For the Pacific

Within the context of relating these policy characterisations of the changing nature of the Internet to the Pacific region the picture is not especially encouraging. Internet Service Providers within those countries which have enjoyed some years of connectivity to the Internet are generally capable of adjusting incrementally to the changing nature of the Internet environment without sudden disruptive shifts or dramatic changes in overall approach. These countries, which from the Pacific region include Australia, Japan, New Zealand and Hong Kong. Within those areas there is an emerging spectrum of Internet Service operations, covering both the original catalytic Academic and Research sector services, and an emerging picture of a set of commercially structured providers operating within the broader business of Internet service provision. Within these countries there is a picture of deregulation of the public regulatory environment where the emphasis of public policy in the communications sector is no longer centrally concerned with the protection of dominant monopoly service providers under the characterisation of regulatory assistance in servicing a universal service obligation. Within these countries the public regulatory emphasis is shifting towards one of structuring the national communications industry into a viable area for increased private investment, and the consequent regulatory position is geared towards created accessible markets for communications services.

What role does the National Telephone Service Operator play?

However this picture is by no means uniform, and other countries within the region are entering the Internet service domain within a framework of national Academic and Research sector service requirements and a more fragmentary picture of commercial service requirements voiced most visibly by multinational corporate entities. Within this environment the public regulatory position is generally structured more tightly around the national telephone service operator as a monopoly provider, and with due consideration of the desire to continue to operate such a strategic service within a national entity (rather than as an off shore operation of a foreign corporate entity), and economic considerations of this approach effectively preclude an openly positioned domestic communications environment. Within this more restrictive public regulatory environment the formative Internet Service provider is faced with both a constrained area of local operation and a more complex Internet environment into which the domestic service has to interconnect.

The consequent observation is that for these national environments the task is both more daunting from a regulatory environment perspective and more daunting in so far as the Internet environment is technically more complex and the issue of connecting to "the Internet" is becoming an issue where transit services, routing services and traffic carriage policies are combined with issues of the formation of name and address management services and similar local infrastructure provision responsibilities.

The learning curve for new players gets steeper & the entry price for Internet service provision rises

The overall summary of the situation is that for new Internet players in the Pacific region the learning curve required to master in order to establish the service continues along a increasingly steep incline. This learning curve can be translated into the observation that the entry price for the Internet is getting higher rather than lower for those national areas who are more recent entrants into the Internet environment. The related observation is that this increased price is one which is a being faced largely by the developing countries within the region.

agement approach which is either a model which assumes that administrative responsibility equates to overall control, or a model which equates evident free market interest with a government position of non-interference.

Thus it is unlikely that the public management role is one which will be initiated by reason of popular demand, and the only realistic scenario which would see an active role for public administration is one where the communications industry regulators successfully advocate the need for public management roles, or where the incumbent monopoly telecommunications service providers invokes public resource management as a response to leakage of business to the unregulated value added reseller business. In both cases the role of public management would be a defensive move, rather than a move to further enable and encourage expansion of access to the common service, and it is unlikely that public resource management roles would be commonly adopted across many nations as a consequence.

Tension of market domination

The tension from the free market sector is one where the operation of the market can be skewed by anti-competitive trade practices being undertaken by incumbent service providers and skewed by large investment programs effectively attempting to exercise a monopoly position over the market.

In essence both areas of market distortion can be controlled through conventional trading practice regulations, and no particular regulatory framework is required for this case as a unique situation.

The major positive factor of market policies is that ability of the market to react to new information markets and new information services very quickly, and an open market can act as a powerful catalyst for national development at a very rapid pace.

Likely Direction

Increasing skew between market driven expansion and current community objectives

As each of these policy domains interact across the Internet the question posed by this presentation remains: what is the likely near term policy future of the Internet?

From a personal perspective I would have to offer the view that the collaborative community will remain the dominant policy framework for some time yet. However offering this view does not imply that the policy objectives of the market place will not continue to grow in significance, and the obvious area of skew between the collaborative community and the marketplace will become a highly significant item within the overall policy agenda of the Internet for some yet as the difference between the objectives of these two communities continue to escalate.

It is unlikely that the public regulatory position will be as significant within this perspective. The issues already outlined relating to the likely quality of public resource management within this area, and the pace at which opportunities are identified and subsequently exploited is such that public regulation will not be a significant factor within many nations for some time yet.

