行政院所屬各機關因公出國人員出國報告書
(出國類別：會議)

出席太平洋電信協會(PTC)第二十三屆年會報告書

出國人員：

服務機關	職稱	姓名
交通部電信總局	局長	簡仁德
交通部電信總局	科長	瞿曦文

出國地點：美國夏威夷

出國期間：九十年一月十三日至十九日

報告日期：九十年三月三十日

目錄

出席太平洋電信協會第二十三屆年會報告書

壹、前言

太平洋電信協會(Pacific Telecommunications Council, PTC)是由美國夏威夷州一些業者和學者於1978年發起成立，於1980年在夏威夷州正式登記，為一民間組織，後來規模逐年擴大，目前會員數已逾700，來自50個國家地區，分為營利會員、非營利會員、以及個人會員三大類，可謂亞太地區最大的民間電信組織。前本局（電信總局）於1983年以營利會員身分加入，1996年改制後則以非營利會員身分與會迄今，並連續競選理事成功。

該會本屆年會於2001年1月14-18日援例在美國夏威夷州檀香山舉行，會議地點在Hilton Hawaiian Village。年會活動包括會前的一些小型圓桌會議和講習會、理事暨會員大會、研討會、各個常設委員會會議、以及電信展等。研討會為年會的主體，本屆推出的主題是「從整合到興起：是否使用者主導？」（From Convergence to Emergence: Will the User Rule?），整體與會人數約有兩千人，參展廠商超過100家，場面可謂盛大。

該會為迎合中共，曾於 1997 年意圖更改我會員會籍名稱為「中華台北」，所幸本局於 1998 年年會時的理事會上發表聲明，強烈譴責該會不應屈服於中共的政治勒索，最後經由表決而否決了該案，故本案的後續發展一直是本局關切之重點。儘管該會媚共立場未變，經由本局事前強力運作，終究排除了本次理事會有關我會籍案相關議題的討論，雖然會場有代表發言，亦為會議主席巧妙委婉的避開，會議過程堪稱順利。

貳、行程安排

1 月 13 日	自中正國際機場啟程
1 月 14 日	出席理事暨會員大會
1 月 15- 17 日	參加研討會
1 月 18 日	啟程返國
1 月 19 日	返抵國門

參、理事暨會員大會紀要

本屆理事會援例合併會員大會於 1 月 14 日上午十時召開，由現任理事會主席 Ms. Jane Hurd 主持。該會現有理事約五十餘名（附件一），出席理事約二十餘人，其他會員出席也並

不踴躍，不到二十人。理事們具有表決的權利，而一般出席的會員就只能聽和舉手發言，不能參與表決。

會議在主席宣佈開會後，首先通過草擬的議程，會議旋即依排定之議程逐項進行。在主席及會長分別致詞，簡單的歡迎大家與會並簡介一年來的努力後，由提名競選委員會報告，公佈了新當選的 2001-2003 年理事名單。由於國內，包括中華電信在內，並無任何單位參選，故本局仍是理事席上唯一的本國代表。中國大陸則是從無到有，增加了兩席，一是個人會員的甄教授，另一為東亞區營利會員身分的 Q-East 公司。理事主席則由現任主席續任一年。

在本次會議中也通過了該會執委會（Executive Board）新任名單，各個常設委員會的主席、副主席也略有變動。策略委員會提出一份報告，對該會未來的改進與加強做的建議也一併在會上通過。該會正式成立了一個新的小組，稱作「內部監管小組」(Internal Governance Task Force)，由上屆理事主席澳洲籍的 Mr. Chris Vonwiller 擔任主席，旨在督導改進各常設委員會以及執委會的運作及功能，以提升效率，並確保該會公正、透明的運作。另外本次會議也通過了對章程附則（By- Laws）的修訂，如明訂會長、副會長的辭職只須知會理事會而不須獲

得理事會的同意、理事總席次在 12-80 之間並可由會員指定遞補、代理人具十足的投票權、理事會議最低出席人數依實有理事的三分之一計算、電話會議視同會議、以及理事們可經由通訊方式議決事項等。

