行政院及所屬各機關出國報告

（出國類別：其他－國際會議）

出席「亞太網際網路年會 APRICOT 2001 會議」報告

系統識別號:C09002056

公 務 出 國 報 告 提 要

頁數: 55　含附件: 是

報告名稱:
　　出席亞太網際網路年會〔APRICOT2001〕會議
主辦機關:
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聯絡人／電話:
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出國類別:　其他
出國地區:　馬來西亞
出國期間:　民國 90 年 02 月 26 日 -民國 90 年 03 月 02 日
報告日期:　民國 90 年 05 月 15 日
分類號/目:　I8／資訊科學　I8／資訊科學
關鍵詞:
內容摘要:　APRICOT會議，雖是屬亞太地區之Internet活動，但與會
　　　　　　者卻是來自世界各地，其中除政府代表，專家學者外，
　　　　　　更多是來自業界。由此不難看出，世界各國對 網際網路
　　　　　　相關活動參與的熱衷，及其隱藏之無限商機。此次會議
　　　　　　雖屬亞太地區 之會議，然參加者卻不乏來自世界各之網
　　　　　　路組織及業者，總參加人數更是突破 歷年紀錄。除此之
　　　　　　外，APNIC（Asia Pacific Network Information Center）的極
　　　　　　力 贊助及參與，亦為此次會議之一大特色。在此即就
　　　　　　APNIC於APRICOT中所召開 之相關會議資料做一整理，
　　　　　　以供未能撥冗參加且關心相關資訊者，有概括之了解。

本文電子檔已上傳至出國報告資訊網

目　　次

出席「亞太網際網路年會APRICOT2001會議」心得報告

會議基本資料

會議名稱：亞太網際網路年會(APRICOT 2001)會議

時間：90年2月26日至90年3月2日

地點：馬來西亞吉隆坡（**Kuala Lumpur, Malaysia**）

參加國家：以亞太地區國家為主並有來自世界各國人士與會

會議目的

近年來網際網路發展迅速，尤其自 IANA 改組以來，網路上即對相關機制之訂定爭議不斷，世界各國皆極力爭取相關權益，希望在此新的局面能佔有一席之地。APRICOT 會議，雖是屬亞太地區之 Internet 活動，但與會者卻是來自世界各地，其中除政府代表，專家學者外，更多是來自業界。由此不難看出，世界各國對網際網路相關活動參與的熱衷，及其隱藏之無限商機。

此次會議雖屬亞太地區之會議，然參加者卻不乏來自世界各之網路組織及業者，總參加人數更是突破歷年紀錄。除此之外，APNIC（Asia Pacific Network Information Center）的極力贊助及參與，亦為此次會議之一大特色。在此即就 APNIC 於 APRICOT 中所召開之相關會議資料做一整理，以供未能撥冗參加且關心相關資訊者，有概括之了解。APNIC 此次所召開之會議包含下列二個會議，NIR（National Internet Registry）會議及 APNIC 成員會議。

會議資訊及背景資料

詳見附件

會議報告

此會議參加之人員為亞太地區各國家級之網路中心，計有 APJIC、 CNNIC、JPNIC、KRNIC、TWNIC 及 APNIC。主要討論之問題概述如下：

1. APNIC 對 NIR 之教育訓練計畫

APNIC 為讓亞太區家之網路資訊中心對其管理政策及技術進一步了解，以促進網路資源管理之效率，於此會議中 APNIC 提出其對 NIR 之教育訓練規劃。

其將教育訓練分為兩類，一為 APNIC 主動至亞太地區各國舉辦 workshop，針對該國家 NIC 之會員及 APNIC 會員教育訓練。於 1999 年間，APNIC 即至新加坡、印尼、香港等地舉辦多場 workshop。

另一類是由 NIR 派人至 APNIC 實際參與 APNIC staff 之工作，透過 APNIC 人員實地指導、學習，瞭解網路資源管理之技術，以提升更好的服務品質。對於訓練之時間，APNIC 認為以三個月為宜；目前 KRNIC 已著手安排分派員至 APNIC 受訓，TWNIC 亦將研擬其可行性。

2. 目前 NIR IP 位址申請程序之討論

(1) IPV4

目前 IPV4 位址申請，NIR 需填寫"Confederation Address Request Form"
（http://ftp.apnic.net/apnic/docs/confed-address-request）透過
e-mail 向 APNIC 提出申請，APNIC 由此表格檢核 NIR 之分配
（allocation）及指定（assignment）是否合理，及使用率是否超過 80%，
來評估 APNIC 下次應分配予此 NIR 之 IP 位址數量。由於 NIR 所提出之
分配與指定紀錄非常龐大，以致在資料傳送及審核上都易造成問題，故
APNIC 擬改進此程序，以提升需求處理時之效率。另目前各 NIR 於分配
或指定時，程序與方法皆不一致，下表即為各 NIR 執行程序之概況：

NIR	ALLOVATION WINDOW	ASSIGNMENT WINDOW	APNIC-065
TWNIC	No	Yes	Yes
CHNIC	No	Unknown	Yes
JPNIC	No	Yes	Yes
APJII	No	Planned	Yes
KRNIC	No	Yes	Yes

APNIC 希望各 NIR 皆能於分配（allocate）時訂定 allocation window，

於指定（assign）時訂定 assignment window ，並於 ISP 申請時，請其填寫 APNIC-065 表格ftp://ftp.apnic.net/apnic/docs/isp-address-request）。目前 APNIC 授予 TWNIC 授予 TWNIC 之 Allocation Window 為/19（32 class C），Assignment window 為/24（1 class C）。亦即 TWNIC 分配予 ISP 之 IP address 數若超過/19，ISP 即需填寫 Second Opinion Request Form（ftp://ftp.apnic.net/apnic/docs/second-opinion-request）送 APNIC 審核；若 ISP 指定予使用者之 IP address 超過/24，該使用者即需填寫 Second Opinion Request Form 送 TWNIC 審核；於 APNIC 及 TWNIC 審核通過後才烈分配及指定。

（2） IPV6

APNIC 目前已開放 IPV6 之申請，相關之管理政策已設置於（http://www.apnic.net/drafts/ipv6/ipv6-policy-280599.html），若各 NIR 對此仍有任何意見、看法，皆可提供予 APNIC 參考、修改。另 IPV6 之申請表已放置於（http://www.apnic.net/apnic.bin/ipv6.subtla-request.pl），各機關、組織，若有 IPV6 位址之需求，可透過該國之 NIR 將需求表送至 APNIC 審核。

3. APNIC 會員概況

APNIC 將會員分為 Very Large、Large、Medium 及 Small 四類。1999 年總會員數 381，其中新增個數為 170。2000 年總會員數 602，其中新增
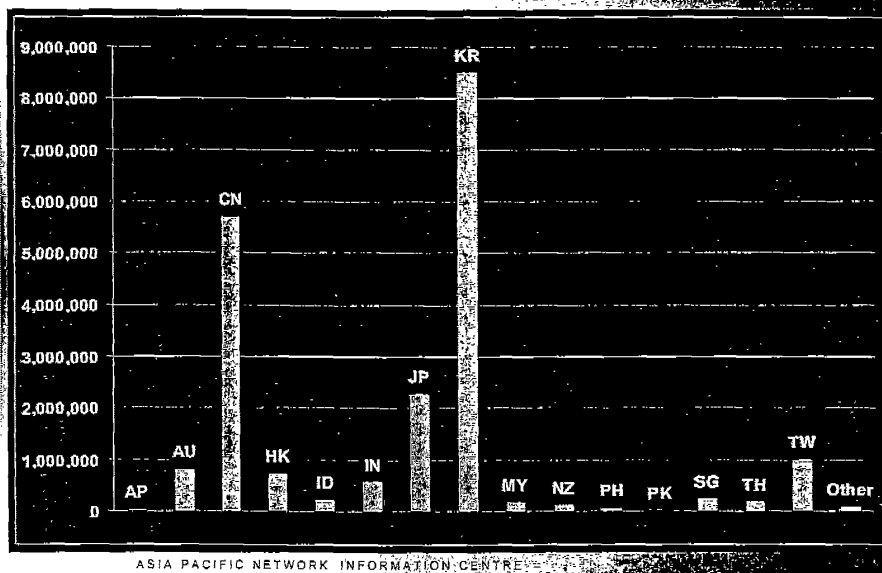
Member Distribution
APNIC

ASIA PACIFIC NETWORK INFORMATION CENTRE
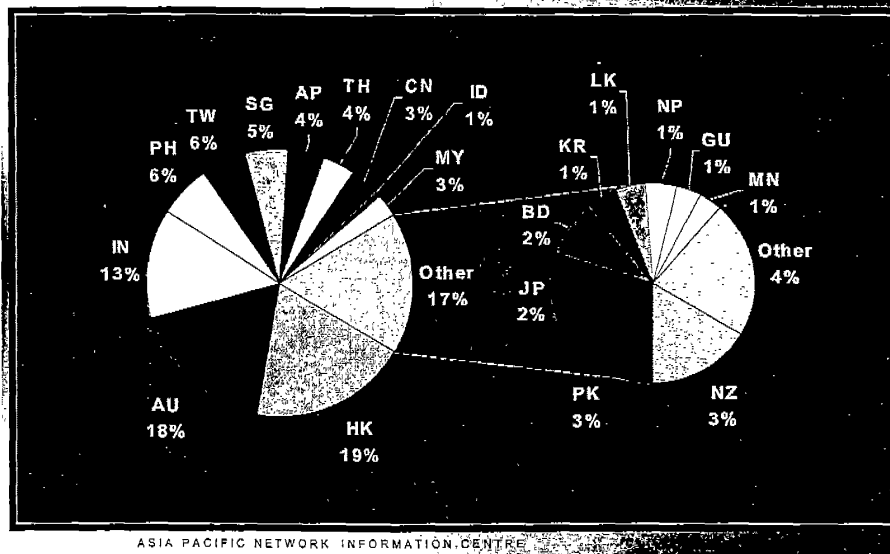
個數為 258。增加率成長 52%，總數上成長 58%。

成員之比例以 "HK"、"AU" 及 "IN" 較多，此三個領域幾乎佔了二分之一
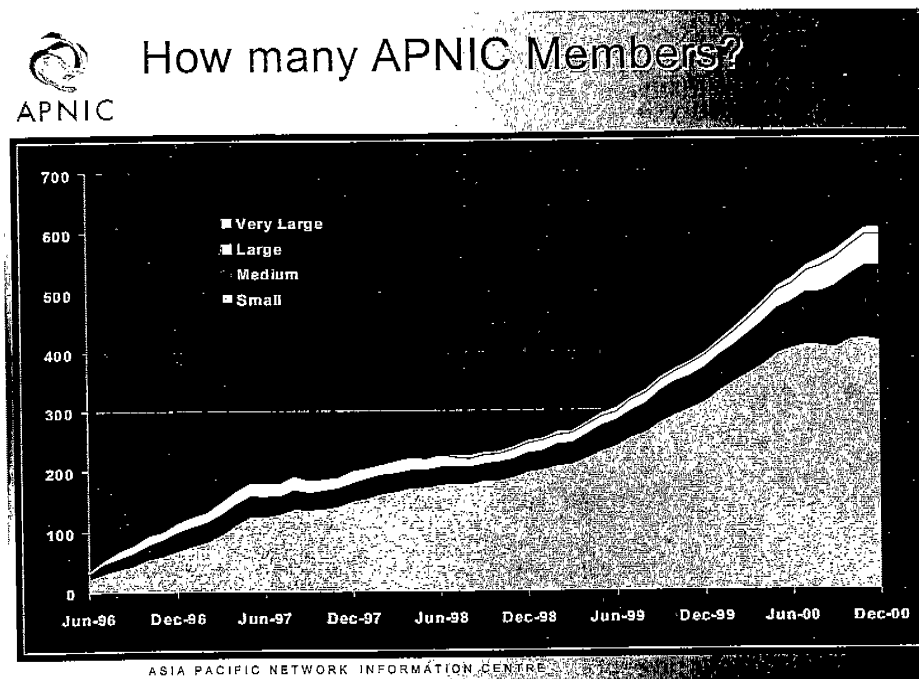

IPv4 Allocations - 2000
APNIC

ASIA PACIFIC NETWORK INFORMATION CENTRE
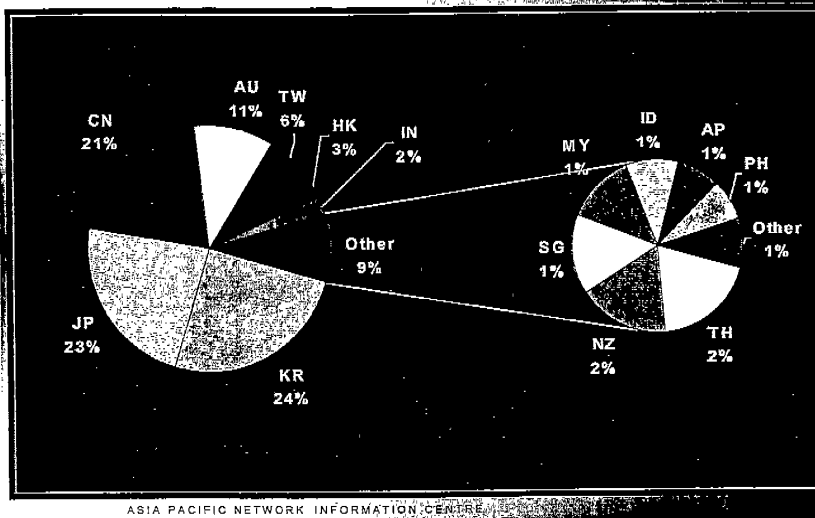
的成員。台灣所佔的比例為 6%，大約是 36 個。

IPV4 Address 分配概況

IPV4 Address 截至 2000 年底，就國家別而言，韓國、大陸及日本已申請的量最大。其次為台灣、香港及澳洲。前三個國家佔了 68%之使用量。整體 IPV4 之需求量仍持續增加。

亞太地區 APNIC 以/8 區塊 (Block)計算，1999 年為 0.58 累計有 2.42。2000 年底為 1.28 累計達 3.71。新核發之年增率為 221%，相當可觀。總核發量成長比率為 53%。

IPv4 Allocations - Distribution
APNIC
ASIA PACIFIC NETWORK INFORMATION CENTRE

4.　IPV6 Address 分配概況

IPV6 Address 自 1999 年開放申請，截至 2000 年底為止，已核發 15 個單位。
2001 年四月已成長到 28 個單位，相關紀錄詳列於下表：

|	
CONNECT-AU-19990916	2001:210::/35
WIDE-JP-19990813	2001:200::/35
NUS-SG-19990827	2001:208::/35
KIX-KR-19991006	2001:220::/35
ETRI-KRNIC-KR-19991124	2001:230::/35
NTT-JP-19990922	2001:218::/35
HINET-TW-20000208	2001:238::/35