Minimal levels of regulation, probably regarding trading practices and investment regulation, are effectively the only anticipated tangible public outcomes for some time yet, and the dominant policy characterisation for the immediate and near term future will be the interplay between the established collaborative community and the emerging open market for Internet-based services.

In a policy sense this effectively indicates that where feasible a public policy position which encourages investment into the national telecommunications sector for servicing value added reseller markets would appear to be appropriate public policy, and an associated policy direction which brings a number of providers into the basic transmission services of cable and data switching area would allow this service-based market to be constructed above a relatively efficient transportation and carriage market.

tive community will continue to exert the same level of policy pressure in the Internet's future.

There are a number of pressures which indicate that this may not be the case. As the Internet itself grows, it is unlikely that the collaborative community will continue to exert the same level of dominant influence across the Internet. The community of usage is becoming more heterogenous and the technical development community also is exhibiting increasing diversity under growth. There is also the issue of areas of finite capacity within components of the Internet and the issue of competitive pressure for access to such resources where there are differing scales of demand growth from various user and provider sectors.

All such considerations indicate that the process of collaborative determination of consensus policies as a management technique of the Internet is being faced with *increasing divisionary pressure* as the Internet continues to grow.

Agile or flexible?

However it is also the case that the collaborative community does possess sufficient agility and flexibility to identify such pressures and respond productively, both in terms of responses at a technical level to pressures on the underlying technology base and to pressures at a policy level to current management practices and style. Indeed there are very few management mechanisms which exhibit such inherent flexibility and attuned responsiveness to evolution of common requirement, and it is this attribute of the collaborative community which remains its central element in validly asserting a continuing role within the Internet.

Regulation of Service Providers?

There are a number of areas where public management practices may be applied to the Internet. Within a number of national domains there are emerging conditions for the role of communications Value Added Reseller which would apply specifically to Internet service providers. Under the constraint of a licensing system of operation (which presumably would entail a license fee as a startup cost and allow administrative policy to determine the size and number of Internet Service Providers operating within the country) there is the opportunity to enumerate a number of desired conditions onto the Internet operation, such as a *policy concerning offensive material*, *market access*, *service definition* and potentially *service limitation* and even to enter into the domain of *inter-Provider interactions*.

In addition the administrative functions, such as address management, routing registry services and name registry services, which are provided within other activity and technology domains as a part of the public activity domain could be operated within the same public domain.

Is there a demand for Public Resource Management?

Such public management structures are invariably initiated within an environment of worthy motives, and indeed there are potentially roles to be undertaken here that the free market would find difficult to fulfil within appropriate parameters of *fairness*, *equity* and *impartiality* and *adequate quality*. Within such areas the collaborative community can voice the need, but in terms of funding requirements for such common administrative elements it invariably falls to public management to undertake such roles.

However such public management roles typically run afoul of issues of quality of public administration, particularly where the entity being administered is relatively novel and requires a degree of care and sensitivity in terms of management programs and their desired effect. Public administration generally works without such fine levels of graduation, and the quality of the administrative role, particularly where there is a requirement for a highly user attuned service and detailed technical knowledge must be stated as a questionable milestone for any area of public administration.

All that can be realistically anticipated from the area of public administration is a static administrative model of the Internet, with a man-

opment of routing tools is the Internet community's response to a significant problem within the routing space. Again the free market and public resource management response would normally be a somewhat different response, again tending to price a scarce public resource as a mechanism to ensure rational exploitation across competing interests.

Connectivity Management

Connectivity management is a similar consideration. While within the telephony world we are accustomed to an environment where the user functionality is that any telephone number is accessible from any other, the current Internet model is a more constrained model of connectivity where connectivity is bartered within a process of service providers' policies and competitive market position. Here the free market characterisation and the collaborative community characterisation are analogous to the current Internet policy environment where universal connectivity is not an intrinsic attribute of the Internet, whereas the universal service obligations of the public resource management perspective would take the stance that universal connectivity is, simply, essential.