在會議進行中有一段小插曲，會員席間有一位任職於美國公司的華裔趙姓人士發言，提及在本屆年會前兩日，也在附近舉辦的「中國電信研討會」是如何的成功，與會廠商約百五十家等等，然後話題一轉，提到我國會員在該會的會籍名稱和大陸「一個中國」政策有所抵觸，故該會迄今仍遭中國大陸抵制，期望該會能有所行動，以拓展會員們在中國大陸的商機云云。由於本局事前的運作，會議主席承諾在本次會議不討論我會籍議題，是故主席委婉的解釋道：積極爭取中國大陸的支持和會員的加入一直是近年來的工作重點，目前也有了很好的成果，未來還會繼續努力。主席除了感謝他提出這個論點，並未做進一步的討論，整個會議過程堪稱順利。

肆、研討會紀要

研討會主要分大會(Plenary)及分組討論會(Concurrent Sessions)，議程安排如附件二。大會時程極短，主要是一般廣

泛性的演說，如首日主題便是「邁向全球資訊化社會的契機和挑戰」(Toward The Global Information Society-- Opportunities and Challenges) 通常邀請在電信界較具知名度的人士以做噱頭，例如本次大會有國際電信使用者協會(International Telecommunications Users Group, INTUG)主席、韓國的科技部部長、國際電聯會(ITU)的副秘書長、網際網路名稱暨號碼指配機構(ICANN)主席等。會議過程在網路上做實況轉撥，當然會後亦可重複收聽、收看(須配有 Real Player 軟體)，這也是網路科技帶來便利的一個實際的例子。(www.ptc.org/ptc2001點選 Web cast 或點選 Proceedings/Plenary)

分組討論會則是研討會的重點，議題廣泛，大致可分為社會文化、科技、商業應用、政策監理、國家地區、以及經濟財政等六大類。不同的議題在不同的會議室同時進行討論，所有會議資料可上網擷取，即在前述網址點選 Proceedings 再選 Sessions，輸入用戶名稱 PTC2001 以及密碼 Wireless (須注意大小寫) 即可取得，本分組討論資料簡明摘要如附件三。

自去年起，第三代行動通信業務 (3G) 的發照就是個熱門的議題，韓國電信公司 (Korea Telecom) 有兩位代表聯合提出了一篇論文，就韓國的 3G 發照方式做了探討 (附件四)。他們

從稀有資源談起，介紹了頻率的拍賣和當時已知的各國發照策略，重點則在於對拍賣制和審議制的優缺點做了剖析。他們認為頻率拍賣容易引得所謂「勝者的詛咒」(Winner's Curse)，也就是得標者往後不易對 R&D 投注心力。還有，跨國性的大財團在競標制中容易勝出，而大財團也將從其他不同管道的獲利來補貼高標金、高成本、回收慢的 3G 服務業。儘管審議制有其缺點，他們還是推崇具有配套措施的審議制，認為是最適合韓國，也認為雖然各國國情有所不同，這套分析也還是適用於其他將進行 3G 發照的國家。由於這兩位都是業者，業者的分析並不見得可以從整體國家或全民利益為出發點做全方位的考量，然針對未來行動通信業的發展，仍可說是一篇有價值的參考資料。

在電信自由化的過程中，接續(Interconnection)是個極為重要的議題，因為它關係到多業者市場的自由競爭是否公平、有效。國際知名的 Ovum 顧問公司一位代表在這方面做了闡述（附件五），他簡介了世界各地在此方面最近的法規進展與施行情形，尤其是亞太地區。除了傳統的接續外，他也提到許多國家，隨著行動通信的普及率急速升高，目前正專注行動通信的接續問題。另外，在網際網路業者間的寬頻接續問題也漸漸成

為近期的焦點，而這些相關議題具有時效性，必須在不到兩年，甚至更短的時間內解決。

如何消弭「數位落差」（Digital Divide）也是最近熱門的話題，美國舊金山大學的一位教授提出一篇論文，標題是「開發中世界邁向數位利得--電信政策及施行上的課題」（附件六）。他用「數位利得」（Digital Dividends）來對應「數位落差」和我國在 APEC 中所提的一項計畫「轉數位落差為數位機會」在名稱上實有異曲同工之處。他認為在政策釐訂上要注意三點：一、電信單位要與其他相關單位結合，不可逕自行事。二、目標和方法必須分離。三、從最急迫的地區下手。在監理方面他認為維持獨立的監理機構不容易卻很重要；如果政府調適反應能力不夠快的話，監理機關和決策機關間的角色就容易混淆；有效的監理應廣納民眾參與意見；舊有的業務分類將不易定義新興的服務；長時期的專營權不符公眾利益；以及市場監督機制是必要的等。在網路接取上，對開發中國家而言，他認為無線通信系統要比固網的效益來的快，而電路的轉售制度（Resale）是促進網路接取很有效的方法。他提到普及服務，認為普及服務應當具有階段性的目標，如第一階段通到各個社區，第二階段通達不同的機構，最後則是通到用戶住宅。另外，