IIJ-JPNIC-JP-20000308	2001:240::/35
CERNET-CN-20000426	2001:250::/35
INFOWEB-JPNIC-JP-2000502	2001:258::/35
JENS-JP-19991027	2001:228::/35
BIGLOBE-JPNIC-JP-20000719	2001:260::/35
6DION-JPNIC-JP-20000829	2001:268::/35
DACOM-BORANET-20000908	2001:270::/35
ODN-JPNIC-JP-20000915	2001:278::/35
KOLNET-KRNIC-KR-20000927	2001:280::/35
HANANET-KRNIC-KR-20001030	2001:290::/35
TANET-TWNIC-TW-20001006	2001:288::/35
SONYTELECOM-JPNIC-JP-20001207	2001:298::/35
TTNET-JPNIC-JP-20001208	2001:2A0::/35
CCCN-JPNIC-JP-20001228	2001:02A8::/35
IMNET-JPNIC-JP-20000314	2001:0248::/35
KORNET-KRNIC-KR-20010102	2001:02B0::/35
NGINET-KRNIC-KR-20010115	2001:02B8::/35
OMP-JPNIC-JP-20010208	2001:02C8::/35
INFOSPHERE-JPNIC-JP-20010207	2001:02C0::/35
ZAMA-AP-20010320	2001:02D0::/35
SKTELECOMNET-KRNIC-KR-20010406	2001:02D8::/35

IPv6 Allocations - Distribution
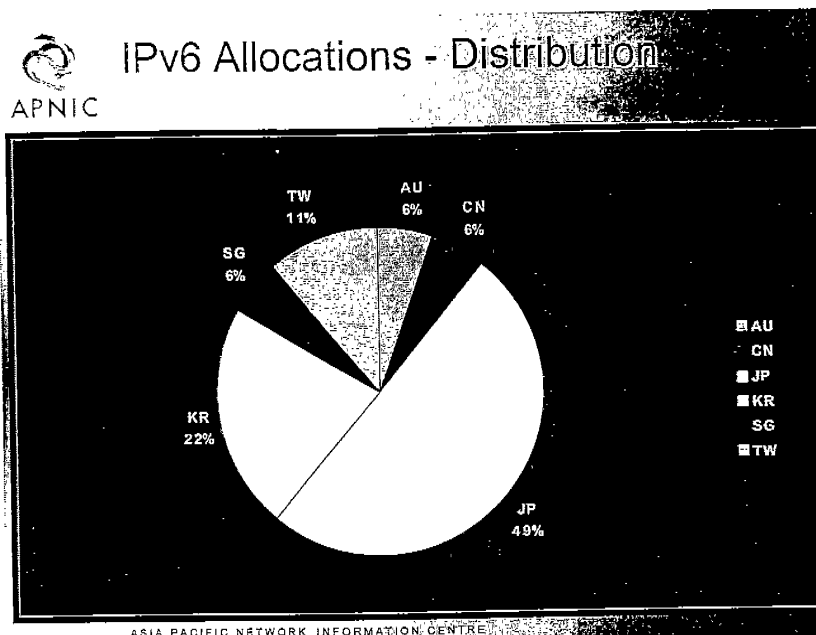
5. AS Number 分配概況

韓國、澳洲及日本佔了 55%。1999 年底 1042 個，2000 年底 1663 個。

ASN Allocations - Distribution
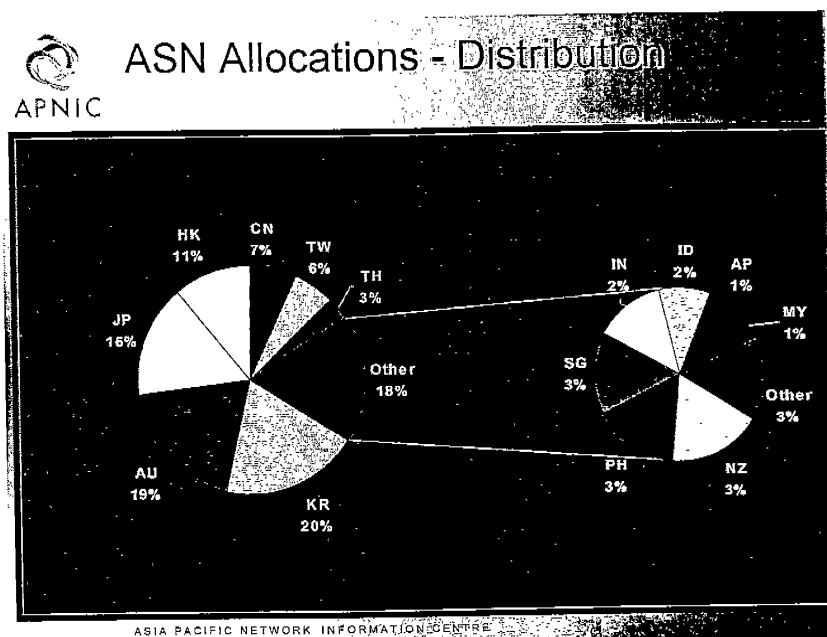
6. 投票項目及結果

項　　目	結　　果
理事改選，候選名單如下： Kuo-Wei Wu (re-elected) Qian Hualin Xing Li (re-elected) Byung-Kyu Kim	吳國維副總經理長期從事網際網路公共領域活動，並兼任本中心國際事務委員等工作。 於本年度 APNIC Executive Council 改選，以最高票榮獲連任！

除以上會議外，APNIC 亦於此次 APRICOT 2000 中舉辦多場技術研討會，如"IPV6"、"RPSL"（Routing Policy Specification Language）、"IP Address Policy"等課程。由此可看出 APNIC 正積極推動相關政策與技術，TWNIC 亦會配合其政策，提升相關技術，同時並秉持公平、公開之原則，提供最好的服務。期於大家的努下，能讓所有的 Internet 使用者擁有最方便而有效率之網路環境。

會議心得、建議事項

1、 我國網際網路事業主管機關為交通部電信總局，相關之服務工作係由

財團法人台灣網路資訊中心（TWNIC）負責，並由研考會協助."gov.tw"本部電子計算機中心協助".edu.tw"網域相關業務之運作管理。於國際間，我國 TWNIC 極需與網際網路相關組織建立合作與信賴關係，實應積極參與相關國際會議，藉以表達我國網際網路推展之現況及策略。掌握此類國際會議之參與，對爭取未來國際間網際網路資源分配、發展策略等相關權益影響甚鉅。

2、　TWNIC 自 88 年 12 月 29 日正式完成財團法人設立登記享宜，繼而正式運作迄今已一年多。TWNIC 是目前國內唯一統籌網域註冊及 IP 位址分發之超然中立之非營利性組織，這一年來中文網域註冊服務已具備雛型、汎用網域名稱也已開放服務。另外如網域名稱爭議處理、Ipv4/Ipv6、registry/registrar、whois DB 及國際相關會議之積極參與等，亦是工作重點，陸續舉辦全國性研討會。

3、　此次會議可以看到 IPV6 在亞太地區的發展算是相當迅速，其中又以日本、韓國及澳洲佔最大比例，另外像是馬來西亞、新加坡、中國大陸、香港也都提出進行中之計畫報告，反觀我國，只有中華電信研究所自 1997 年參與 6bone 的連線計畫，一直持續至今，另外早期 NBEN 有少數國立大學建立之測試環境，因此 TWNIC 在國內 IPV6 的推動上應該辦演更積極角色。除了為我國網際網路事業提供最佳服務，並且使我國在網際網路事業能有更健全、更快速之發展。

PROVISIONAL IPv6 ASSIGNMENT AND ALLOCATION POLICY DOCUMENT

TABLE OF CONTENTS

ABSTRACT

This document describes the registry system for distributing globally unique unicast IPv6 address space. IPv6 address space is distributed in a hierarchical manner (as is IPv4 address space), managed by the IANA

and further delegated by the Regional Internet Registries (Regional IRs) as described in RFC 1881. In the case of IPv6, the Regional IRs allocate Top-Level Aggregation Identifiers (TLAs) to organizations, which, as TLA Registries, in turn allocate or assign address space to other Internet Service Providers (ISPs) and end users. ISPs then serve as Next Level Aggregation (NLA) Registries for their customers.

This document describes the responsibilities, policies, and procedures associated with IPv6 address space management, to be followed by all organizations within the allocation hierarchy. The intention of this document is to provide a framework for clear understanding and consistent application of those responsibilities, policies, and procedures throughout all layers of the hierarchy.

1. SCOPE

This document first describes the global Internet Registry system for the distribution of IPv6 address space (as defined in RFC 2374) and the management of that address space. It then describes the policies and guidelines governing the distribution of IPv6 address space. The policies set forth in this document should be considered binding on all organizations that receive allocations or assignments of IPv6 address space either directly or indirectly from a Regional IR.

This document describes the primary operational policies and guidelines in use by all Regional IRs. Regional IRs may implement supplementary policies and guidelines to meet the specific needs of the Internet communities within their regions.

These policies and guidelines are subject to change based upon the development of operational experience and technological innovations, which together emerge as Internet best practice.

The structure of this document is as follows:

Section 2, "IPv6 Address Space and the Internet Registry System", describes the hierarchical structure of responsible organizations within

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the Internet Registry system and the explicit goals that determine the framework of policies for allocation and assignment of IPv6 address space.

Section 3, "IPv6 Technical Framework", explains the IPv6 addressing format and describes the differences between TLA, NLA, and SLA blocks.

Section 4, "Addressing Policies", describes the requirements for applying for a TLA allocation and the policies that apply to such allocations. It discusses how TLA registries can allocate space to other ISPs (NLA blocks) and assign address space to end-users (SLAs).

Section 5, "Organizations Operating in More than One Region", describes the requirements for organizations operating in more than one IR region requesting address space.

Section 6, "DNS and Reverse Address Mapping", describes the role of the Regional IRs in providing reverse delegation and explains how the Regional IRs can manage subsidiary reverse delegation of allocated/assigned address space.

Section 7, "Glossary", provides a listing of terms used in this document along with their definitions.

Section 8, "List of References", provides a list of documents referenced in this document.

2 IPv6 ADDRESS SPACE AND THE INTERNET REGISTRY SYSTEM

IPv6 unicast addresses are aggregatable with contiguous bit-wise masks used to define routable prefixes, using a method similar to that used for IPv4 addresses under CIDR. With IPv6, scarcity of address space is assumed to no longer exist for the end-user. However, inefficient assignments of address space and rapid expansion of routing tables remain as serious potential impediments to the scalability of the Internet. The Internet Registry system exists to ensure that IPv6 address space is managed in a globally consistent, fair, and responsible manner that

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minimizes wastage, and maximizes aggregation within the routing structure.

2.1 The Internet Registry System Hierarchy

The hierarchical Internet Registry system exists to enable the goals described in this document to be met. In the case of IPv6, this hierarchy consists of the following levels, as seen from the top down: IANA, Regional Internet Registries, TLA, NLA Registries, and end-sites.

2.1.1 IANA

The Internet Assigned Numbers Authority (IANA) has authority over all IP number spaces used in the Internet, including IPv6 address space. IANA allocates parts of the IPv6 address space to Regional Internet Registries (Regional IRs) according to their established needs.

2.1.2 Regional Internet Registries

Regional IRs operate in large geographical regions such as continents. Currently, three Regional IRs exist: ARIN serving North and South America, the Caribbean, and sub-Saharan Africa; RIPE NCC serving Europe, the Middle East, and parts of Africa; and APNIC serving the Asia Pacific region. These Regional IRs also serve areas beyond their core service areas to ensure that all parts of the globe are covered. Additional Regional IRs may be established in the future, although their number will remain relatively low. Service areas will be of continental dimensions.

Regional IRs are established under the authority of the IANA. This requires consensus within the Internet community and among the ISPs of the respective region.

2.1.3 TLA Registries

TLA Registries are established under the authority of the appropriate Regional IR to enable "custodianship" of a TLA or sub-TLA block of IPv6 addresses. TLA Registries perform roles and bear responsibilities which are analogous and consistent with those of the Regional IR within

their designated network services and infrastructures.

2.1.4 NLA Registries

[to be written]

2.1.5 End-sites

[to be written]

2.2 Goals of the Internet Registry System

The goals described in this section have been formulated by the Internet community with specific reference to IPv6 address space. They reflect the mutual interest of all members of that community in ensuring that the Internet is able to function and grow to the maximum extent possible. It is the responsibility of every IR to ensure that all assignments and allocations of IPv6 address space are consistent with these goals.

These goals will occasionally be in conflict with the interests of individual ISPs or end-users. Therefore, IRs evaluating requests for allocations and assignments must carefully analyze all relevant considerations and must seek to balance the needs of individual applicants with the needs of the Internet community as a whole. The policies and guidelines described in this document are intended to help IRs balance these needs in consistent and equitable ways. Full documentation of, and transparency within, the decision making process must also be maintained in order to achieve this result.

2.2.1 Uniqueness

Each IPv6 unicast address must be globally unique. This is an absolute requirement for guaranteeing that every host on the Internet can be uniquely identified.

2.2.2 Aggregation

IPv6 addresses must be distributed in a hierarchical manner, permitting the aggregation of routing information and limiting the number of routing entries advertised into the Internet. This is necessary to ensure

proper operation of Internet routing and to maximize the routing system's ability to meet the demands of both likely and unforeseeable future increases in both size and topological complexity. In IPv6, aggregation of external routes is the primary goal.

This goal is motivated by the problems which arose in IPv4 network addressing. IPv4 address allocations have not been sufficiently hierarchical to ensure efficient routing across the Internet. Inefficient use of classful allocations led to an excess of routing entries appearing in the default-free routing table. Furthermore, increased complexity of network topologies led to IPv4 prefixes being announced many times via different routes.

Responsible policies and guidelines must limit the number of top level prefixes that are announced on the Internet so as to ensure that the problems of IPv4 are not repeated in IPv6. Such policies and guidelines will always reflect the constraints of current router technology and will be subject to reevaluation as that technology advances. Furthermore, such policies and guidelines will be reviewed according to a model consistent with that provided in RFC 2374 and RFC 2450. Under this model, a threshold is set significantly below the number of default-free routing table entries considered to be currently supportable. If the number of entries reaches that threshold, then allocation criteria are to be reviewed (see section 4.4).

2.2.3 Efficient Address Usage

Although IPv6 address resources are abundant, the global Internet community must be careful to avoid repeating the problems that arose in relation to IPv4 addresses. Specifically, even though "conservation" of IPv6 addresses is not a significant concern, registries must implement policies and guidelines that prevent organizations from stockpiling addresses. IPv6 addressing architecture allows considerable flexibility for end-users; however, all registries must avoid wasteful use of TLA and NLA address space by ensuring that allocations and assignments are

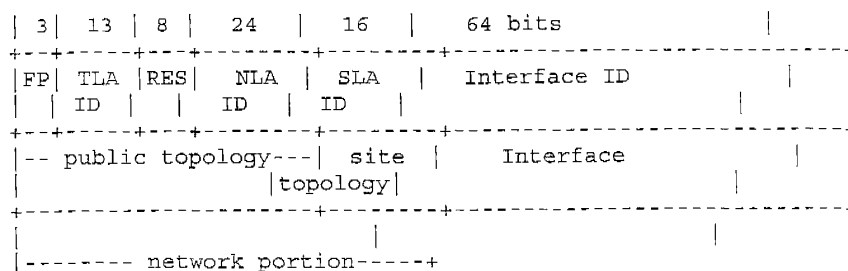made efficiently and based on demonstrated need.