Administrative Infrastructure

The collaborative community also works under the impression that within a homogenous community personal and common interests coincide, to the extent that common administrative tasks are often undertaken on a basis of funding where services are provided freely to the end user community. The free market approach would tend to advocate a position of pricing such functions in order to ensure sufficient funding is derived from the actions themselves so that the function can be undertaken free of inherent bias or undue influence, whereas the public resource management perspective may well adopt a position of public funding of such services as a means of secur-

ing an influential public policy role in the domain through the exercise of administrative influence.

There are number of other areas which are relatively immature within the Internet at present which impact on the future patterns of continued growth of the Internet. These include transit provisions between Internet Service Providers, the broader issues of Inter-Provider settlements across the Internet, and the end-to-end quality issue, and the role of service providers within this quality domain.

Internet as a marketplace

The assumption being made within these areas is that the Internet will not be operated as a single entity either nationally, or globally, now or in the foreseeable future, and issues of Internet Service Provider interaction will continue to rise in importance as the number and diversity of service providers increases. The underlying position is that the Internet, as a marketplace, has a likely future as a price-driven commodity market in packet switching and packet transmission. The fundamental shift that has occurred with the Internet as a communications environment is that service definition now occurs as a function of the end computer systems, and the communications system imposes no service constraints, nor adds any further service value above this end to end service definition. This position is one in which one can anticipate some resistance from the market perspective. Basic transmission data unit, or packets, are not necessarily purchased by the user in different inherent service qualities, and while this would tend to direct the competitive Internet market to be a price-driven market, where each player attempts to work stably within parameters of the marginal cost of production of the service, such a marketplace is one in which each player attempts to bias by introducing additional (often artificial) differentiators, and the market push is there to attempt to differentiate on service profiles, which in turn brings into question the transparent end-to-end service and uniform technology model of the Internet.

Policy Directions

The question is whether the current collabora-

common interests of the national population, are dominant factors in shaping public resource management policies and actions.

Issues of *universal equity of access* to the service, *uniform service coherency*, *quality of the service* as supplied to all subscribers and the *structure of the service environment* that can ensure that the infrastructure and services can be positioned as a national asset are uppermost within the public resource characterisation of the Internet. These can be summarized as national public resource management intended to ensure the maximal positive outcome of a public commodity or service for the benefit of the nation and the benefit of the national population.

Non-monopoly position over information flow

These motives of national public resource management regimes are also concerned with taking appropriate measures to avoid outcomes which are regarded as negative from a national perspective. Such negative outcomes include the assumption of an *unregulated monopoly* position over a strategically critical or widely used resource, or the deliberate disenfranchisement of areas of the population through the deliberate actions of service providers operating outside of any national policy framework, or, at times, issues relating to the control of a nationally strategic resource by non-national interests. We are accustomed to active public resource management in many areas: water, electricity, air quality and closer to the communications industry, the print media, the use of the radio spectrum, and the telephone service.

The issue here is whether the Internet has achieved sufficient penetration of the national population to be considered as being subject to *universal service obligations* in any nation to date, and whether the Internet has as yet achieved sufficient national strategic importance to effectively ensure the need for a public resource management role in order to achieve the objectives as stated above. In this case the public management questions can be posed as not whether public management measures will ever be applied to the Internet, but when.

Internet Policy Issues

The characterisation of the Internet today is therefore seen as being within an unresolved area of tension between these three major policy domains, as characterised above. To illustrate this from the perspective of the Internet, there are a number of critically important issues within the Internet which can be analysed in terms of the tension between these three areas. While it is not proposed within the scope of this presentation that any of these approaches is intrinsically better, they are presented here as alternative approaches to policy issues to illustrate the current levels of tension within the policy setting process for the Internet.

Address Space Management

Address Space management has been largely operated in an ad hoc fashion, where any entity requesting network address space was allocated space without charge and without question. Issues relating to perceived future scarcity of addresses, and the risk of domination of the Internet space through domination of the address space have lead the Internet community to agree on a number of additional constraining measures. The free market approach and the public resource management perspective would coincide in this area to see the address space as being fundamentally no different from, say, the radio spectrum, where access to the common resource is managed through normal resource management measures to ensure fair and equitable access to the underlying resource and fair and efficient pricing of such access.