他對偏遠地區也提出看法。例如，根據他的研究，偏遠地區的需求往往比想像中的來得大，而利用創新科技，偏遠地區的建設成本往往又比想像中的來得低。

伍、感想與建議

一、會籍名稱問題宜妥為因應

近年由於中國大陸市場商機誘人，再加上其他政治因素，當可預見 PTC 討好中共的心態將有增無減。雖然本屆年會經本局事前強力運作，理事會中排除了有關我會籍名稱問題的討論，惟依情勢判斷，該會終究仍將屈服於中共，再度將議題搬上檯面。民間組織比照官方而依奧運及 APEC 模式稱我為「中華台北」並無前例，而此例一開，勢必影響我在其他非官方組織中之會籍名稱，實宜妥為因應。

二、民間組織宜由民間業者主導

目前PTC 會員總數已超過七百，其中個人會員約兩百人，非營利性會員約僅五十個，其餘皆為營利性會員，也就是一般電信資訊業者。而非營利性會員中，大部分又為一些法人組織、研究機構等，政府代表可謂是極少數。就以現任的理事為例，本局屬惟一的政府代表。在此具有鮮明的業者色彩之組織活動

中，政府機關實宜退居第二線，而讓業者全權主導。本乎此，本局宜不再涉身該會會務，亦即不再競選理事，而將協調輔導國內業者積極參與，尤其是執國內電信牛耳的中華電信公司。

三、宜善加利用該會資源

該會年會及年中會所舉辦的研討會，就其會議資料或所提論文品質而言，雖無法與一般專業期刊如 IEEE 等相提並論，甚或蘊藏濃厚的商業氣息，惟其中仍不乏一些獨到之見解，以及值得借鏡之經驗，頗具參考價值，宜善加利用之。如今拜網際網路蓬勃之賜，透過密碼管制，上網即可取得相關資料，更是方便至極，這在感謝該會在網站上所投注的心力之餘，同時更要呼籲本局同仁多多利用這項資源，充分享受本局身為該會會員的權益。

四、宜把握 PTC 年會時的交流管道

該會年會依例皆於每年一、二月間在檀香山舉行，近年來規模越來越大，而在該會年會前後，甚至在同一地點，合併有其他會議或研討會，如太平洋電信者聯盟會議（Pacific Partners Meeting, PPM)就每每在其前召開，這次也有所謂的「2001 年中國電信研討會」，另外還有太平洋經濟合作理事會（Pacific Economic Cooperation Council, PECC）、亞太遠距教學論壇(Asia

Pacific Distance Learning Forum, APDLF)、太平洋島嶼電信聯盟(Pacific Island Telecommunication Association, PITA)等的會議，如此造就一次電信相關業者的大集合。業者們實宜把握這個機會，拓展商機、尋覓合作。本次年會，有國內某電信業者利用這個時機，與多達近十家的其他業者洽談合作事宜便是一例。該會年中會的規模相較之下要小許多，當然在這方面的效益就比較有限了。

陸、附　件

附件一

理事名單

Pacific Telecommunications Council

BOARD OF TRUSTEES FY 2002/2003
(x Term Expires January 2002)
(* Term Expires January 2003)

CATEGORY: FOR PROFIT

North America
x Verizon Global Solutions International (Mr. John Pricken)
xLockheed Martin Global Telecommunications (Mr. Robert Twining)
xGeneral Telecom (Ms. Melissa Craig)
xLoral Space Systems (Mr. Robert Farmer – replaces Tom Solitario)
xMotorola-Global Telecom Solutions Group (Mr. Pertti Johansson)
xSBC International (Mr. Ray Sulsh)
*Severance International, Inc. (Ms. Jane N. Hurd)
*Kalba International, Inc. (Mr. Kas Kalba)
*Boeing Satellite Systems (Mr. Roger Naff)
*Loral Skynet (Mr. Jonathan Olow)
*Concert (Mr. Phillip Overmyer)
*MCI Worldcom (Mr. Bruce A. Willey)