2.2.4 Registration

Every assignment and allocation of IPv6 Internet address space must be registered in a publicly accessible database. This is necessary to ensure uniqueness and to provide information for Internet trouble shooting at all levels. It also reflects the expectation of the Internet community that all custodians of public resources, such as public address space, should be identifiable. As is the case with IPv4 addresses, each of the Regional IRs will maintain a public database where all IPv6 allocations and assignments are entered.

3. IPv6 TECHNICAL FRAMEWORK

3.1 IPv6 Addressing Hierarchy

RFC 2374 specifies that aggregatable addresses are organized into a topological hierarchy, consisting of a public topology, a site topology, and interface identifiers. These in turn map to the following:

```
| 3| 13 | 8 |   24    |  16   |      64 bits                          |
+--+-----+---+---------+-------+--------------------------------------+
|FP| TLA |RES|   NLA   |  SLA  |    Interface ID                      |
|  | ID  |   |   ID    |  ID   |                                      |
+--+-----+---+---------+-------+--------------------------------------+
|-- public topology---| site  |      Interface                       |
|                     |topology|                                     |
+---------------------+--------+--------------------------------------+
|                        |                      |
|-------- network portion-----+
```

The public routing topology is represented by a /48, giving each site 16 bits to create their local topology. The host portion is represented by the last 64 bits of the address.

Because all interface IDs are required to be in the EUI-64 format (as specified in RFC 2373 and RFC 2374) the boundary between the network and host portions is "hard" and ID address space cannot be further sub-divided.

Also, in order to facilitate multihoming and renumbering, the boundary between the public topology and the site topology division at the /48 is

also hard. (RFC 2374 explains this more completely.)

3.2 Initial IPv6 Addressing Hierarchy

A modified version of the addressing hierarchy described in section 3.1 will be used for the initial IPv6 allocations. The first TLA prefix (TLA 0x0001) has been divided into further blocks, called "sub-TLAs", with a 13-bit sub-TLA identifier. Part of the reserved space and the NLA space have been used for this purpose.

This modified addressing hierarchy has the following format and prefix boundaries:

```
Format boundaries

| 3|    13    |   13   | 6 |   13   |   16   |    64 bits       |
+--+----------+--------+---+--------+--------+------------------
-+
|FP|   TLA    | sub-TLA|Res|   NLA  |  SLA   |   Interface ID   |
|  |   ID     |        |   |   ID   |  ID    |                  |
+--+----------+--------+---+--------+--------+------------------
-+

Prefix boundaries (starting at bit 0)

            number of the   number of the          ID
            left-most       right-most      longest   length
            bit             bit             prefix    (in bits)
            ************    ************    *******   ********
TLA ID          3               15            /16        13
sub-TLA ID     16               28            /29        13
Reserved       29               34
NLA ID         35               47            /48        13
SLA ID         48               63            /64        16
```

For purposes of a "slow start" of a sub-TLA, the first allocation to a TLA Registry will be a /35 block (representing 13 bits of NLA space). The Regional IR making the allocation will reserve an additional six bits for the allocated sub-TLA. When the TLA Registry has fully used the first /35 block, the Regional IR will use the reserved space to make subsequent allocations (see section 4.2.5).

All router interfaces are required to have at least one link-local unicast address or site-local address. It is recommended that site-local addresses be used for all point-to-point links, loopback addresses, and so forth. As these are not required to be visible outside the site's network, they do not

require public address space. Any global unicast address space assigned must not be used for link-local or site-local purposes as there is address space reserved for these purposes. (Note that "all 1s" and "all 0s" are valid unless specifically excluded through reservation. See list of reserved addresses in RFC 2373.)

4. ADDRESSING POLICIES

As described above, Regional IRs make IPv6 allocations to requesting organizations that qualify for a sub-TLA (TLA Registries). TLA Registries then allocate NLA space to ISPs that are their customers (NLA Registries). NLA Registries in turn assign SLA space to end-users. TLA Registries may also assign SLA space directly to end-users. TLA Registries and NLA Registries also use SLA space to address their own networks. This hierarchical structure of allocations and assignments is designed to maximize the aggregation of routing information.

4.1 IPv6 Addresses not to be considered property

All allocations and assignments of IPv6 address space are made on the basis that the holder of the address space is not to be considered the "owner" of the address space, and that all such allocations and assignments always remain subject to the current policies and guidelines described in this document. Holders of address space may potentially be required, at some time in the future, to return their address space and renumber their networks in accordance with the consensus of the Internet community in ensuring that the goals of aggregation and efficiency continue to be met.

4.1.1 Terms of allocations and assignments to be specified

At the time of making any allocation or assignment of IPv6 address space, Registries should specify the terms upon which the address space is to be held and the procedures for reviewing those terms in the future. Such terms and procedures should be consistent with the policies and guidelines described in this document.

4.2 Allocations

In order to meet the goal of aggregation (section 2.2.2) Regional IRs will only allocate sub-TLA address space to organizations that meet the criteria specified in one or more of the following sections: 4.2.1 "General Criteria for Initial Sub-TLA Allocation" and 4.2.2 "Criteria for sub-TLA Allocations in Transitional 'Bootstrap' Phase".

The criteria for an initial allocation to an organization are different from the criteria that apply for subsequent allocations. Whereas the requirements for an initial allocation are based on technical considerations, requests for additional address space are evaluated solely on the basis of the usage rate of the initial allocation.

The following criteria for sub-TLA allocations reflect the intentions of the authors of the IPv6 addressing architecture (see RFC 2374, RFC 2373, and RFC 2450), namely that addressing policies must promote the goal of aggregation. The basis of these criteria is that it is primarily the organizations acting as transit providers or exchange points that will be involved in the top-level routing hierarchy and that other Service Providers should receive NLA address space from these organizations.

4.2.1 General Criteria for Initial Sub-TLA Allocation

Subject to sections 4.2.2, and 4.2.3, Regional IRs will only make an initial allocation of sub-TLA address space to organizations that meet criterion (a) AND at least one part of criterion (b), as follows:

a. The requesting organization's IPv6 network must have exterior routing protocol peering relationships with the IPv6 networks of at least three other organizations that have a sub-TLA allocated to them.

AND either

b(i). The requesting organization must have reassigned IPv6 addresses received from its upstream provider or providers to 40 SLA customer sites with routed networks connected by permanent or semi-permanent links.

OR

b(ii). The requesting organization must demonstrate a clear intent to provide IPv6 service within 12 months after receiving allocated address

space. This must be substantiated by such documents as an engineering plan or deployment plan.

4.2.2 Criteria for sub-TLA Allocations in Transitional "Bootstrap" Phase

By requiring exterior routing protocol peering relationships with at least three other IPv6 networks, section 4.2.1 creates a problem during the initial period of transition to IPv6 network addressing, namely that too few organizations will meet the general criteria during this phase (referred to as the "bootstrap phase"). The criteria in this section provide an interim mechanism for eligibility that will only apply during the bootstrap phase, that is until the number of organizations operating IPv6 networks is considered sufficient for the general criteria to operate. (See section 4.2.2.1 "Duration of Bootstrap Phase".)

Notwithstanding section 4.2.1, during the bootstrap phase, Regional IRs will make an initial allocation of sub-TLA address space to organizations that meet criterion (a) AND criterion (b) AND either criterion (c) OR criterion (d).

a. The requesting organization's network must have exterior routing protocol peering relationships with at least three other public Autonomous Systems in the default-free zone.

AND

b. The requesting organization must show that it plans to provide production IPv6 service within 12 months after receiving allocated address space. This must be substantiated by such documents as an engineering plan or a deployment plan.

AND either

c. The requesting organization must be an IPv4 transit provider and must show that it already has issued IPv4 address space to 40 customer sites that can meet the criteria for a /48 IPv6 assignment. In this case, the organization must have an up-to-date routing policy registered in one of the databases of the Internet Routing Registry, which the Regional IR may verify by checking the routing table information on one of the public looking glass sites).

OR

d. The requesting organization must demonstrate that it has experience

with IPv6 through active participation in the 6bone project for at least six months, during which time it operated a pseudo-TLA (pTLA) for at least three months. The Regional IRs may require documentation of acceptable 6Bone routing policies and practice from the requesting organization.

4.2.2.1 Duration of Bootstrap Phase

The eligibility criteria in this section will only apply until 100 requesting organizations have received allocations of sub-TLA address space, provided that no more than 60 of these organizations are located in one Regional IR's region. After this threshold has been reached, the bootstrap phase will be considered to be over and Regional IRs will only make allocations to organizations that meet the general criteria in section 4.2.1.

If 60 organizations have been allocated sub-TLAs within one region (but less than 100 have been allocated worldwide) then the bootstrap phase within that region will be considered to be over. Additional applications from that region must satisfy the general criteria in section 4.2.1, while applications from other regions need only satisfy the bootstrap criteria.

When 100 sub-TLA registries are formed worldwide, there will be enough choices for new prospective sub-TLAs to find others to connect to and the bootstrap phase can end. The regional limitation on bootstrapping is intended to prevent one region consuming all available bootstrap opportunities before IPv6 deployment has started in other regions.

4.2.3 Special considerations

4.2.3.1 Exchange Points

It is expected that some exchange points will play a new role in IPv6, by acting as a sub-TLA registry for ISPs that connect to the exchange point. Because there is little information available about such exchange points and how they will operate, they have not been considered during development of sub-TLA eligibility criteria. As these exchange points are established, the Regional IRs will evaluate whether special criteria are required. It is expected that the Regional IRs will request from the

exchange point information about the nature of the contracts they enter with the ISPs seeking IPv6 service.

4.2.3.2 Multihomed Sites

[to be written]

4.2.4 Size for Initial Allocation: "Slow-Start" Mechanism

Regional IRs will adopt a "slow start" mechanism when making initial allocations of sub-TLA space to eligible organizations. By this mechanism, the initial allocation will allow 13 bits worth of NLA IDs to be used by the organization unless the requesting organization submits documentation to the Regional IR to justify an exception based on topological grounds. This initial allocation allows the organization to create a hierarchy within the allocation depending on their customer type (ISP or end-site) and the topology of their own network. For example, an organization may receive 8,192 SLAs (a /48 each). (See section 4.3 for policies relating to assignments.)

The slow-start mechanism for sub-TLA allocations is important to the development of IPv6 addressing hierarchies for several reasons. One significant reason is that it allows the Regional IRs to set relatively low entrance criteria for organizations seeking a sub-TLA allocation. This makes the process fair to all organizations requesting sub-TLA space by giving everybody the same (relatively small) amount and basing future allocations on track record. Furthermore, the effect of this process will be to create a range of different prefix lengths which, in the event that routing table growth requires it, will allow the ISP industry to make rational decisions about which routes to filter.

Another important reason for adopting the slow-start mechanism is to allow Regional IRs to maintain contact with TLA Registries as they develop, thereby providing a level of support and training that will help ensure that policies and practices are implemented consistently. Without a slow start mechanism, TLA Registries receiving large initial

allocations may not have formal contact with the Regional IR for several years. The slow-start mechanism helps Regional IRs to meet the goals of registration and efficiency, by providing a process that enables them to monitor whether the TLA Registries are properly registering assignments in the database and correctly applying the policies for NLA and SLA assignments contained in this document.

4.2.5 Criteria for Subsequent Sub-TLA Allocations

Regional IRs will not make subsequent allocations of sub-TLA address space to a TLA Registry unless the TLA Registry has used at least 80 percent of its previously allocated address space. In this context, address space is considered to be "used" if the TLA Registry has made all of its allocations and assignments of that address space to its own infrastructure or customer needs in accordance with the policies and guidelines specified in this document.

The size of subsequent allocations depend on the demonstrated usage rate of the previous allocations.

4.2.5.1 Contiguous allocations

The subsequent allocation will be contiguous with the previously allocated range to allow for aggregation of routing information. When a Regional IR makes an initial allocation to TLA Registry, it will reserve the full sub-TLA from which this allocation was made. Subsequent allocations to that TLA Registry will be made from the reserved sub-TLA. If no further growth is possible within that sub-TLA range, the Regional IR may allocate a full TLA. (Note, this practice may eventually lead to a situation in which no empty sub-TLAs are available, but the existing sub-TLAs are not fully utilised. If this occurs, then the provisions of section 4.4 will apply.)

4.2.6 Registering and Verifying Usage

Each TLA Registry is responsible for the usage of the sub-TLA address space it receives and must register all end-site assignments and ISP

allocations in the database of the Regional IR in its region. The Regional IR may verify whether all assignments are registered in the database. In addition to the database entries, the Regional IR may ask for periodic reports specifying how the addresses are being used.

Registered end-sites must be connected and reachable. To verify this, the relevant Regional IR is entitled to ping /48s within end-sites. Filtering holes should be negotiated by the Regional IR and the organization holding the addresses in question. Therefore, it is suggested that end-sites use anycast cluster addresses on their border routers to enable this. It is expected that one /48 SLA block is enough address space per end-site. If an end-site requests an additional SLA, the TLA Registry must send the request to the Regional IR for a second opinion.

4.2.7 Renumbering

It is possible that circumstances could arise whereby sub-TLA address space becomes scarce. This could occur, for example, due to inefficient use of assigned address space, or to an increase in the number of organizations holding both TLA and sub-TLA space.

If such circumstances arise, it may be necessary for Regional IRs to require that previously allocated address space be renumbered into different ranges.

If a Regional IR requires a TLA Registry to renumber its own network, this will also have an impact on all of its customers' networks. Therefore, it is recommended that TLA Registries and NLA Registries enter contractual arrangements with their customers at the time of the first allocation or assignment. Such arrangements should clarify that the address space might have to be returned, requiring all end-sites to be renumbered. If renumbering is required, then TLA Registries should inform their customers as soon as possible.

Regional IRs requiring a TLA Registry to renumber will allow that Registry at least 12 months to return the sub-TLA space. [Note that the

granted renumbering time may depend on the prefix length returned. The draft document http://search.ietf.org/internet-drafts/draft-ietf-ipngwg-router-renum-08.txt describes the issues involved in and methods used for renumbering IPv6 networks.]

[Note that site-local addresses are not affected by renumbering the global unicast IPv6 addresses.]

4.2.8 Allocations to NLA Registries

TLA Registries with ISP customers may use their 13 bits of NLA address space to create an addressing hierarchy for those ISPs. Each of the TLA Registry's own end-user organizations would receive a /48 (see section 4.3); however, the ISP customers (NLA Registries) could be "allocated" additional bits in order to aggregate the ISP's customers internally. A slow-start mechanism will be used for these NLA allocations.