Routing Table Management

The Routing Table growth is a similar area where the community response of common pressure on elements of the network to invest in CIDR techniques, together with the rapid devel-

The Free Market Commodity

The Internet viewed as a value added service as distinct from a basic carriage service

The Internet is regarded in a different light by other sectors. The Internet operates as a service layered above basic transmission elements and within many countries it operates under the terms and conditions of a value added reseller, rather than being an intrinsic activity of a duly established common communications carrier.

Within many countries this area, that of value added resellers is an area which is in the process of deregulation. The motivation for deregulation being to encourage investment within the national communications industry to effectively induce levels of competitive activity which allow an open competitive market to operate. The overall intent is to stimulate levels of investment in national infrastructure and provide consumers with a range of services which are geared to efficient and effective service operation.

Within such a perspective the Internet operates as any other value added service, where service definition, pricing, policy of operation and all other aspects of the service are defined through the operation of market forces within a competitive market. Within such a market place artificial denial of service through AUPs play no discernible role, and differential tariffing of services fulfils no other role other than market penetration and competitive market acquisition.

Implicit decision making process through market forces

The interesting observation to make is whether such a market-orientated view of the Internet allows integration of basic technology change into the sector's characterisation of the Internet, as is the case within the collaborative community. While the deployment of new services based on technology evolution could be seen as a competitive advantage within a market, if such changes also effectively isolate existing market sectors then it is not clear whether they would be openly embraced by the marketplace.

The major observation of the open market is that policies are derived through the interplay of market pressures and client expectation, and service and infrastructure roles are derived not through common collaborative agreement, but through attempts to generate both price, and more critically, service differentiation within the marketplace.

The Public Resource

Acknowledged public benefit through access to service

The characterisation of the Internet from the Public Resource perspective is that of a public data interconnection infrastructure which is undertaking a publicly significant role within the overall communications environment.

Here the precise nature of the deployed technology is irrelevant to the public resource perspective (as distinct to the central and indeed vital, role played by technology evolution within the collaborative community). Within the public resource domain, and from the perspective of public regulatory measures, the issue is current and likely future areas of uptake of the service and if there is a significant proportion of the national population, or a nationally significant set of sectors who could benefit from the service, and if there are perceived unacceptable risks through lack of regulation and lack of public management measures, then it is natural to expect that national public communications regulatory bodies (which abound across the world) will voice the need to apply *public management policies* onto the Internet.

Motives for public management

There is of course no doubt that the motives of such bodies are such that the overall national infrastructure and capability, and the perceived

The collaborative community

The collaborative community still has a dominant base of influence within the Internet, and continues to exert a high degree of influence over the technology of the service, and the resultant Internet service environment (dominant both in terms of usage metrics such as traffic volumes and influence metrics such as investment levels - although the investment dominance by this sector is not an aspect which anyone could view with confidence as continuing unchallenged over the forthcoming years).

The free market

However the emerging Internet service industry, and a large number of more recent clients of these service offerings view the Internet as an open, and unregulated, market place where goods and services are freely traded based on perceptions of need and demand. Here the communications environment is seen as an opportunity for exploitation by market forces in the same way that other media, such as the radio spectrum, are employed by the market.

Public Resource Management

There is a third area of tension as well, which is that of public regulation pressures, which would wish to ensure that as a nationally important resource, and a resource which would appear to be significant to the population's interests over the forthcoming years public resource management measures would ensure the efficient and effective exploitation of the resource in the common national interest.

The following sections will characterise these areas in further detail.

The Collaborative Community

The current characterisation of the collaborative community has been explored in previous sections when looking at evolution of the Internet environment, and can be summarised as one based largely on the area of the technological base of the Internet, with a strong focus on the aspects of academic and research activities into both the Internet as a dynamic technology platform and in the use of the Internet for other academic and research pursuits.

Public funding versus commercialization

In characterising the Internet as a research platform the position within publicly funded academic and research domains is evident through the provision of services through public funding programs, and the inevitable side effect that such programs do not readily admit a component broad user base exploiting the derived services on a commercial basis. Public policy generally dictates that such publicly funded research and development programs are intended to effectively develop and harden technology artefacts up to the point of viability of commercial exploitation, and that once commercial exploitation is considered viable public funding of the resource is not a realistic role for public money on the basis of market skew by public policy being considered harmful and inefficient. The manner by which such broad policy agendas are expressed within the Internet are through "Appropriate Use Policies" where use of a publicly funded component of the Internet is restricted on a policy basis to certain types of users.