South America
VACANT

Central America
VACANT

East Asia
X Fujitsu, Ltd. (Mr. Makoto Fujisawa)
X Japan Telecom, Co., Ltd. (Mr. Noboru Ubayama)
X Mitsubishi Electric (Mr. Keigo Komuro)
X NEC Corporation (Mr. Eiji Hayashi)
X Objective Systems Integrator-Asia Pac. Org.
(Mr. Martin Cuipa)
X SK Telecom (Mr. Jung Nam Cho)
* IBM Japan, Ltd. (Mr. Mutsuya Asano)
*Hong Kong Telecom, Ltd. (Mr. Keith Harrison)
*Korea Telecom (Mr. Hansuk Kim)
* NTT Communications (Mr. Masayuki Takahashi)
*DDI (KDDI) Corporation (Mr. Seiichi Tsugawa)
*Q-East.com(Dr. Tao Yun)

South-East Asia
xVACANT:
*iSoftel Ltd. (Mr. Kevin Chia)
* New Skies Satellite (Mr. Eui K. Koh)
*Globe Telecom, Inc. (Mr. Cesar L. Sison)
*Pasfik Satelit Nusantara (Ms. L. Woerfiendarti)

Hawaii
VACANT
*Verizon Hawaii (Mr. Dennis Niimi)

Oceania
X – ORACLE (Mr. Graeme Crayford)
X Telstra (Mr. John Hibbard)
* Telecom New Zealand, Intl. (Mr. Anthony N. Briscoe)
*Ovum Pty., Ltd. (Mr. James Holmes)

CATEGORY: NON-PROFIT

North America
xU.S.C. Center for Telecomm. Management (Mr. Jack Borsting)
xInternational Engineering Consortium (Mr. John R. Janowiak)
*Industry Canada (Mr. Bruce Drake)

South America
VACANT

East Asia
xDirectorate General of Telecomm (Mr. Jen Ter Chien)
xJapan Telecoms Eng. & Consulting Svcs
(Mr. Tsunenatsu Yano – replaces Mr. Kenichiro Torigoe)
*NHK (Mr. Hiroshi Nakamura)

Southeast Asia
VACANT

Hawaii
xUniversity of Hawaii (Mr. David Lassner)
*East-West Center (Meheroo Jussawalla)

CATEGORY: INDIVIDUALS

xMr. George Lissandrello (USA)
xMr. Kyung-Han Sohn (South Korea)
xMr. Diana Sharpe (UK)
xMr. John Spence (Australia)
xMr. Richard Taylor (USA)
*Mr. Richard Barber (USA)
*Mr. Gregg Daffner (USA)
*Dr. Osamu Hayama (Japan)
*Dr. Mark Hukill (USA)
*Ms. Yoshiko Kurisaki (France)
*Dr. Dan Wedemeyer (USA)
*Mr. Zhen Kai Yuan (China)

CATEGORY: OTHER

X Immarsat, Ltd.(Mr. Ramin Khadem – replaces George Novelli) UK
*INTELSAT (Larry Valenciano) UK
VACANT

附件二

年會議程

PTC 2001

Sunday, 14 January 2001

0900–1200

Workshops

(Visit www.ptc.org for Workshop updates on 27 November 2000)

WKS1

Essentials of Broadband & Emerging Technologies: Infrastructure & Services

Facilitator:
RAY HORAK, President and GPB,The Context Corporation, *USA*

This session explores the world of broadband communications, focusing on infrastructure and services. Infrastructure is examined in terms of access and transport technologies, including Digital Subscriber Line (DSL), Wireless Local Loop (WLL), and SONET/SDH. The wireline services discussion compares and contrasts IP (Internet Protocol) versus ATM (Asynchronous Transfer Mode). Wireless Internet discussion focuses on WAP (Wireless Access Protocol), contrasted to iMode. This session is a highly dynamic, fast-paced and plain-English discussion of the latest developments in the broadband networked world.

