective to use and low in cost.

**3. Alternative means of access require outstandingly user-friendly interface design and service functionality; the requirements for useability and functionality should be initially scoped by first defining a 'standard' model of an e-mail service or access device against which future designs can be benchmarked.**

For frequent users of e-mail, existing useability and functionality clearly do not pose a barrier to use – although shortcomings in these regards may limit the effectiveness of

usage. However, for infrequent users and particularly non-users, one could conceive of an entry-level service or device(s), being the e-mail equivalent of the ordinary postal mail service for the average small business or residential person. The key features of such a standard model include:

- Service availability at a location convenient to the user, such that the following features are retained;
- A capacity to send and receive, store and reliably transfer messages, coupled with confirmation of message receipt;
- Easy access to comprehensive and accurate directories of e-mail addresses;
- Easy to use message authentication, as well as encryption for added privacy;
- In-built protection against spam or other unwanted messages; and
- A capacity to send attachments with a message.

Taken together, the above features embodied in one or more physical representations of a 'standard' model of an e-mail service need to be in accord with a set of minimum standards and/or codes of practice accepted by major service providers and bodies representing key user groups. It is particularly important that there be efficient and effective service transferability between network and/or service providers, as well as between alternative means of access within the same service provider.

To attract a significant proportion of current non-users, an alternative design characteristic could facilitate multimedia e-mail, such that brief messages may also carry video and/or sound attachments.

#### **4. There is a need for comprehensive searchable e-mail directories, subject to trust, privacy and management considerations.**

Mass market use of e-mail as a personal communications channel will not succeed without the provision of comprehensive directory services. Existing commercial directory services are often out of date or are service provider specific, reducing the effectiveness of use. A gap clearly exists that could be filled by industry or government. Development of directory services for telephony provided a key component for near universal domestic take-up. A similar level of available functionality for e-mail could serve to increase usage in a similar manner.

However, as there have been no comprehensive industry initiatives to date, government could provide a co-ordination role (for example in the provision of meta-directories). Directories should be electronic rather than printed, and the responsibility for updating could be devolved to service providers responsible for maintaining their own customers' entries.

Standardised addressing is seen as a secondary issue to that of provision of comprehensive directory services. Recent developments by the US Postal Service may link users' existing e-mail addresses to a free account with an e-mail address based on a physical address. This approach raises privacy concerns.

#### **5. The legal framework for e-mail needs to be as comprehensive as those for postal mail and telephony.**

A mix of government policy and legislative initiatives, coupled with superior service delivery by network and/or service providers, are required to address user concerns

about privacy, security and overall trust that will become of paramount importance in a mass-market environment.

Management of privacy and authentication may be more appropriate through a tiered system of regulation, including government regulation and industry self-regulation.

Confirmation of the common carriage status for ISPs is vital, in terms of transport of messages (as opposed to storage).

Existing consumer legislation should be applied clearly to e-mail, particularly the laws governing 'reasonable notification' (for example, by a government department). USO-type policies may only be useful when a large majority (i.e., more than 90 per cent) of citizens already have access. It is important to distinguish universal access from universal service.

Although control of spam may be achievable, with technical solutions and market forces addressing the problem to some extent, there is also a need for a legislative option as a last resort, including sanctions for spamming with criminal intent.

Legal and other working requirements need to be widely appreciated by all types of users and service providers, such that all parties are aware of their rights and obligations.

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## **Appendix A: Project Steering Committee**

The following people represented major stakeholders throughout the project, participating on the project steering committee, which met regularly between April and August 2000.

**Donna Martin**, Manager, Community Development, Multimedia Victoria

**Stuart Hall**, Manager, Online Products, VicNet

**Robert Morsillo**, Manager, Consumer Relations, Telstra

**Shar McMillan**, Research Admin Coordinator, Interactive Information Institute, RMIT

**Steve Eaton**, Research Manager, Electronic Commerce Unit, Australia Post

**Luke Naismith**, Senior Analyst, NOIE

**Bruce Tonkin**, Research Director, Melbourne IT



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## Appendix B: E-Mail for All Workshop Attendees

The following participants in the E-Mail for All workshop series attended one or more of the workshops held at the Interactive Information Institute at RMIT:

Workshop 1: 28 April 2000 “General Discussion of Issues”

Workshop 2: 19 May 2000 “User Needs in Context”

Workshop 3: 9 June 2000 “Technology & Processes”

Workshop 4: 30 June 2000 “Policy Issues & Implications”

Appelbe, Prof Bill - Computer Science, RMIT

Brown, Richard - Richard Brown & Associates

Burke, John - CIRCIT at RMIT

Cartwright, Bill - RMIT

Castro, Dr. Maurice - Software Engineering Research Centre, RMIT

Clemens, Ben - Multimedia Victoria

Coburn, Michael - RMIT

Diggle, Jenny - RMIT

Eaton, Steve - Australia Post

Evans, Daryl - VUT

Funston, Andrew - Communications Law Centre, VUT

Gaffney, Gerry - Information & Design Pty Ltd

Geiselhart, Karin - RMIT

Hall, Stuart - VicNet

Harris, Richard - RMIT

Kelso, Ross - CIRCIT at RMIT

Killey, Steven - Telstra

Laidler, Assoc. Prof. Terry - CIRCIT at RMIT

Lim, Jo - National Office for the Information Economy

Morsillo, Robert - Telstra

McDowall, Julie - WSA Online

McMillan, Shar - Interactive Information Institute, RMIT

Naismith, Luke - National Office for the Information Economy

Nimmervoll, Norbert - Interactive Information Institute, RMIT

O'Dea, Marie - Victorian Farmers Federation  
Payne, Assoc Prof Fred - RMIT  
Prater, David - CIRCIT at RMIT  
Pryor, Rick - Siemens  
Roberts, Erica - Melbourne IT  
Ryan, Annette - CIRCIT at RMIT  
Singh, Dr. Supriya - CIRCIT at RMIT  
Slegers, Claudia - CIRCIT at RMIT  
Tegart, Alistair - CIRCIT at RMIT  
Thornton, Richard - Telstra Research Laboratories  
Walder, Steven – Siemens