The NLA block is an allocation to the NLA Registry and not an assignment. If the NLA Registry does not sufficiently use it within a reasonable time, the TLA Registry may require it to be returned. Definitions of 'sufficient use' and 'reasonable time' will be provided in a future version of this policy document. These definitions will be influenced by IPv6 operational experience and determined by the Regional IR's with the consensus of the Internet registry and engineering communities.

Once an NLA Registry has assigned at least 80 percent of its allocation, it may request an additional block from the TLA Registry. This block can be any size, depending on the NLA Registry's usage rate for its first block. A TLA Registry receiving a request for subsequent NLA allocations must submit the request to the relevant Regional IR for a second opinion.

Each NLA allocation must be registered in the Regional IR's database. All end-user assignments must also be registered in the Regional IR's

database. The same procedures for these end-user assignments apply for the end-user assignments made by the TLA Registry to their customers directly. Ultimately, the TLA Registry is responsible for management of all address space it allocates and should, therefore, appropriately monitor all assignments made by the NLA Registries to which it allocates. The Regional IR can at any time ask for additional information about the allocations and assignments being made.

4.3 Assignments

4.3.1 Assignments to End-users

The minimum assignment to end-user organizations that have a need to create subnets in their network is a /48 (80 bits of address space). Within this /48, 16 bits are an SLA block used for subnetting and further 64 bits are used per interface.

TLA Registries must submit all requests they receive for additional assignments to the relevant Regional IR for evaluation (a "second opinion"). All such requests must document the full use of the initial SLA and must be accompanied by an engineering plan justifying the need for additional address space.

Dial-up lines are considered part of an ISP's infrastructure and, therefore, addresses for such purposes should be assigned from the SLA block of that ISP. It is expected that longer prefixes be used for non-permanent, single-user connections.

4.4 Reclamation Methods/Conditions

Allocations are valid only as long as the organizations holding the address space continue to meet the criteria for allocations set out in sections 4.2.1, 4.2.2, and other criteria which may be specified subject to the provisions of this section. Consistent with the goal of aggregation described in section 2.2.2, the criteria for allocations may be reviewed with regard to current routing technology. The current threshold point for reviewing the allocation criteria is 4096 default-free entries in the

global routing table.

If this threshold is reached and current routing technology then allows additional route entries, the number of possible TLAs and sub-TLAs may be increased accordingly.

However, if the limit is reached and routing technology at that time is not able to support additional routing entries, Regional IRs will review all allocations made up to that point. In the course of this review, the Regional IRs may seek consensus of the Internet registry and engineering communities to set minimum acceptable usage rates or new criteria determining eligibility to hold sub-TLA space. Dependent upon such a consensus, the Regional IRs may revoke the sub-TLA allocations of any Registry not complying with those rates or criteria. Such Registries will be required by the relevant Regional IR to renumber their networks and return their previous allocation within a reasonable time.

During the period that routing technology is being investigated, the Regional IRs will continue allocating address space even if the number of "possible" routes are reached.

5. ORGANIZATIONS OPERATING IN MORE THAN ONE REGION

Organizations requesting sub-TLA space that operate in more than one region, and that need separate sub-TLA blocks for routing purposes, may request the address space from more than one of the Regional IRs, provided that the organization's networks meet the criteria for allocation of sub-TLA address space in each of the relevant regions.

6. DNS AND REVERSE ADDRESS MAPPING

6.1 Allocation and Reverse Address Mapping

IANA will delegate to the Regional IRs responsibility for the management of the reverse address mapping of each of the address ranges allocated to them.

For each IPv6 address block allocated by a Regional IR to a member or customer, the Regional IR must set up NS records in the appropriate

sub-domain within the "ip6.int" domain.

For example, where a /35 address block is allocated:

An allocation of "3FFE:2100:2000::0/35" would require the following
two zones to be delegated in the "0.0.1.2.e.f.f.3.ip6.int" zone file:

```
$ORIGIN 0.0.1.2.e.f.f.3.ip6.int.
2 NS ns1.ispA.net.
  NS ns2.ispA.net.
3 NS ns1.ispA.net.
  NS ns2.ispA.net.
```

Prior to allocating address space, the Regional IRs will notify the
recipient of the address range they will receive. The recipient should
configure reverse DNS servers for that address range and then inform
the RIR of that configuration in order to complete the allocation process.

6.2 Assignments and Reverse Address Mapping

All holders of a /35 allocation who make assignments from that
allocation are required to set up reverse DNS for their customers.

7. GLOSSARY

Allocation - The provision of IP address space to ISPs that reassign their
address space to customers.

Assignment - The provision of IP address space to end-user
organizations.

Default-free zone - The default-free zone is made up of Internet routers
which have explicit routing information about the rest of the Internet
and, therefore, do not need to use a default route.

End-user - An organization receiving reassignments of IPv6 addresses
exclusively for use in operational networks.

Exterior routing protocol peering relationships - Routing relationships in
which the organisations receive the full Internet routing table separately
from neighbouring Autonomous Systems and are, therefore, able to use
that routing table to make informed decisions about where to send IP
packets.

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Interface Identifiers - A 64-bit IPv6 unicast address identifier that identifies an interface on a link.

NLA ID - Next-Level Aggregation Identifier.

NLA Registry - Internet Service Providers receiving IPv6 address allocations from a TLA Registry.

Public Topology - The collection of providers and exchanges who provide public Internet transit service.

Regional Internet Registries - Organizations operating in large geographical regions such as continents which are responsible for fair distribution of globally unique Internet address space and for documenting address space allocation and assignment.

Site - A location, physical or virtual, with a network backbone connecting various network equipment and systems together. There is no limit to the physical size or scope of a site.

Site Topology - A local, specific site or organization which does not provide public transit service to nodes outside the site.

SLA ID - Site-Level Aggregation Identifier.

Slow Start - The efficient means by which addresses are allocated to TLA Registries and to NLA ISPs. This method involves issuing small address blocks until the provider can show an immediate requirement for larger blocks.

TLA ID - Top-Level Aggregation Identifier.

TLA Registry - Organizations receiving TLA/sub-TLA ID from Regional IRs to reassign to customers.

Unicast - An identifier for a single interface. A packet sent to a unicast address is delivered to the interface identified by that address. Note that the definition of an IPv4 host is different from an IPv6 identifier. One physical host may have many interfaces, and therefore many IPv6

identifiers.

8. LIST OF REFERENCES

[to be written]

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AGENDA

A - Conference

Monday - Feb 26

9:00 AM - 12:00 PM

APNG General Meeting (D1A1)
Mr. Shigeki Goto, APNG
Location: Bilik Selangor (Selangor Room), Level 3

1.30 PM - 3:00 PM

APNG Education WG Meeting (D1A2)
Dr. Nian-Shing Chen,
Location: Bilik Selangor (Selangor Room), Level 3

3:15 PM - 5:45 PM

ICANN Update (D1A5)
Mr. Hiro Hotta, NTT
Location: Bilik Selangor (Selangor Room), Level 3

B - TUTORALS DAY 1

Introductory Tutorials

NOTE: Each Tutorial has two entries below. One is there just to show that there is a discount for APNIC members.

Monday - Feb 26

9:00 AM - 5:00 PM

APNIC Training Course [Non-APNIC Member] (D1T1)
Mr. Champika Wijayatunga, APNIC
This course is an important presentation of current APNIC policies and a guide to completing APNIC request forms successfully. It covers important hostmaster-related topics such as preparing a network plan, APNIC database procedures, AS procedures, reverse DNS, and IPv6. APNIC training is intended for technical personnel located in the Asia Pacific region who have responsibility for allocating and assigning IP addresses. A sample of this course is available at http://www.apnic.net/training/recent.
Location: Tun Hussein Onn Hall B, Level 2
Fee: $100.00 for non-APNIC member
More Information: http://www.apnic.net/training/recent

9:00 AM - 5:00 PM

APNIC Training Course [APNIC Member] (D1T1-A)
Mr. Champika Wijayatunga, APNIC
See D1T1 above
Location: Tun Hussein Onn Hall B, Level 2
Fee: $75.00 for APNIC member
More Information: http://www.apnic.net/training/recent

9:00 AM - 5:30 PM

ISP System Administration: Network Management [Non-APNIC Member] (D1T5)
Mr. Paul Kooros, NeTrack / KDC

Who should attend?

The intended audience of this tutorial includes system and network administrators at Internet service providers.

Description:

An ISP environment provides some specific challenges. The usercommunity is highly dynamic and
demanding, the security vulnerability is hostile, and the growth rate is astronomical. This tutorial will illustrate the potential associated problems and will provide tips to meet these challenges specific to ISPs - both technology and policy. We'll discuss typical pitfalls in problems faced by ISPs and how they can be best avoided or solved.

Topics will include:

- Reliability and redundancy
- Performance (LAN, WAN and web server)
- Resource availability

- ~~Resource availability~~
- DNS BIND 8 migration
- Caching
- Support tools
- Training and/or hiring talent
- Product/service planning

After completing this tutorial?

Attendees will have a greater understanding of the tools, techniques and responsibilities of running

Unix server based services for an ISP
> Location: Bilik Terengganu (Terengganu Room), Level 3
> Fee: $125.00 for non-APNIC member

9:00 AM - 5:30 PM

Creating Service Delivery Environments for Broadband Networks [Non-APNIC Member] (D1T7)
Mr. Scott Stevens, Unisphere Networks
You have built your broadband infrastructure at both access and core levels, and the customers are coming subscribing to your service in droves. Now, how do you add "profitability" to your new infrastructure. This tutorial addresses: Consumer Service Provisioning, Broadcast, Multicast, PointCast & Unicast (on demand) video and audio services, interactive network gaming, and tiered service levels. Business Service Provisioning, SLA for Broadband, emulating Leased Line on Broadband, Self Provisioning, Network Accounting Services.
> Location: Bilik Perlis (Perlis Room), Level 2
> Fee: $125.00 for non-APNIC member

9:00 AM - 5:30 PM

Introduction to Multilingual Domain Names [Non-APNIC Member] (D1T8)
Mr. James Seng, i-DNS.net International
> Location: Bilik Pahang (Pahang Room), Level 2
> Fee: $125.00 for non-APNIC member

9:00 AM - 5:30 PM

IPv6 Introduction and Deployment [Non-APNIC Member] (D1T2)
Mrs. Rohani Ishak, MIMOS Berhad
Mrs. Raja Azlina Raja Mahmood, MIMOS Berhad
IPv6, an enhanced version of existing IP, has been developed with a number of promising features. It provides bigger addressing space, auto-configuration, better quality of service, security and optimal header format. As one of the largest ISPs in Malaysia, MIMOS Berhad is to provide IPv6-based network to its valued-customers eventually. In doing that, MIMOS Berhad has been actively participating in the IPv6 community and is in the process of migrating its own network to IPv6- based network. Moreover, MIMOS Berhad is the first organization in Malaysia to be connected to the international IPv6 test-bed, or known as 6bone as well as the first to be allocated with the pTLA(pseudo Top Level Aggregator) status. Therefore, this presentation focuses on our experiences in implementing IPv6 network with the rest of the Malaysians.
> Location: Bilik Perak (Perak Room), Level 2
> Fee: $125.00 for non-APNIC member

9:00 AM - 5:30 PM

BGP in the Internet - Promoting Routability [Non-APNIC Member] (D1T3)
Dr. Philip Smith, Cisco Systems, Inc.
The tutorial introduces the terms and concepts used in Internet routing. An introduction to the operation of BGP and internal routing protocols in an ISP backbone is given. Routing netiquette issues of central importance to ISP's, such as dampening, filtering, CIDR and the Internet Routing Registry (IRR) are also covered. Topics covered * Routing Terms and Concepts * Introduction to OSPF * Basic and Advanced BGP for ISPs * Routing design for ISPs using OSPF and BGP * Routing Ettiquette and the Internet Routing Registry After completing the Tutorial Attendees will be better able to design and configure ISP backbone routing protocols. They will know how to use the power and flexibility of BGP, as well as how to efficiently and effectively configure BGP for connection to other ISPs and Internet Exchange Points. They will also know how to simplify the management of routing information and configuration, and diagnose and solve routing problems more easily. They will be aware of some of the issues affecting the Internet today, and how they can make a useful contribution to the seamless functioning of the Internet.
> Location: Bilik Pulau Pinang (Pulau Pinang Room), Level 2
> Fee: $125.00 for non-APNIC member

9:00 AM - 5:30 PM

Introduction to DNSSEC [Non-APNIC Member] (D1T4)
Mr. Edward Lewis, Network Associates
Mr. Bill Manning, ISI
> Location: Bilik Negri Sembilan (Negri Sembilan Room), Level 2
> Fee: $125.00 for non-APNIC member

9:00 AM - 5:30 PM

MPLS: Protocols and Applications [Non-APNIC Member] (D1T6)
Mr. Mark Williams, Nortel Networks
An introduction to MPLS technology. Topics covered include:

- Introduction and basic concepts
- Applications of MPLS
- MPLS encapsulations on different link layers.
- Label Distribution and LDP
- Traffic Engineering, and TE extensions to OSPF, IIS-IS, CR-LDP,RSVP-TE
- MPLS for multi-service networks
- MPLS for VPNs
- MPLS and Optical Networks

Location: Bilik Sabah (Sabah Room), Level 3
Fee: $125.00 for non-APNIC member

9:00 AM - 5:30 PM

IPv6 Introduction and Deployment [APNIC Member] (D1T2-A)
Mrs. Rohani Ishak, MIMOS Berhad
Mrs. Raja Azlina Raja Mahmood, MIMOS Berhad
See D1T2 above
Location: Bilik Perak (Perak Room), Level 2
Fee: $93.75 for APNIC member

9:00 AM - 5:30 PM

BGP in the Internet - Promoting Routability [APNIC Member] (D1T3-A)
Dr. Philip Smith, Cisco Systems, Inc.
See D1T3 above
Location: Bilik Pulau Pinang (Pulau Pinang Room), Level 2
Fee: $93.75 for APNIC member

9:00 AM - 5:30 PM

Introduction to DNSSEC [APNIC Member] (D1T4-A)
Mr. Bill Manning, ISI
See D1T4 above
Location: Bilik Negri Sembilan (Negri Sembilan Room), Level 2
Fee: $93.75 for APNIC member

9:00 AM - 5:30 PM

ISP System Administration: Network Management [APNIC Member] (D1T5-A)
Mr. Paul Kooros, NeTrack / KDC
See D1T5 above NOTE: New Instructor
Location: Bilik Terengganu (Terengganu Room), Level 3
Fee: $93.75 for APNIC member

9:00 AM - 5:30 PM

MPLS: Protocols and Applications [APNIC Member] (D1T6-A)
Mr. Mark Williams, Nortel Networks
See D1T6 above.
Location: Bilik Sabah (Sabah Room), Level 3
Fee: $93.75 for APNIC member

9:00 AM - 5:30 PM

Creating Service Delivery Environments for Broadband Networks [APNIC Member] (D1T7-A)
Mr. Scott Stevens, Unisphere Networks
See D1T7 above.
Location: Bilik Perlis (Perlis Room), Level 2
Fee: $93.75 for APNIC member

9:00 AM - 5:30 PM

Introduction to Multilingual Domain Names [APNIC Member] (D1T8-A)
Mr. James Seng, i-DNS.net International
See D1T8 above.
Location: Bilik Pahang (Pahang Room), Level 2
Fee: $93.75 for APNIC member

C - FIVE DAY ISP TECHNICAL WORKSHOP

NOTE: *This Workshop will parallel the conference for a full 5 days. Attendees are expected to attend the full workshop and will be able to attend the Plenary Sessions, BOFs and Social Events of the main conference.*

The only other options is to take Monday AND Tuesday
OR only Wednesday AND Thursday AND Friday

If you are going to take the full 5 day Workshop, you should register only for the 5 day ISP Workshop and not be required to pay for both the Workshop and the Conference.