Motivation for common solution through cooperation

Also noted here within the community characterisation of the Internet is the careful construction of consensus within the community and the strong level of motivation for common solution seeking by the Academic and Research players. The reasons for such common consensus approaches are based on the understanding of the role of the Internet as a common technology base, Consensus, if achieved, allows all players, both now and in the future, equal access to the technology elements, and effectively constructs an open technology environment which can be exploited on equal terms by all players if they so choose.

While it is possible to define new technologies as backward compatible extensions to the existing technology base, the issues of transition to incompatible technologies hinge centrally around the incremental costs that would be borne by each user entity, and the issue that such costs would not be readily met if the existing technology matched the service expectations of such clients.

Policy flexibility suffers similar constraints under such growth, where major policy shifts within one section of the community imply a forced change in policy across the remainder of the network (as an example of forced policy matching, one can see that if a critically significant sector moved to, say, charged packet transit services, then the remainder of the sector will be effectively forced to adopt similar measures in order to ensure parity of approximate peering across the network).

Where policy becomes a more static factor, rather than a commonly agreed modus operandii, then each component player within the environment must devote some time and attention to generating stable commonly agreed policies to ensure functional operational interaction of each component network. Without such stability of policy the collaborative nature of the community quickly breaks down, to be replaced by an aggressive short term self interest optimisation pattern.

The outcome of this process is that common interest within the relatively homogenous worldwide academic and research community has allowed common policy formation to occur, and each component player now becomes reliant on the outcomes of such common policies as the means of ensuring continuity and functionality of the total common communications environment rather than being reliant on direct and frequent collaborative processes as the means of definition of community self regulation and the overall community characterisation.

Policies and the Internet

Number and diversity of Internet Service Providers

As well as a process of visible change within the nature of the initial collaborative community, as a reflection of the growth of the Internet within this domain, the other major feature of the past five years has been the outgrowth of the Internet.

This outgrowth is one where the Internet is encompassing additional service domains in the government, corporate, public service, educational and industrial areas This is currently an area of growth which becomes self-sustaining once a certain level of initial uptake is obtained - a client base allows a service operation to operate within acceptable parameters of scale and efficiency, and the presence of providers and relevant services acts as a strong attractor for more clients as long as there are perceived areas of leverage and benefit in so doing.

The observation made within this context however is that the motivation of both the client base and the service providers within the areas are not directly motivated by the characterisation of the collaborative community objectives and agenda. Indeed these user domains typically regard the Internet in the same way as any other customer service product, and tend to interpret the environment of the Internet as being one with levels of stability of service and indeed levels of stability of the underlying technologies which are at some level of difference with the inherently more dynamic models assumed by the academic and research collaborative community.

The Current Policy Environment

The current policy environment is best described as one of unresolved tension over the very nature of the Internet and its regulatory model between three policy sectors:
- the collaborative community
- the free market
- public resource management

community and also strengthened the cohesion of the network itself, allowing the Internet to develop as a *single environment of connectivity* rather as fragmented islands of connectivity.

The Environment of the 1980's

The outcomes of this collaborative community can be characterised within the following parameters:
- no formal regulation of the Internet as an externally imposed constraint;
- an associated position of self moderation of the Internet by the Internet community itself;
- a high level of policy adaptability within the constraints of collaborative community expectation.

Collaborative community

Such a self moderated, highly adaptable policy environment precisely matched the requirement of the process of technology evolution, where the Internet assumed the roles of both a research project and a production service platform simultaneously. The collaborative nature of the community, and the relatively small size of the community allowed rapid evolution of the environment in both technology and policy terms.

In general such highly adaptable environments are a typical feature of small cohesive communities undertaking developmental efforts. They typically possess the inherent ability to adjust the parameters of self moderation to suit the requirements of the day, and possess suitably flexible control structures to allow policy adaptability at a similar scale.

