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Market Viability as a IPng Criteria

Status of this Memo

This memo provides information for the Internet community. This memo does not specify an Internet standard of any kind. Distribution of this memo is unlimited.

Abstract

This document was submitted to the IETF IPng area in response to RFC 1550. Publication of this document does not imply acceptance by the IPng area of any ideas expressed within. Comments should be submitted to the big-internet@munnari.oz.au mailing list.

Introduction

In an open marketplace, adoption of new technology is driven by consumer demand. New technologies that wish to succeed in the marketplace must provide new capabilities or reduced costs to gain consumer confidence. Internetworking technologies can be particularly difficult to deploy and must provide a correspondingly high return on investment. In order to determine market viability of new internetworking technology, it's necessary to compare the required deployment effort against the potential benefits as seen by the customer. "Viability in the Marketplace" is an important requirement for any IPng candidate and this paper is an attempt to summarize some important factors in determining market viability of IPng proposals.

"Pushing" Internetworking Technology

It has been asserted by some that the adoption of a single IPng protocol by the computing industry would generate general acceptance in the networking industry. There is ample evidence to support this view; for example, some of the today's more prevalent networking protocols gained initial market acceptance through bundling with computer operating systems (e.g. IP via UNIX, DECNET via VMS, etc.) It should be noted, however, that this approach to technology deployment is by no means assured, and some of today's most popular internetworking software (Novell, etc.) have thrived despite alternatives bundled by computing manufacturers. Given that IPng will have to compete against an well established and mature

internetworking protocol (IP version 4), promotion of an IPng solution by computer system manufacturers should be recognized as highly desirable but not sufficient on its own to ensure IPng acceptance in the marketplace.

Can IPng compete against IPv4?

Given the large installed base of IPv4 systems, computer system manufacturers will need to continue to provide IPv4 capabilities for the foreseeable future. With both IPng and IPv4 support in their new systems, users will be facing a difficult choice between using IPv4 and IPng for internetworking. Existing IPv4 users will migrate to IPng for one of three possible reasons:

New functionality not found in IPv4

IPng needs to provide functionality equivalent to that currently provided by IPv4. It remains to be seen whether additional functionality (such as resource reservation, mobility, autoconfiguration, autoregistration, or security) will be included in the base specification of any IPng candidate. In order to provide motivation to migrate to IPng, it will be necessary for IPng proposals to offer capabilities beyond those already provided IPv4.

Reduced costs by using IPng

It is quite unlikely that migration to IPng will result in cost savings in any organization. Migration to IPng will certainly result in an increased need for training and engineering, and hence increased costs.

To gain connectivity to otherwise unreachable IPng hosts

For existing sites with valid IPv4 network assignments, connectivity is not affected until address depletion occurs. Systems with globally-unique IPv4 addresses will have complete connectivity to any systems since backwards-compatible communication is required of new IPng hosts.

From the perspective of an existing IPv4 site, IPng provides little tangible benefit until IPv4 address depletion occurs and organizations reachable only via IPng appear. Given the absence of benefits from migration, it is uncertain whether a significant base of IPng sites will be occur prior to IPv4 address depletion.

Sites which are not yet running IP have little motivation to deploy IPng for the immediate future. As long as IPv4 network assignments are available, new sites have an choice to use IPv4 which provides

the sufficient internetworking capabilities (measured in functionality, cost, and connectivity) for many organizations today. Given the parity in IPng and IPv4 capabilities, IPv4 (as a more mature internetworking protocol) is the more probable choice for organizations just now selecting an internetworking protocol.

Once IPv4 address assignments are no longer available, sites wishing to participate in the global Internet will have a very difficult decision in selection of an internetworking protocol. The current suite of IPng proposals cannot provide complete internetworking between IPng-only sites and IPv4-only sites since (by definition) there will be insufficient space to map all IPng addresses into the IPv4 address space. As none of the proposals currently call for dynamic network address translation (NAT), it is inevitable that IPng-only sites will have access to a partial set of IPv4 sites at any given moment.

Internetworking services which do not allow complete access to the global Internet (IPv4 and IPng in the post-IPv4-address-depletion world) are clearly not as valuable as services which offer complete Internet access. Sites which are unable to obtain IPv4 network assignments will be seeking Internet services which can provide complete Internet service. Additionally, some sites will have "privately numbered" IPv4 networks and will desire similar Internet services which provide transparent access to the entire Internet. The development of network address translation devices and subsequent services is highly likely under these market conditions.

Summary

No internetworking vendor (whether host, router, or service vendor) can afford to deploy and support products and services which are not desired in the marketplace. Given the potential proliferation of network address translation devices, it is not clear that IPng will secure sufficient following to attain market viability. In the past, we have seen internetworking protocols fail in the marketplace despite vendor deployment and IPng cannot succeed if it is not deployed by organizations. As currently envisioned, IPng may not be ambitious enough in the delivery of new capabilities to compete against IPv4 and the inevitable arrival of network address translation devices. In order to meet the requirement for "viability in the marketplace", IPng needs to deliver clearly improved functionality over IPv4 while offering some form transparent access between the IPv4 and IPng communities once IPv4 address depletion has occurred.

Security Considerations

Security issues are not discussed in this memo.

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