If you are only attending for for Monday/Tue or Wed/Thur/Fri, then you should register for the

conference and register for one of the above combination of single days.

The technical workshop being held at APRICOT 2001 is designed to provide network engineers who are new to the Internet and its environs with the necessary tools to design, scale, and maintain a production Internet Service Provider network. The workshop is a combination of lectures, whitepapers and hands-on laboratory exercises all focused on teaching the participants the fundamentals of system administration, network design, and network operations. The workshop is based on the successful ISOC Network Training Workshops, last held in Yokohama in July 2000.

Who should attend: This is a technical workshop. Technical staff who are now or soon will be building or operating a wide area TCP/IP base Internet Service Provider (ISP) network or Internet eXchange Point (IXP), likely with international and/or multi-provider connectivity.

Prerequisites: Cisco IOS Fundamentals; user level UNIX and maybe some system administration; some use of network design, preferably TCP/IP-based. Ideally all attendees will already be working for an ISP in either a systems or network engineering capacity.

Monday - Feb 26

9:00 AM - 5:30 PM

ISP Technical Workshop Day 1 (D1TW)
Ms. Abha Ahuja, ArborNetworks/Merit
Mr. Ned McClain, XOR Inc.
Ms. Evi Nemeth, University of Colorado
Mr. Duncan Rogerson, Cisco Systems
Dr. Philip Smith, Cisco Systems, Inc.

Days 1 and 2 will cover the following:
Module 1: System Administration - installation of *nix operating system and system security
Module 2: System Administration - set up services (DNS, Web, Mail. FTP, SSH etc)
  Location: Bilik Melaka (Melaka Room), Level 2
  Fee: $100.00 Do not check if you registered for all 5 days. Otherwise you must also register for Tuesday

Tuesday - Feb 27

11:00 AM - 5:30 PM

ISP Technical Workshop Day 2 (D2TW)
Ms. Abha Ahuja, ArborNetworks/Merit
Mr. Ned McClain, XOR Inc.
Ms. Evi Nemeth, University of Colorado
Mr. Duncan Rogerson, Cisco Systems
Dr. Philip Smith, Cisco Systems, Inc.

Days 1 and 2 will cover the following:
Module 1: System Administration - installation of *nix operating system and system security
Module 2: System Administration - set up services (DNS, Web, Mail, FTP, SSH etc)
  Location: Bilik Melaka (Melaka Room). Level 2
  Fee: $100.00 Do not check if you registered for all 5 days. Otherwise you must also register with Monday

Wednesday - Feb 28

11:00 AM - 5:30 PM

ISP Technical Workshop Day 3 (D3TW)
Ms. Abha Ahuja, ArborNetworks/Merit
Mr. Duncan Rogerson, Cisco Systems
Dr. Philip Smith, Cisco Systems, Inc.

Days 3 - 5 will cover the following:
Module 3: Network Configuration (build router network, cables, router security, configuration)
Module 4: Build ISP network (configure routing protocols: OSPF, iBGP)
Module 5: external peering (basic eBGP)
Module 6: Internet Exchange Point
  Location: Bilik Melaka (Melaka Room), Level 2
  Fee: $100.00 Do not check if you registered for all 5 days. Otherwise you must also register for Thur & Fri

Thursday - Mar 1

9:00 AM - 5:30 PM

ISP Technical Workshop Day 4 (D4TW)
Ms. Abha Ahuja, ArborNetworks/Merit
Mr. Duncan Rogerson, Cisco Systems
Dr. Philip Smith, Cisco Systems, Inc.

Days 3 - 5 will cover the following:

Module 3: Network Configuration (build router network, cables, router security, configuration)
Module 4: Build ISP network (configure routing protocols: OSPF, iBGP)
Module 5: external peering (basic eBGP)
Module 6: Internet Exchange Point
Location: Bilik Melaka (Melaka Room), Level 2
Fee: $100.00 Do not check if you registered for all 5 days. Otherwise you must also register for Wed & Fri

Friday - Mar 2

9:00 AM - 5:30 PM

ISP Technical Workshop Day 5 (D5TW)
Ms. Abha Ahuja, ArborNetworks/Merit
Mr. Duncan Rogerson, Cisco Systems
Dr. Philip Smith, Cisco Systems, Inc.

Days 3 - 5 will cover the following:
Module 3: Network Configuration (build router network, cables, router security, configuration)
Module 4: Build ISP network (configure routing protocols: OSPF, iBGP)
Module 5: external peering (basic eBGP)
Module 6: Internet Exchange Point
Location: Bilik Melaka (Melaka Room), Level 2
Fee: $100.00 Do not check if you registered for all 5 days. Otherwise you must also register for Wed & Thur

C1 - 2 DAY DNSSEC WORKSHOP

A practical exploration of what DNSSEC (DNS with Security Enhancements) and how to implement it on your own infrastructure.

NOTE: It is required that you bring your own Unix/Linux/BSD machines (Laptops are fine, but they must run some form of *NIX and NOT WINDOWS) as we will not have the PCs to supply to everyone who is in this session.

Wednesday - Feb 28

9:30 AM - 5:30 PM

Day One - DNSSEC Why and How (D3W2)
Mr. Edward Lewis, Network Associates
Mr. Bill Manning, ISI
Location: Bilik Kelantan (Kelantan Room), Level 2
Fee: $100.00

Thursday - Mar 1

9:30 AM - 5:30 PM

Day Two - slaving and Key Expiration (D4W2)
Mr. Edward Lewis, Network Associates
Mr. Bill Manning, ISI
Location: Bilik Kelantan (Kelantan Room), Level 2
Fee: $100.00

D - PLENARY SESSIONS

Tuesday - Feb 27

9:00 AM - 10:30 AM

Plenary Session 1 (D2P1)
Mr. Tan Sri Dato' Dr. Othman Yeop Abdullah, Multimedia Development Corporation
Prof. Jun Murai, Keio University / WIDE Project
Opening Session where everyone attends. Keynote Speakers
Location: Tun Dr Ismail Hall, Level 2

Wednesday - Feb 28

9:00 AM - 10.30 AM

Plenary Session 2 (D3P1)
Mr. Anders Comstedt, Stokab
Mr. David Isenberg, Isen.com
Some Views on the future Low Cost High Bandwidth Internet
Location: Tun Dr Ismail Hall, Level 2

E - CONFERENCE TRACK I (APNIC)

Tuesday - Feb 27

11:00 AM - 12:30 PM

APNIC SIG: Routing (D2T1S1)

Dr. Philip Smith, Cisco Systems, Inc.

This SIG will examine important issues of Internet routing and policy in this region and globally, such as Internet routing table growth, de-aggregation of provider blocks, routing stability and flap damping, best configuration practices for ISPs, Internet exchange points, and the Internet Routing Registry.

Location: Tun Hussein Onn Hall B, Level 2

More Information: http://www.apnic.net

2:00 PM - 3:30 PM

APNIC SIG: IPv6 (D2T1S2)

Prof. Jun Murai, Keio University / WIDE Project

Location: Tun Hussein Onn Hall B, Level 2

4:00 PM - 5:30 PM

APNIC SIG: Reverse DNS (D2T1S3)

Mr. Paul Gampe, APNIC

This SIG will examine developments in policies and procedures for reverse DNS operations in the Asia Pacific region. It will include topics such as reverse delegations for IPv6 networks, dynamic updates, secure DNS, and legacy transfers from other databases.

Location: Tun Hussein Onn Hall B, Level 2

More Information: http://www.apnic.net

Wednesday - Feb 28

11:00 AM - 12:30 PM

SIG: Address Policy (New Technology) I (D3T1S1)

Mr. Geoff Huston, Telstra

This SIG will focus on the policy implications of technological innovations and developments in best practice. Major issues affecting the Asia Pacific Internet community include cable and ADSL deployments, GPRS infrastructure, and 3G mobile phone address requirements.

Location: Tun Hussein Onn Hall B, Level 2

2:00 PM - 3:30 PM

SIG: Address Policy (New Technology) II (D3T1S2)

Mr. Geoff Huston, Telstra

This continuing SIG will focus on the policy implications of technological innovations and developments in best practice. Major issues affecting the Asia Pacific Internet community include cable and ADSL deployments, GPRS infrastructure, and 3G mobile phone address requirements.

Location: Tun Hussein Onn Hall B, Level 2

4:00 PM - 5:30 PM

SIG: Address Policy (New Technology) III (D3T1S3)

Mr. Geoff Huston, Telstra

This continuing SIG will focus on the policy implications of technological innovations and developments in best practice. Major issues affecting the Asia Pacific Internet community include cable and ADSL deployments, GPRS infrastructure, and 3G mobile phone address requirements.

Location: Tun Hussein Onn Hall B, Level 2

F - CONFERENCE TRACK II

Tuesday - Feb 27

11:00 AM - 12:30 PM

Internet Technologies and Protocols I (D2T2S1)

Mr. Tommi Chen, ipVx Sdn Bhd
Mr. Andrew Coward, Unisphere Networks
Mr. David Drew, Cosine Communications
Mr. Roosevelt Ferreira, Juniper Networks
Mr. Horace Lau, Lucent Technologies
***Chair:* Tommi Chen**

IP Quality of Service (QoS): Impossible Dream or Emerging Reality?

Speaker: Andrew Coward

One of the biggest challenges Service Providers face is convincing enterprise customers that they can deliver three-nines plus uptime and robust application performance over IP-based networks. A key success factor in the IP performance formula is Quality of Service (QoS). The Internet Engineering Task Force has been working diligently on numerous methods for addressing QoS over IP issues. This presentation will give a ?state of the QoS Union? report, including a brief overview of the drivers behind this technology. We will review recent QoS IP technology developments, focusing on two emerging and much awaited technologies: Differentiated Services (DiffServ) and Multiprotocol Label Switching (MPLS), and discuss other QoS-enhancing methodologies such as rate limiting, policing and traffic shaping.

New Network Architecture for IP Service Delivery Platform

OSPF and IS-IS: Network Design Comparisons and Considerations.
Speaker: Roosevelt Ferreira
While most network architects understand OSPF thoroughly, ISIS can be more of a mystery. Designers of ISP networks may pick OSPF for this reason alone, and then wonder if ISIS might have been a better choice. The objective of this session is to compare and contrast OSPF and ISIS, so that the attendee has more general facts from which to make specific design choices. The session begins with an overview of the fundamental similarities and differences in packet/PDU structures and progresses to an examination of the protocols respective area structures, scalability, and robustness. Similarities and differences in timers, counters, metrics, and state machines are discussed, as are issues of extensibility and security.

Network Based IP Services
Speaker: Horace Pok Choi
Location: Tun Hussein Onn Hall A, Level 2

2:00 PM - 3:30 PM

Internet Technologies and Protocols II (D2T2S2)
Mr. Haifeng Bi, Nortel Networks
Mr. Tommi Chen, ipVx Sdn Bhd
Mr. Timothy Robert Clark, Lucent Technologies
Mr. Roosevelt Ferreira, Juniper Networks
Mr. C. A. Nambi, Cisco Systems, Inc.
Chair: Tommi Chen

DPT Solution Based on the Spatial Reuse Protocol (SRP)
Speaker: A. C. Nambi
CISCO's Dynamic Packet Transport (DPT) technology is media-independent MAC layer implementation that operates over a dual ring network topology. DPT transports IP packets over long transmission distances at multi-gigabit speeds while providing support for bandwidth scalability and packet survivability. The DPT MAC provides the functionality for addressing packet stripping bandwidth control and message propagation on the packet ring. While DPT is a CISCO-specific term the term SRP stands for the underlying Protocol used by the DPT technology.

NextGen Packet VoIP Protocols
Speaker: Enis NMN Erkel
Review of SIP and H.323 as VoIP protocols in next gen networks... Evolutionary path discussions along with comparison of advantages of each protocol.

Positioning To Meet The Needs Of The Mobile Internet Market
Speaker: Timothy Robert Clark

- Understanding the paradigm shift of value chains
- The "killer" content, services and applications
- Portals and aggregation content in the mobile internet environment
- Technology solutions that support the value chain

BGP - Route Reflection and Confederations, Network Design Comparisons & Considerations
Speaker: Roosevelt Ferreira
This session explores scaling considerations dealing with the Border Gateway Protocol in service provider networks. It discusses how networks currently are designed with route reflection and confederation, as well as the reasons and issues for using either solution. The session also covers redundancy issues with both solutions.

Agenda:

- BGP Routing Policy Review
- Scaling the iBGP Full Mesh
- Route Reflection
- Confederations

Location: Tun Hussein Onn Hall A, Level 2

Billing and Provisioning (D2T2S3)
Mr. Sui Jin Foong, Unisphere Networks
Mr. Craig Ginsberg, Lucent Technologies
Mr. Gary Liew, Portal Software (Asia Pacific) Ltd.
Ms. Elektra S. Mararian, iPass Asia Pte Ltd
Ms. Gigi Wang, QALA
Chair: Gigi Wang
- MIS for ISPs

Service Provisioning and Assurance for IP Networks
Speaker: Craig Ginsberg
Service Provisioning

In the emerging battlefield for customers, service provisioning now called service fulfillment, is taking on a much more strategically important role.

Carriers can no longer afford to rely on old technology and in-house systems that only support the provisioning of services in one domain.

The playing field is now about multi-service offerings accross many domains. The service provioning engine now needs to support multiple technologies supplied by many vendors. In addition the front end ordering system need to be able to easily replicate the maket offering that are configured for billing.

In the IP world this is even more complex as end to end IP services will travel across multiple technologies such as ATM, SDH, DWDM and Optical equipment.

Service Assurance

Like fulfillment the management of the network once provisioned needs to support the multiple domains across the network. In order to provide a high level of service assurance operators must be able to track and manage faults across all domains from a single platform.

It is however not enough to just manage faults. Carriers must proactively assure that the network is performing at its optimum level through tools that manage congestion, performance, dimensioning and identify area's for expansion.

Zero-Touch Provisioning
Speaker: Sui Jin Foong
To increase profitability in the face of intense competition, Service Providers are searching for ways to decrease their operational costs. The operational costs associated with the rollout of Consumer services, including Broadband Remote Access (BRAS) and VoIP services, take on even more important role because of the immense scale of the typical deployment. Zero-Touch-Provisioning has been heralded as the new must have functionality for Service Providers looking to decrease operational costs for large-scale deployments.