The 1990's

More Academic & Research programs using the Internet as a key communications resource

While such a collaborative process can

operate in an extraordinarily effective manner within a small homogenous community (and indeed such a process is probably optimal for such communities), it is not the case that such a process maintains robustness under growth. Indeed the very effectiveness of the process is a catalyst of community growth. This growth is readily apparent within the Internet, due in no small part to the particular openness and effectiveness of the underlying technology, as the collaborative non-regulated environment has made increased levels of participation easier, rather than acting as an inhibitor, for many. This growth in community population has, in turn, necessitated some significant changes in the community's collaborative consensus seeking process.

This growth manifests itself in very visible ways, such as the increasing population of the Internet domain in both computer and human population counts, and in terms of the amount and diversity of information and communication domains that together form the total Internet service domain. However there is another metric that is also a factor in terms of a policy-based perspective, and that is the increasing level of investment into Internet-based services and programs. This investment level is also increasing, measured in both monetary terms and in terms of programs and services which are now critically reliant on functionally capable access to a coherent worldwide Internet environment. This investment becomes a critical factor in assessing whether the Internet can be seen as a migratory phase on the path to some as yet ill-defined global information and communications infrastructure, or whether the Internet itself is the platform upon which the existing investment levels act as a strong attractor for further investment.

The 1990's Outcome of A & R Internet community growth: decreasing levels of policy adaptability within the Internet

The outcomes of this intense growth factor are visible within the original collaborative academic and research sector, where the flexibility of the refinement of the underlying technology base becomes limited by the increasing size and investment levels made by this sector.

which ensured delivery to the appropriate destination client network. However such a core no longer exists, due to the pressures placed on such a single central structure through growth and related diversity of the Internet. However this consequent interconnection structure places considerable stress on routing structures, as the addressing structure of the Internet requires synchronised locations of global routing knowledge, which in a non-core model, each such location must compute such knowledge independently. In addition the routing issue is often further laden with the requirement for policy integrity where connectivity and transit arrangements are overlaid with external requirements which have to be mapped into the routing environment.

In essence an Internet core was an appropriate architectural model from a technology perspective, but has not been able to withstand the pressures of policy diversity, geographical domain and size and volume of the network, and most importantly has not been able to withstand the pressures of the evolution of a diverse policy environment within the Internet.

It is this diverse policy environment which will be examined further in this presentation.

Policies and the Internet

Policies must be effective within the context of the nature of the Internet itself.

For policies to be effective within the environment of the Internet it is a necessary precondition that any such policies reflect a detailed understanding of the current nature and environment of the Internet, and also to voice a coherent objective in terms of a future vision of the Internet. Sadly such positions of understanding and coherent vision are not visibly abundant within the Internet today and there remains ample evidence of policy positions which are more concerned with attempting to re-visit previous policy issues rather than adopting a forward looking stance within a policy framework.

To understand the changing requirements for policy determination it is first necessary to observe the changing characterisation of the

Internet

To adopt a forward looking stance effectively necessitates a more dynamically positioned policy framework which reflects the current, and likely future positioning of the Internet as it continues to grow. It must be stressed that the Internet environment is not one which remains static on an yearly, or perhaps even on a monthly basis. The changes within the Internet are not only within a dimension of more participants, but also within a dimension of an evolving and expanding service environment. The policy challenges are effectively challenges based on the likely outcomes of further rapid growth in this environment and the areas of opportunity that are presented within such a process.

However to understand such changing policy requirements it is first necessary to observe the changing characterisation of the Internet up to the present, and draw out a likely future characterisation based on a projection on these pressures and forces.

The 1980's

Predominate characteristic of an academic and research community activity

Through the 1980's the Internet, as a collection of service providers, consumers, developers and researchers was a largely homogenous environment, and appeared to bear all the appropriate hallmarks of a *collaborative community* characterisation, including aspects of common policies, derived through a process of *consensus seeking*, and a common forward policy agenda strongly concerned with technological refinement, also derived in a collaborative manner. The common nature of the various participatory partners and their shared objective effectively ensured that a consensus seeking collaborative policy determination process would indeed terminate quickly with readily acceptable outcomes.

It should also be noted that as major area of common motivation of this community was an interest in the underlying technology of the Internet, areas of strong commonality were to be found within this area of collaborative technological development of the Internet which strengthened both the cooperative nature of the Internet

only developing strongly in recent years, and the conservative nature of the international cable and satellite deployment activities where deployment has traditionally occurred long after adequate demand has been identified, has resulted in a situation where international data services for many countries in the region are priced at levels which reflect a limited supply under heavy competitive pressure.

The Internet technology base does not provide any assistance here either in terms of building an effective *regional mesh of connectivity*. There are no readily deployable tools which can assist in inter-provider settlements which would form the basis of provider agreements, nor are there any technology tools which make shared use of a common resource, a reliable option when considering link aggregation options. Also the ITU directives on shared use of international communications facilities make governmental supported Internet service providers nervous, and correctly so. The result is that the barriers to creating an investment environment, required to fund a common operational entity, are such that the option does not appear feasible to date. Each Internet Service Provider in the region therefore is working largely as an individual entity in the global Internet.

The Pacific View of the Internet

Providers operating a single international link

The result of these factors is that each national network provider within the region is faced with the task of attempting to load maximal utility and maximal connectivity into a *single outbound link.*

Within such an operational environment there is little capability to segregate policy-domain traffic into distinct links due the prohibitive tariff structure and accordingly the task is to locate a termination point for each of these links which can provide such comprehensive connection services. Thus the objectives of these connections are identical: to provide a comprehensive and functionally capable connection to "the Internet", or "default" in routing terms.

To date no such single point has been established and the *diversity* of Pacific grounding points is an inevitable outcome of such an environment. Indeed it is a reasonable prediction to make that no such single point of comprehensive reachability will ever exist as a stable single entity - leading to the consequent observation that the "default" route is one which may not necessarily have a physical instantiation, and is instead the outcome of computation of over an aggregation of routes at a certain point. Wherever the "default" computation is performed today the resultant view of the Internet is not likely to offer an identical single consistent view of the Internet, as total connectivity is still constrained by a number of technical and policy-based considerations which means that "default" becomes a concept strictly relative to the eye of the beholder rather than some objective eternal truth!

The apparent contradiction between the common requirement for a single consistent "default" and the situation where, as a result of policy and technical considerations, no such "default" exists, is a major component of the current agenda of Internet technology and policy issues.

The Other End of the Link

What capabilities exist within the Internet to provide such connection points for regional network providers?

The original Internet architectural model (as used within the ARPANET) was that of a central transit network which was configured with comprehensive routing knowledge. Each client network fed all non-local traffic to this core,

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Desperately Seeking Default Internet Policy Update: A Perspective from the Pacific

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Abstract

This paper examines the policy environment of the Internet from the viewpoint of an Internet player located in the Pacific. Within that region the costs of international Internet access effectively dictates that in order for the Internet to be a competitive communications service there is a requirement for a degree of coherency in both the global engineering of the Internet, and the associated policy environment of the Internet. It examines the current characterisation of the Internet policy environment as a collaborative community, and examines the pressures placed on this environment through the growing pressures of the free market and the potential presence of public regulation and public resource management practices. The tension between these three policy environments is examined, and some potential policy directions for the Internet are proposed.

Keywords: Internet, Policy, Futures

Introduction

This presentation is not intended to enumerate to any level of detail the various national or regional policy-based environments within which the Internet operates - either within the Pacific region or globally. Nor is it intended to describe the current state or likely developments of specific Internet service programs. Instead this presentation is intended to illustrate the nature of the Internet in terms of *policy domains*, and illustrate the various pressures which are driving change within the policy environment, and attempt to draw some conclusions from these observations in terms of appropriate policy measures for the further development of the Internet.

The particular perspective taken in this presentation by way of background information and policy requirements is that of the author's personal position as an Internet

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Service Provider operating in the Pacific region, and from this position it is readily admitted that a somewhat different perspective may be seen from other parts of the world which is not addressed within this presentation.

The Pacific Perspective

The Pacific region is one which can be characterised by a high degree of *cultural*, *economic* and *political diversity*. As a consequence of such a strikingly diverse environment there are no readily available effective paradigms for regional efforts within either the Internet or within the larger economic and social regional domain.

A regional perspective?

From an Internet perspective this region is not one which inherently possesses any strong regional bindings as a basis for common effort. The *communication tariff structure* within the region is a typical example of lack of such regional binding, where the tariffs in place effectively values inter-regional infrastructure at the same level as intercontinental infrastructure. In addition the economies of many countries in the region are