What is Zero-Touch-Provisioning? How can Zero-Touch-Provisioning decrease operational costs for Service Providers? What are the necessary components for a fully functional Zero-Touch-Provisioning solution? The answers to these and other questions relevant to the implementation of Zero-Touch-Provisioning will be answered in this interactive session.

Creating Revenue for the Next Generation Business
Speaker: Gary Liew
As new Internet technology emerges in exponential order, new services keep appearing everyday. Being able to offer these new services already post a challenge to service providers, creating revenue out of this ever changing and dynamic market place is even harder. In this presentation, the speaker will describe how to create revenue for the next generation business. The speaker will introduce the next generation customer management and billing platform designed to answer all the unanswered questions today?s service providers may have. The genuine open platform design set you free from the rigid and closed system that hindered your company?s growth for long time.

Attendees will learn:

- How next-generation CM&B platform turn back-office, batch-oriented billing operations into a front-office, customer-oriented strategic weapon

- Advanced CM&B capabilities associated with online, real-time activity tracking, provisioning, customer satisfaction, flexible pricing. revenue assurance, and fraud protection
- Using the CM&B platform to provide private branding services for complex business model agreement
- Real-life examples illustrating how successful the CM&B platform work in different markets such as VoIP. xDSL, LMDS, cable, IDC, MAN, ASP. content provider, integrated communication provider. etc.

Introduction and Case Study on Creating Secure Remote Access for a Corporate Network
Speaker: Elektra S. Mararian
Keeping over 1,000 worldwide employees and business partners connected constantly at a reasonable cost proved to be a challenge for a US headquartered corporation. A more reliable, easy to use remote access solution with extended global coverage was urgently needed. With connectivity costs of US $30,000 monthly and especially high bills from India and Brazil, a solution had to be found.
An introduction on how a corporate based plan solution was implemented to meet the challenge. A solution with 8,000 POPs in 150 countries featuring customized client software. on-site RoamServer software for the authentication of users, one-click VPN integration, consolidated billing and 24x7 support for corporate helpdesks.
Location: Tun Hussein Onn Hall A, Level 2

Wednesday - Feb 28

11:00 AM - 12:30 PM

Traffic Engineering and MPLS (D3T2S1)
Mr. Dan Lockwood, Juniper Networks
Mr. Paul McNulty, UUNET
Mr. Darren Patterson. Cisco Systems, Inc.
Mr. Tom Ruban. Unisphere Networks
Mr. Zhenjun Zhu, Lucent Technologies
Chair: **Paul McNulty**

MPLS VPN's
Speaker: Darren Patterson
Configuring and deploying RFC2547 MPLS BGP VPN's

MPLS interoperability
Speaker: Dan Lockwood
Interoperability is an important issue in any multi-vendor network. This presentation summarizes the various functions that should be examined when testing for MPLS interoperability between LSRs of different vendors.

The future of MPLS
Speaker: Zhenjen Zhu
This presentation will give an overview of MPLS concepts, examine the current state of MPLS implementation and application, and give some projection on the future on application of MPLS in the carrier environments. It also uses a case study to show how MPLS works in establishing premier service Virtual Private Networks that is the future service to evolve existing private leased line or switched services.

Mapping SLA's to MPLS VPN's and Traffic Engineering
Speaker: Tom Ruban
MPLS form a basis for service providers to offer service guarantees on the delivery of IP traffic. Much has been said about the technology. This presentation maps the technology to the customer.
Location: Tun Hussein Onn Hall A, Level 2

2:00 PM - 3:30 PM

Data Center Engineering & Services (D3T2S2)
Mr. Rob R. Glenn, Sun Microsystems'
Mr. Sandip Gupta, Ensim Corp.
Mr. Kenny S. Huang, Asia Infra International Ltd
Mr. Srinivas Mulugu, Juniper Networks
Ms. Raja Azrina Raja Othman, MyCERT(Malaysian Computer Emergency Response Team)
Chair: Kenny S. Huang

High performance solutions
Speaker: Srinivas Mulugu
The following topics with reference to Internet Data Center design are covered: datacenter design, and WAN connectivity considerations, deploying a high-performance infrastructure and approaches that enable full utilization of deployed resources, content localization strategy. security

issues pertaining to SYN and ICMP attacks, space and power considerations.

Web-Hosting Automation
Speaker: Sandip Gupta
New architectural alternatives are allowing Web hosting providers to overcome capital constraints and scarcity of IT professionals to meet the growing demand for their services. This session discusses architectural alternatives that provide very high growth scalability for expanding revenue opportunities without sacrificing customer service.

Effective Computer Incident Response
Speaker: Raja Azrina Raja Othman
Hacking, cracking and now hactivism is fast becoming a serious threat to internetworking. ISPs and companies whose business depends on the network availability are faced with a new challenge greater than recovering from service hiccups, which is defending and recovering from attacks.

Denial of Service attack, intrusion and domain rerouting are major threats to the Internet services. Despite the many technology, i.e. firewall and Intruder Detection Systems installed, there still requires a human element of Incident Response - to ensure responsiveness and effectiveness of the technology. MyCERT will share some of the major requirements in running an effective Incident Response Team which is fast becoming a necessity in operating and maintaining any network.

Power Requirements for Internet Data Centers
Speaker: Rob Glenn
Overview of iDC trends relating to Power Requirements within the facilities.
Location: Tun Hussein Onn Hall A, Level 2

4:00 PM - 5:30 PM **Peering and Bandwidth Trading (D3T2S3)**
Mr. Bill Manning, ISI
Mr. William B. Norton, Equinix
Mr. Bill Woodcock, Packet Clearing House
Chair: Bill Manning

Peering Simulation Game
Speaker: William B. Norton
This presentation and simulation is based on recent Internet Operations Research done by the presenter focusing on Internet Service Provider Peering and traffic exchange practices. Typically hid under non-disclosure agreements, peering remains one of the most misunderstood operations topics in the Internet industry. We first share the research describing technically and financially why and how ISPs peer. We then demonstrate Peering strategy using audience members playing the roles of Peering Coordinators in a live electronic game board simulation where ISPs acquire territories and negotiate peering with their competitors. The simulation typically demonstrates when peering makes sense, and when parties may not wish to peer for rational business reasons. This simulation has been done in several forums around the world now, from the ITU Forum in Brazil, to the IIR forum in the UK and the FCC and NANOG forums in the US.

Setting up Peering Points
Speaker: Bill Woodcock
TBD
Location: Tun Hussein Onn Hall A. Level 2

G - CONFERENCE TRACK III

Tuesday - Feb 27

11:00 AM - 12:30 PM **IPv6 Issues and Trends (D2T3S1)**
Mr. Ettikan Kandasamy Karuppiah, Multimedia University
Mr. Gopi Kurup, NTT MSC
Mr. Gopinath Rao Sinniah, Universiti Sains Malaysia
Mr. Wei Chong TWC Tan, Multimedia University
Dr. Kazuhiko YAMAMOTO, Internet Initiative Japan Inc.
Chair: Kazuhiko YAMAMOTO
- **IPv6 security**
- **IPv6 migration issues**
- **IPv6 implementation**

IPv6 LAN and WAN Deployment Issues

Speaker: Gopi Kurup
IPv6 standardization and implementation has been on-going for a couple of years and has reached a maturity level for commercial trials.

This paper aim to give an up-to-date picture of IPv6 ready platforms, the necessary configurations for IPv6 compatibility and LAN and WAN connectivity issues. This talk would include the advantages of implementing an IPv6 LAN, the available services and corresponding applications. It will also give a brief overview of the current standardisation, organisations involved and worlwide deployment of IPv6.

Porting IPv4 Codes to IPv6
Speaker: Wei Chong Tan
Since the introduction of IPv6 as the new potential standard for the Internet compatibility scalability and portability of existing applications from IPv4 have been a major issue for Application Developers and Application Service Providers. Various steps have been taken in order to reuse existing applications and infrastructures to reduce reconstruction cost and to save investment. Internet Engineering Task Force has produced various documents to guide the developers on the migration issues. However not much information is available to share practical experience in porting existing IPv4 application to IPv6 which crucial.

This paper is aimed to discuss about various issues when porting an IPv4 application to IPv6 with focus on issues that an application developer would face rather than a complete API reference. The porting of codes has been grouped into four main categories based on complexity of the work involved.

The first category refers to the most protocol independent codes where the codes can be ported easily while second category refers to codes that can be ported by introducing new API to replace the old ones. The third category group's codes that need modification for some of the system calls and finally forth category covers codes that can only be ported if there is a modification of the program logic.

Through our experience porting of an application from IPv4 to IPv6 may fall in any of these categories or combination of the categories based on the previous code implementation. Experience of porting IPv4 Trivial File Transfer Protocol (tftp) application which comes with the standard FreeBSD distribution kit to IPv6 will be used as the base for discussion in this paper.

IPv6 Anycast Issues
Speaker: Ettikan Kandasamy Karuppiah
The Internet Protocol anycasting communication service has been designed to support service locating to the nearest anycast server based on routing protocol measure of distance for anycast service from a pool of identical service servers. The birth of IPv6 has given opportunity to design and implement anycast service at IP layer which could not be implemented in IPv4 due to addressing complexity. In this paper we analyze and compare the anycast architecture for IPv4 and IPv6.

Pitfalls in the new proposed IPv6 anycast design has been identified and solutions to the problems have been proposed. The nature of anycast service which delivers anycast datagrams to the nearest anycast server independent of previous datagrams will cause unexpected results if the packets have been fragmented. The fragmented packets may be delivered to different anycast servers and will not be useful for the anycast clients.

To obviate the problem we have proposed new protocols at transport layer for anycast messaging between anycast clients and servers for service locating and obtaining information from the servers. FTP client and server applications have been modified to demonstrate the applicability of the proposal.

Implementation of Host Name Resolution Protocol for IPv6 Stateless Configuration nodes
Speaker: Gopinath Rao Sinniah
Since the introduction of new Internet Protocol IPv6 researchers and network experts are trying to upgrade existing applications to be used with this protocol. Domain Name System (DNS) is one of the most important application that need to be studied. To make DNS support IPv6 DNS experts have implemented a new DNS for IPv6 DNSv6.

To make the DNS more intelligent we propose a new method for DNS to automatically learn and update all the nodes on a network. The intention of this paper is to discuss the implementation of the proposed method using a new protocol which is Host Name Resolution protocol (HNRP).

HNRP will dynamically update the DNS when new hosts are connected to a network. To make it smarter the HNRP will also regenerate the Medium Access layer (MAC) address by getting the link local address of the host. The algorithm and the implementation of this protocol will also be discussed in this paper. For the implementation ICMP packets will be used to get the information needed by the hostname.

Location: Tun Dr Ismail Hall A, Level 2

2:00 PM - 3:30 PM

Internet and Network Security (D2T3S2)

Dr. Butch Anton, hereUare Communications, Inc.
Mr. Soh Seng Hooi, Lucent Technologies   - —
Mr. Ian Quinn, Juniper Networks
Mr. Paul Woosnam, Nortel Networks
Chair: Butch Anton

- Preparations against next generation security problems
- Advances in intruder detection systems
- Network scanning technologies

RFC 2764 A Framework for IP Based Virtual Private Networks

Speaker: Paul Woosnam
The presentation will describe a framework for virtual private networks running across IP backbones as described in RFC 2764. It will discuss the various types of VPNs, their respective requirements, and proposes specific mechanisms that could be used to implement each type of VPN using existing or proposed specifications. The role of the Virtual Router as an enabler for IP VPN services will be explored along with the concept of the full Virtual Service Network with virtual IP services such as Firewalls and NAT (Network Address Translation).

Managed VPNs and Network Security

Speaker: Soh Seng Hooi
This session will provide clear tools and guidelines on secure VPN solutions for managed services.

Solutions for DoS minimization

Speaker: Ian Quinn   - —.
Denial of Service (DoS) attacks are an increasingly serious and prevalent problem faced by Service Providers. High profile attacks in February 2000 on major sites brought the problem to the forefront in the media and the impact of continuing problems throughout 2000 and into 2001 have only increased the pressure on Service Providers to effectively deal with DoS attacks.

This session outlines the DoS problem with particular emphasis on how DoS impacts Service Provider networks the Asia Pacific region. It discusses the prevalent attacks that cause network service to be degraded, and the steps that network operators can take to minimise the impact on network service levels. This presentation should provide network architects and operations staff with a design and procedural framework within which to deal with the impact of DoS attacks.

Location: Tun Dr Ismail Hall A, Level 2

4:00 PM - 5:30 PM

The State of DNS (D2T3S3)

Mr. David Conrad, Nominum
Mr. Mathias Kâÿber, Nominum, Inc.
Mr. Edward Lewis, Network Associates
Mr. Bill Manning, ISI

DNSSEC Panel

Chair: Bill Manning
TBD
- —.

Edward Lewis Pannelist
David R. Conrad Pannelist
Mathias Kâÿber Pannelist

Location: Tun Dr Ismail Hall A, Level 2

Wednesday - Feb 28

11:00 AM - 12:30 PM

Application Service Provider Opportunities (D3T3S1)

Mr. Wally Ho, Nortel Networks
Mr. Kok Hon-Loong, Intel Electronics (M) Sdn Bhd
Mr. David T. Khim, Tech System Technology Ltd.
Mr. Toru Takahashi, Research Institute for Internet Strategies, Inc.
Mr. Michael Warren, Datapro Asia

Chair: Toru Takahashi

How IDC/ASP sparks eCommerce
Speaker: Wally Ho
The presentation will provide an overview of the current business trend in ASP arena: outsourcing by CXO due to TTM, TTR, LCO etc: Industry trend in terms of the growth of data service centralization and will also uncover the popularity of eCommerce, user behaviour in wired world and wireless world.

Vertical Application Services Provider Opportunities and Technologies
Speaker: David T. Khim
Application Service Provider vs Vertical Application Service Provider

- Vertical Applications for Vertical Market Opportunities
- Distributed Application Hosting Technology for VASP
- Mediation Technology for convergent network environments
- Use of IPDR as a common interface among VASP components
- Mediation Technology for convergent network environments

TBD
Speaker: Kok Hon Loong

The role of a 2nd Generation IDC in Enabling ASPs
Speaker: Michael Warren
Presentation or Tutorial Description : This presentation would differentiate between the traditional Internet Data Centers (IDCs) providing space (collocation) and the newer emerging ASP enablers that focus on deployment of new tools for security (layer 7 app switches), provisioning, virtual server partitioning, and integrated ASP billing systems. Deployment revolves around execution of new systems from Top Layer Networks, Ensim, and Portal Systems.font>
Location: Tun Dr Ismail Hall A, Level 2

2:00 PM - 3:30 PM

Voice, Email and unified messaging services (D3T3S2)
Mr. Enyen Cheong, China Internet Incubation Center
Mr. David Crocker, Brandenburg Consulting
Mr. Chen Teck Wah, 2bSure.com PTE. LTD.
Chair: David Crocker

Update on Internet Messaging Standards
Speaker: David Crocker

VoIP Technology
Speaker: Enyen Cheong
From the 1st Generation communication which was analog we moved to the current 2nd Generation digital systems. As anticipated, the upcoming 3G systems will be of packet based. This presentation will first provide a brief history and overview of VoIP technology. Further on, we will explore VoIP applications, for instance, the deployment of Web Call Center and Enterprise Voice Solution along with its benefits. The implementation challenges faced in the area of network architecture: hardware, software and protocol limitations and issues will be addressed. The future role of VoIP in 3G mobile communications will sum up the presentation.

Unified Messaging; An Evolution
Speaker: Chen Teck Wah
From the developments in the past months, UM is set to take off following, yet many flavors of UM exists in different market segment and needs. As an early UMS service provider in AP, the speaker will share the experience of various aspects of UM as company evolve from providing UM service to a future Unified Communication Service
Location: Tun Dr Ismail Hall A, Level 2

4:00 PM - 5:30 PM

High Performance Routing (D3T3S3)
Mr. Okie LoPresti, Juniper Networks
Mr. Glen Reinhardt, Unisphere Networks
Mr. Zhenjun Zhu, Lucent Technologies
Chair: Glen Reinhardt

Terabit Routing: Technology Imperatives and Applications
Speaker: Zhenjun Zhu
This presentation will cover the key objectives of terabit routing, the major bottlenecks that have

to be resolved for terabit routing to function, and the major applications of terabit routing. In addition, it will also present some value propositions that Service Providers are looking for in a Terabit routing technology or products.

Enabling IP Services with the IPII
Speaker: Okie LoPresti
TBD
Location: Tun Dr Ismail Hall A, Level 2

H - CONFERENCE TRACK IV

Tuesday - Feb 27

11:00 AM - 12:30 PM   **Networking Technology (D2T4S1)**
Mr. Scott D. Blessley, Astral Point Communications
Mr. Ole Jacobson, Cisco Systems
Mr. Daniel Karrenberg, RIPE NCC
Mr. Dan Lockwood, Juniper Networks
Chair: Ole Jacobson

- **Optical networking**
- **Next generation LAN technolgies**
- **Next generation broadband technologies**
- **IP over fibre**

Will DWDM Make Bandwidth Cheap
Speaker: Scott D. Blessley
Although most in the industry would agree that technically DWDM has what it takes to make bandwidth cheap and plentiful a number of issues remain that are limiting its deployment in many areas. To bring DWDM into these areas carriers must address issues including how to implement DWDM services without disrupting existing SONET networks; whether all Customer Premises Equipment should be fiber-based; and whether utilizing an ATM switching fabric is the appropriate method for accommodating low speed (PDH) services along with STM-1/STM-16.

In this presentation the speaker will discuss DWDM and describe the issues that are limiting deployment. The speaker also will examine the steps service providers can take overcome these limitations. Attendees will learn: ?The market opportunities for DWDM ? Implementation issues Technologies that can enable widespread DWDM deployment

Need for Routing in the Optical Environment
Speaker: Dan Lockwood
The term Optical Router conjures up an image of pure optical devices performing IP lookups without first converting the light signal to electronic form. While we are decades away from packet-processing at the photonic level, there is a definite, short-term need for routing in the optical environment.

As networks evolve in the 21st century, there is a convergence toward a two-layer network. The transport layer will migrate from pure SONET/SDH hierarchical networks to partial mess topologies built with DWDM devices and Optical Cross Connects (OXC). The network layer will continue to evolve toward IP and MPLS-based technologies. While these two networks perform distinct functions-lambda switching at the optical level, and packet-processing at the network level-there is a clear need to integrate the contol planes to make a more robust and intelligent overall network.

Over the past few years, the industry has seen first hand the problems of running disparate two-layer networks. Large IP backbone providers tried desperately to scale IP networks by running them over ATM-based cores. While successful in many aspects, scalability became a major issue primarily due to lack of intelligent signalling between IP and ATM. This was one of the driving factors behind integrating MPLS in today's IP routers.

In order to scale tomorrow's networks, we need to ensure that we do not continue to create networks that don't communicate. There is critical need for the IP and Optical layers to exchange both topology and signalling information. Generalized MPLS, or what is also known as MPLambaS, will allow both the IP and Optical layers to share relevant control plane data. The GMPLS effort leverages the lessons learned from integrating MPLS technology in IP routers, and extends these lessons to the Optical domain.

The Test Traffic Project
Speaker: Daniel Karrenberg

The Test Traffic project is one of the new activities proposed in RIPE-144. The goal of the project is to do independent measurements of connectivity parameters, such as delays and routing-vectors, in the Internet. The project implements the metrics discussed in the IETF IPPM working group (see RFC's 2330, 2679, 2680 and related documents).

Work on this project started in April 1997. Since then, we have published several documents describing the design and implementation of the project.

Over the last years, it has been shown that our setup is capable of routinely measuring delays, losses and routing vectors on a large scale. The Test-Traffic project is therefore being moved from an experimental project, to a service offered by RIPE NCC to the entire community.

This service is called **Test Traffic Measurements (TTM)** and was announced on October 20, 2000.

The major changes when this project was turned into a regular service were:

- The TTM service will be available to everybody interested, not just the current LIR members,
- Any organization can apply for more than 1 test-box, and, for example, install a box at every major PoP.

Test-boxes are now sold at the cost of the hardware, approximately 2500 Euro in October 2000. However, these boxes have better hardware than the previous series:

- Easier installation
- More freedom in installing the antennas.
- More resources, this will be used in the future to do other measurements with the box.

The project has been also discussed in plenary and parallel sessions at the RIPE meetings since April 1997. The slides shown there are also available from this page. The presentations at the RIPE meetings contain a detailed progress report over the months before the meeting as well as the schedule for the months following the meeting.
Location: Tun Dr Ismail Hall B, Level 2

2:00 PM - 3:30 PM

Gigabit Ethernet in the LAN, MAN & WAN (D2T4S2)
Mr. Ran Atkinson, Extreme Networks
Mr. Wai Kok Chan, Multimedia University
Mr. Paul Gampe, APNIC
Mr. Scott Stevens, Unisphere Networks
Mr. Mark Williams, Nortel Networks
Chair: Paul Gampe

Effectiveness of VLAN
Speaker: Wai Kok Chan
The purpose of VLAN is to reduce broadcast in LAN by limiting broadcast and multicast traffic to a particular VLAN only.Many of the LAN Ethernet traffic is focused on total LAN traffic and does not described the nature of broadcast and multicast traffic. There are claims by networking vendors that VLAN is required for broadcast isolation to make the network to be more scalable. However there isn't much data on the nature of broadcast and multicast packets to substantial these claims. In this presentation some results of our network traces are presented to substantial and determining the usefulness of VLAN in broadcast isolation.

The Impact on the Internet Economy from Gigabit Ethernet and Beyond
Speaker: Ran Atkinson
Gigabit Ethernet is already extending the traditional LAN based Ethernet to the Metropolitan Area Network (MAN). With the 10 Gigabit Ethernet standard coming, Ethernet will for the first time in history be applied in the Wide Area Networks (WAN). This session will address how IP-Based Ethernet services compared with incumbent SONET/SDH/ATM technologies? How QoS can be delivered over an Ethernet network.

Listen to expert who has built Gigabit Ethernet networks in the service provider market and the enterprises. Find out how where Gigabit Ethernet is at today, what are the issues in

implementation, and when and where 10 Gigabit Ethernet will arrive. Also covered will be standards status of 10 Gigabit Ethernet as well as migration paths and applications.

CityLans: Metropolitan Ethernet Networks for Asian Cities
Speaker: Mark Williams
A class of networks that offer globally-accessible services through LAN access technology is discussed. The potential providers, end-users and target service products with special reference to the conditions prevalent in Asian cities are listed, and a set of technological and business requirements is derived. An end-end network reference architecture is proposed and explained.

Building services on Ethernet to the Home / Building network model
Speaker: Scott Stevens
The development of long-range, low-cost Ethernet has created an opportunity to build FTTH and FTTB networks using FastE and GigE equipment. Beyond this interconnection at Layer 2, consumers need to experience services such as Broadcast, Multicast, PointCast & Unicast (on demand) video which are billed and managed at Layer 3 and above.
Location: Tun Dr Ismail Hall B, Level 2

4:00 PM - 5:30 PM

Broadband over the Last Mile (D2T4S3)
Dr. Butch Anton, hereUare Communications, Inc.
Mr. Jim Hennessey, Qala Pte Ltd
Mr. Paul Kooros, NeTrack / KDC
Mr. Tjie Seng Njauw, Cisco Systems
Chair: Paul Kooros

802.11b for-pay public wireless
Speaker: Dr. Butch Anton
802.11b is a hot new technology that offers very high-speed wireless connectivity. It's a universal standard, whose bandwidth allocation is (essentially) the same throughout the entire world. Couple this with public access locations like coffee shops, airports, and hotels, and you have a very powerful access medium that's location specific and user friendly.

Update on Providing an Integrated Service Package over Copper and Cable
Speaker: Jim Hennessey
TBD

Wireless LAN Solution & Deployment
Speaker: Njauw Tjie Seng
This session revolves around the discussion of the paradigm shift from getting connectivity via conventional wired infrastructure to wireless solutions - for flexibility & mobility.

As part of the discussion, the speaker will provide an introduction to Wireless LAN, where it fits in the Radio Frequency technologies. And importantly, the WLAN use of the Industrial, Scientific & Medical Band of 2.4GHz.

The challenges faced in the deployment of WLAN in this unlicensed band will be explored, leading to propositions on how security implementation, proper channel planning & management of transmission power may help minimized these problems.

In closing, the session will provide thoughts on the various application of WLAN technology, touching on various components and requirements necessary to build those solutioning; whether it is connect WLAN clients to wired infrastructure in-building or to provide building-building wireless link.
Location: Tun Dr Ismail Hall B, Level 2

Wednesday - Feb 28
11:00 AM - 12:30 PM

Streaming and Multicast (D3T4S1)
Mr. Louis Chan, Unisphere Networks
Mr. Calvin Go, Tech System Technology Ltd.
Mr. Andrew Khoo, Akamai Technologies
Mr. Josef Kizo, Digital Island Inc.
Ms. Evi Nemeth, University of Colorado
Chair: Evi Nemeth

Network infrastructure requirements for successful multicast deployment
Speaker: Louis Chan
Implementing a scalable deterministic multicast network has not been easy. Variations in network

hardware and subscriber density can wildly affect the throughput and latency of a total network supporting multicast services. Controlling these issues with modern design is possible, but requires forethought.

Streaming using Content Delivery Networks
Speaker: Josef Kizo
TBD

Implementing Multicast for Static and Streaming Content Distribution
Speaker: Andrew Khoo

Real-time streaming management using multicast-to-unicast protocol conversion approach
Speaker: Calvin Go
IP Multicast has proven to be an effective communication for multimedia applications such as video and audio conferencing, transmission over networks of live TV or radio news programs. But IP multicast requires multicast-enabled network infrastructure on its way. So we introduced multicast to unicast protocol conversion model to support various network environment. Especially we use multicast header translation technique to speed up performance. Also, It enables our model to support all multicast application regardless of its own protocol.
Location: Tun Dr Ismail Hall B, Level 2

2:00 PM - 3:30 PM

Web caching and replication (D3T4S2)
Mr. Jonathan Barry, Alteon WebSystems, a company of Nortel Networks
Mr. Marcos R. Della, Cstone Inc.
Mr. Andrew Khoo, Akamai Technologies
Mr. Scott Sullivan, Orblynx
Chair: Marcos Della
- **Content Distribution Networks**
- **Caching infrastructure**

International Internet Services and the impact of content delivery networks
Speaker: John L. Stevenson
Internet services have evolved and matured to keep pace with technology, with tremendous developments in approaches and methodologies adopted. This presentation will focus on the content distribution service initiatives required for the web to continue along this steady growth path. Specifically, key issues will be addressed such as regional and global service opportunities, content transmission and content management, added-value at just one network edge or both. Comparative aspects will be highlighted, including satellite versus terrestrial infrastructure, reliable multicast versus standard broadcasting, open standards based versus proprietary platforms, and true push applications versus aggregated pull. The session will use global practices and methodologies adopted as examples. Additionally, descriptions of multicast service deployment, scope, and customer interfaces will be provided.

New Standard for Content-Rich Web Service Delivery
Speaker: Jonathan Barry
As the Internet continues to grow, and performance increases through the deployment of faster and higher capacity optical core switching equipment. The challenge will be how to apply intelligence at the network edge, both the access edge and the server farm edge. We require this intelligence to direct requests, ensure high availability and allow richer and more personalized services to be built and delivered quickly and reliably. Content Networking will be a key component in delivering these rich services, which will be delivered to a myriad of platforms. Wireless Devices, such as Internet ready phone and PDA, Home appliances, traditional PC platforms.

Content Distribution Networks
Speaker: Andrew Khoo
The akamai CDN reaches the edge of the internet by deploying servers in various networks all over the world. This presentation explains how the CDN is built and describes the techniques applied in implementing the technology. During the session there will also be a discussion of the practical problems facing efficient distribution of content on the edge of the internet and some possible solutions attempted to date.
Location: Tun Dr Ismail Hall B, Level 2

4:00 PM - 5:30 PM

Experiences Deploying Optical Networks (D3T4S3)
Mr. Arief Hamdani Gunawan, RisTI - TELKOM
Chair: Arief Hamdani

TOT Dynamic Packet Transport (DPT) & VoIP Deployment
Speaker: Dr. Nopparat, Senior Director, Telecommunication Authority of Thailand (TOT)

This session talks about TOT's deployment of Dynamic Packet Transport (DPT) in Thailand to provide IP, VoIP and VPN services. TOT has an OC-48/STM-16 ring that services the Bangkok metro area and OC-12/STM-4 ring that services the outer province.

China Netcom VPN & VoIP Deployment
Speaker: TBD
This presentation describes the deployment of China Netcom's IP over DWDM network and their deployment of MPLS VPN and VoIP services.

B2 Broadband Deployment in Sweden
Speaker: Jan Nilsson, B2
This presentation talks about B2 deployment of broadband services in Sweden.

Sprint Optical Backbone Design
Speaker: Ted Seely and Rob Rockell, Sprint
This presentation describes the deployment of Sprint's OC-48/STM-16 optical backbone, which integrates Packet Over SONET/SDH (POS) and Dynamic Packet Transport (DPT) and their ongoing deployment of OC-192/STM-64. We'll also look at the new PoP architecture that they are deploying to scale beyond the current architecture.

Location: Tun Dr Ismail Hall B, Level 2

I - TUTORIALS DAY 4

Intermediate and Advanced Tutorials and APNIC SIGs on Thursday

NOTE: Each Tutorial has two entries below. One is there just to show that there is a discount for APNIC members.

Thursday - Mar 1

9:00 AM - 5:00 PM

APNIC SIGs on Thursday [APNIC members] (D4AP-A)
Mr. Takashi Arano, Japan Network Information Center
Mr. Seung Min Lee, Korea Network Information Center
9.00 am - 10.30 am - SIG Database and Certification Authority
Speaker: Xing Li

11.00 am - 5.00 pm - SIG Access Policy (Procedures)
Speakers: Lee Seung Min, Arano Takashi

Location: Tun Hussein Onn Hall B, Level 2
Fee: $50.00 for APNIC members
More Information: http://www.apnic.net

9:00 AM - 5:00 PM

APNIC SIGs on Thursday [Non-APNIC Members] (D4AP)
Mr. Takashi Arano, Japan Network Information Center
Mr. Seung Min Lee, Korea Network Information Center
9.00 am - 10.30 am - SIG Database and Certification Authority
Speaker: Xing Li

11.00 am - 5.00 pm - SIG Access Policy (Procedures)
Speakers: Lee Seung Min, Arano Takashi

Location: Tun Hussein Onn Hall B, Level 2
Fee: $75.00 for non-APNIC members
More Information: http://www.apnic.net

9:30 AM - 5:30 PM

BGP Multihoming [Non-APNIC Member] (D4T1)
Dr. Philip Smith, Cisco Systems, Inc.
The tutorial introduces case studies and configuration examples on how to use BGP for various types of multihoming. Also covered are aspects of scalable network design, Internet netiquette, as well as the technical issues behind IXPs and provision of transit services. Topics covered * Scalable Network Design * IGP vs BGP * Advanced BGP primer and Best Current Practices * Multihoming Case Studies * Use of communities for policy control * Transit and IXP Case Studies * Routing Ettiquette After completing the Tutorial Attendees will be better able to support a variety of connection services to their customers, and their upstream service providers. They will also have an understanding of network scalability issues, and be able to better adapt their operational infrastructure to cope with the rapid growth of the Internet.
Location: Bilik Pulau Pinang (Pulau Pinang Room), Level 2
Fee: $125.00 for non-APNIC member

9:30 AM - 5:30 PM

DSL Networks: Implementation, Application and Services [Non-APNIC Member] (D4T2)
Mr. Kinhquoc Nguyenngoc, Lucent Technologies
Mr. Kok Chung Tham,
This session will cover imperatives for adopting broadband especifically DSL. Presentation will start with basics of DSL and will than cover requirements and applications of such a network - including the implementation of data, voice and video over DSL. It will also cover deployment, management and loop testing issues. Additionally, network architectures and solutions available for enabling IP services over a broadband network will be covered in detail.
Location: Bilik Perlis (Perlis Room), Level 2
Fee: $125.00 for non-APNIC member

9:30 AM - 5:30 PM

Large Scale Internet Topology Design, Implementation and Management [Non-APNIC Member] (D4T3)
Mr. Bill Woodcock, Packet Clearing House
This tutorial will address the questions and issues associated with the formation of local and regional Internet traffic exchange facilities. When and where are they needed? What requirements must a building meet to house one? What business model is most appropriate, and how can you finance the costs? What services should an exchange point provide to its users, and what policies can be established to ward off trouble? We'll discuss all of these questions with an emphasis on Asia-Pacific regional issues, in this one-day tutorial.
Location: Bilik Perak (Perak Room), Level 2
Fee: $125.00 for non-APNIC members

9:30 AM - 5:30 PM

Architecture in Optical Access Networks [NON-APNIC MEMBERS] (D4T4)
Mr. Arief Hamdani Gunawan, RisTI - TELKOM
Optical access network is an alternative to an access network platform used for delivering future telecommunication services called multimedia services. Components used in the network include O/E equipment fiber optic cable etc. This tutorial will describe the approach for choosing the type of O/E equipment which is used in an Optical Access Network such as OLT (Optical Line Termination) ONU (Optical Network Unit) and RT (Remote Terminal). A comparison of the optical access network architecture solutions will also be presented.

There are two aspects considered in the problem analysis: those related to network specification and the relative importance of network elements. Network architecture determination substantially impacts service delivered to the customer as well as pricing and complexity in installation or O&M activity as well as in future network development.
Location: Bilik Pahang (Pahang Room), Level 2
Fee: $125.00 for non-APNIC member
More Information: http://www.ristinet.com

9:30 AM - 5:30 PM

BGP Multihoming [APNIC Member] (D4T1-A)
Dr. Philip Smith, Cisco Systems, Inc.
See D4T1 above.
Location: Bilik Pulau Pinang (Pulau Pinang Room), Level 2
Fee: $93.75 for APNIC member

9:30 AM - 5:30 PM

DSL Networks: Implementation, Application and Services [APNIC Member] (D4T2-A)
Mr. Kok Chung Tham,
See D4T2 above.
Location: Bilik Perlis (Perlis Room), Level 2
Fee: $93.75 for APNIC member

9:30 AM - 5:30 PM

Large Scale Internet Topology Design, Implementation and Management [APNIC Member] (D4T3-A)
Mr. Bill Woodcock, Packet Clearing House
See D4T3 above.
Location: Bilik Perak (Perak Room), Level 2
Fee: $93.75 for APNIC members

9:30 AM - 5:30 PM

Architecture in Optical Access Networks [APNIC MEMBERS] (D4T4-A)
Mr. Arief Hamdani Gunawan, RisTI - TELKOM
See D4T4 above
Location: Bilik Pahang (Pahang Room), Level 2
Fee: $93.75 for APNIC member

9:30 AM - 5:30 PM

Security Practices [APNIC MEMBER] (D4T5-A)
Mr. Tom James Cross, iAsiaWorks
See D4T5 above
Location: Bilik Negeri Sembilan (Negeri Sembilan Room), Level 2
Fee: $93.75 for APNIC member

9:30 AM - 5:30 PM

Security Practices [NON-APNIC MEMBERS] (D4T5)
Mr. Tom James Cross, iAsiaWorks
This tutorial is intended to teach people who operate network infrastructures how to protect those networks from malicious attack. Topics covered include: How to approach the overall security

problem; common security weaknesses in router and switch configuration; routing protocols; proper user account management; application of commercial security technologies; UNIX and NT system security; experiences with system crackers, denial of service attacks, and SPAM; educating customers about security; and a brief overview of MSP/ASP opportunities.

Location: Bilik Negeri Sembilan (Negeri Sembilan Room), Level 2
Fee: $125.00 for non-APNIC member
More Information: http://www.asiaworks.com

J - EVENING BIRDS OF A FEATHER (BOF) SESSIONS

After hour informal gathering on specific topics. Please contact rjbApricot@ibd.com if you would like to add another BOF

Tuesday - Feb 27

6:30 PM - 8:00 PM

Asia Pacific Operators (APOPS) meeting (D2B1)
Mr. Hideo Ishii, Global Crossing
Dr. Philip Smith, Cisco Systems, Inc.
A meeting of APOPS, the Asia Pacific Operators. APOPS has traditionally been a mailing list only activity, but I'd like to gauge the interest in the region as to whether APOPS should function more formally, with meetings during the APNIC or APRICOT conferences, or even outside this. I'd propose to find presenters who would talk about operational issues affecting the region.
Location: Bilik Pulau Pinang (Pulau Pinang Room), Level 2

6:30 PM - 8:00 PM

Broadband Service Providers meeting (D2B2)
Mr. Adam Judd, Unisphere
Mr. Glen Reinhardt, Unisphere Networks
Note: If you would like to be a panelist, please contact the Chair

Broadband Services in Asia have grown explosively over the past 12 months. This BOF is an opportunity for service providers who have invested in this technology to compare experiences and results in an informal setting on both technical and commercial levels. Short introductory presentations (5 min each) will be made by several service providers on their experiences.

Here is the kind of questions we would like to review.

1) As the panellists have rolled out, or plan to roll out broadband services, what do they believe the most significant technology challenge to be? (e.g. DSLAM deployment issues, subscriber management, routing, bandwidth constraints, etc.)

2) Most service providers in Asia offering DSL services have deployed PPPoE or PPPoA client software for consumers and businesses. Is this model working, and what benefits are the panellists deriving from living with the complexities of client software distribution?

3) How do the panellists see broadband content and services catching up with the high speeds offered to consumers and businesses, and what broadband services do they think will be of interest to their consumer and business customers?

4) Do the panellists believe their broadband networks will be used for Voice over IP and video conferencing, and what technical barriers lie in the way of realising this?

5) How do the panellists plan to scale their network design to cope with the anticipated expansion of broadband traffic? (Access and core bandwidth, IP address assignment, traffic prioritisation, etc.).
Location: Bilik Perlis (Perlis Room), Level 2

6:30 PM - 8:00 PM

Certification Authority (CA) (D2B4)
Mr. Paul Gampe, APNIC
This BOF will continue the discussions commenced at the 10th APNIC Open Policy Meeting in October 2000. Discussion will focus on APNIC's use of encryption, keys, digital signatures, and certificates for secure access to APNIC services via email and the web. APNIC will also provide an update of the status of the Certification Authority, which was launched in October 2000.
Location: Bilik Perak (Perak Room), Level 2

6:30 PM - 8:00 PM

At Large Membership in Asia-Pacific area (D2B3)
Mr. Izumi Aizu, Asia Network Research
Location: Bilik Pahang (Pahang Room), Level 2

6:30 PM - 8:00 PM

MINC BoF on Multilingual Domain Names: Interoperability Testing (D2B5)

Mr. David Conrad, Nominum
Mr. David Lawrence, Nominum, Inc.
Mr. Tin Wee Tan,
Mr. Y Yoneya,
Co-Chairs: *David Lawrence, Interoperability Testing WG, MINC*
Y. Yoneya, Interoperability Testing WG, MINC

Over the past six months, more than half a dozen different testbeds and deployments for multilingual domain names have emerged, using various implementations of ACE formats and other proprietary systems. These systems may or may not conform to IETF IDN standards which are in the process of emerging, and even if they do, whether they will interoperate with each other is an open question. This BoF held in conjunction with the Multilingual Internet Names Consortium MINC will provide the platform for discussion of the technical issues relating to Interoperability and Interoperability Testing.
Location: Bilik Sabah (Sabah Room), Level 3

6:30 PM - 8:00 PM

APTLD Outreach Programme (D2B6)
Mr. Ramesh Kumar Nadarajah, Asia Pacific Top Level Domain

The Asia Pacific Top Level Domain Organisation is concerned with coordination administration policy management and governance of the Internet naming in the Asia-Pacific region. This talk will introduce APTLD inform why more participation in Internet Governance is needed from the AP region and introduce some of the Internet governance issues currently plaguing the AP community.

Thursday - Mar 1
6:30 PM - 8:00 PM

Challenges of for-pay public wireless access (D4B3)
Dr. Butch Anton, hereUare Communications, Inc.
Location: Bilik Pulau Pinang (Pulau Pinang Room), Level 2

6:30 PM - 8:00 PM

Membership Agreement (D4B1)
Mr. Gerard Ross, APNIC Pty Ltd
This BOF will update the status of the draft for a new APNIC Membership Agreement. APNIC will summarise the process followed to prepare the current draft and the comments received from members to date. This BOF will seek input and advice to produce an agreement that best represents the interests of the APNIC membership.
Location: Bilik Perlis (Perlis Room), Level 2

6:30 PM - 8:00 PM

ASO Open Meeting (D4B2)
Mr. Takashi Arano, Japan Network Information Center
The Address Supporting Organization (ASO) of ICANN will hold this Open Meeting to discuss issues of global address policy. It will also be a valuable opportunity to learn more about the status and role of the ASO and the part it plays in representing the interests of the addressing communities within the ICANN structure.
Location: Bilik Perak (Perak Room), Level 2

K - SOCIAL EVENTS

Monday - Feb 26
6:30 PM - 8:00 PM

APRICOT Opening Social Event (D1S1)
Social event hosted by MDC
Location: Cyberview Lodge, Cyberjaya

Wednesday - Feb 28
6:30 PM - 8:00 PM

Tech Conference Closing Social Event (D3S1)

L - APNIC ANNUAL MEMBER MEETING

The APNIC Annual Member Meeting will be held on 2 March 2001 (following the APRICOT programme).

9:00 AM - 5:00 PM

APNIC Member Meeting [Non-APNIC Member] (D5T1-NO)
This is the APNIC Member Meeting. Non-APNIC members can attend but they have to pay a fee
of USD 50.00.
    Location: Tun Hussein Onn Hall B, Level 2
    Fee: S50 00 for non-APNIC member
    More Information: http. www .apnic.net meetings/index.html

9:00 AM - 5:00 PM

APNIC Member Meeting [APNIC Member] (D5T1-A)
The APNIC Annual Member Meeting will be held on 2 March 2001 (following the APRICOT
programme). It provides a forum for discussions and decision-making on issues specific to APNIC
Membership. including the APNIC budget, workplan, annual report. and the election of members
of the APNIC Executive Council.
    Location: Tun Hussein Onn Hall B, Level 2
    More Information. http://www.apnic.net meetings index.html

M - APIA AGM AND OPEN FORUM

APIA Annual General Meeting (for APIA members only) and APIA Open Forum (for all)

Thursday - Mar 1

9:00 AM - 12:25 PM

APIA Annual General Meeting (members only) (APIA-1)
Preliminary Agenda for AGM [as of 7 Feb]

9:00 - 9:30 Registration
9:30 - 9:40 Introduction (each other)
9:40 - 10:00 Chair's Report - Pindar Wong & Hirofumi Hotta
*Presentation of appreciation certificates to Pindar Wong and Izumi Aizu
10:00 - 10:05 Board Secretary Report - Hirofumi Hotta
10:05 - 10:10 Financial Report - Toru Takahashi (Treasurer)
10:10 - 10:30 Secretary Report - Izumi Aizu (SG/AS)
10:30 - 10:45 Coffee Break
10:45 - 11:45 Member Discussion
Discussion about Strategic Plan: New and Core Activities
11:45 - 12:15 Election of New Board of Directors
12:15 - 12:25 Introduction of New Board members
    Location: Bilik Selangor (Selangor Room), Level 3
    More Information: http://www.apia.org

2:00 PM - 5:30 PM

APIA Open Forum (open to all) (APIA-2)
Agenda

14:00 - 15:30 Part I Content Self-regulation Study Report
15:30 - 15:45 Coffee Break
15:45 - 17:30 Part II Digital Divide or Digital Opportunity?

Part I Content Self-regulation Study Report

With growing concerns about potentially illegal and/or harmful content on the Net. what kind of
social mechanism will most effectively address these issues? APIA commissioned an independent
study on this self-regulation, headed by Dr. Ang-Peng Hwa. and would like to share the result with
the Internet community in Asia Pacific.

Part II Digital Divide or Digital Opportunity? (Consultation for G8 DOT Force activity)

At the Okinawa Summit last July. G8 countries agreed to setup the Digital Opportunity Task
Force, or DOT Force, to address the potential dangers of leaving developing nations behind in the
growth of the new digital economy.

In cooperation with GLOCOM (Center for Global Communications, International University of
Japan), we would like to discuss how to include all players in the potential new prosperity. This is
part of G8 consultation process and GLOCOM is designated as NPO representative to DOT Force
from Japan.

    Location. Bilik Selangor (Selangor Room). Level 3
    More Information: http:/ www.apia org