WKS2

Joint Ventures and Strategic Alliances in Asia: Convergence and Consolidation

Moderator:
PHILLIP L. SPECTOR, Partner & Chair Communications & Technology Practice Group, Paul, Weiss Rifkind, Wharton & Garrison (PWRW&G), *USA*

Panelists:
JEANETTE K. CHAN Partner PWRW&G *Hong Kong*

SAMUEL SOON-YUB KWON, Executive Vice President, Chief New Business Officer, and General Counsel, Hansol PCS Co Ltd., Seoul, *South Korea*

LIONEL OLMER, Partner PWRW&G, *Japan*

This workshop will focus on the practical, "hands-on" aspects of forming transnational joint ventures and strategic alliances in the telecommunications and information industries. After an overview of issues common to all such alliances, the workshop will provide a country-specific analysis with respect to three major Asian nations: China (including Hong Kong), Japan, and Korea. The emphasis will be on the practical— the "how to" and "with whom", and there will also be discussion of both financial and legal issues.

1000–1300

Board of Trustees Meeting

1300–1600

Roundtables

(Visit www.ptc.org for Roundtable updates on 27 November 2000)

RT1

Future Scenarios for the Submarine Cable Industry

Moderator:
STEPHEN MCCLELLAND, Editorial Director, International Operations, Telecommunications (R) International

As global demand for bandwidth has burgeoned the fiberoptic submarine cable industry has moved to centre-stage in the international telecom industry PTC2001 represents a unparalleled opportunity to bring together the key figures in the operator, vendor and support environments to debate what the future shape of this industry will look like This year, the session will adopt a new format In the session will be:

Rapid response question and answer, The introduction of prepared scenarios for the submarine cable industry to stimulate debate; The appearance of 'expert witnesses' to help in cross-examination.

Questions to be asked and answered are: What is the most positive aspect of this industry? What is the most negative aspect? Can the industry continue to enjoy endless success? What are the limiting factors in this business? What defines the supply function, what defines the operating function? Can suppliers become operators? When is there a conflict of interests? Is there a balance of power? Has the Internet redefined all future ways of international connectivity? What part does the US play in international connectivity? Is it causing sharply directional traffic characteristics in global networks and is this a major concern? Can the industry—in its optimism —overbuild? Can bandwidth endlessly increase can unit pricing endlessly decrease?

What will be the balance of operator-funded projects versus private ones?

RT2

The ICAIS Dilemma: International Charging Arrangements for Internet Services

Moderator:
JAMES SAVAGE President and CEO Raincoast Group, *Canada*

Participants To Be Confirmed

1700–1800

PTC2001 Opening Ceremony

1800–1930

Opening Reception

Hosted by Verizon

Monday, 15 January 2001

0730–0830

Speakers' Breakfast

0730–0830

First-time Attendees'/New Members' Meeting

(Coffee and pastries will be served.)

0800–1200

Poster Sessions

HAIYAN ZHAN, Deputy Manager Shanghai Metro Telecommunications & Transmission Co., Ltd and YONGCHANG ZHAO Instructor, Shanghai University *People's Republic of China*
Implementation of an Integrated Radio Distribution System in Shanghai Metro

JAY EDWIN GILLETTE Professor, Information & Communication Sciences, Center for Information & Communication Sciences, *USA*
Innovative Public Policy: Calling for an Innovation Standard for Telecommunications Universal Service

ABDUL RAUF PARKER Economic Strategies Expert Oman Telecommunications Company *Sultanate of Oman*
Entrepreneurial Emergence Post Privatization

LEONARD ELFENBEIN Chairman & CEO, and THOMAS BOOKWALTER Pres dent Lynx Technologies, Inc *USA*
Benchmarking: An Annual Review of Your Telecom Rates

0830–1030

Plenary Session

(Webcast Sponsored by Compaq)

Speakers:
ROBERTO BLOIS Deputy Secretary-General, International Telecommunication Union

MARIA LIVANOS CATTAUI, Secretary-General, International Chamber of Commerce

MIKE ROBERTS President & CEO, The Internet Corporation of Assigned Names & Numbers (ICANN)

1030–1100

Morning Break

Sponsored by Corning Incorporated

1100–1230

Concurrent Sessions

M.1.1

Adoption of New Technologies

Chair:
BARRY BROWN, Professor, College of Education, University of Saskatchewan *Canada*

M.1.1.1
ELIZABETH MORE, Director, Macquarie Graduate School of Management and G MICHAEL MCGRATH, Deputy Director, JRCASE, Macquarie University, *Australia*
Stakeholder Considerations for Implementation of E-Commerce Applications: A Health Care Industry Study

M.1.1.2
SUPRIYA SINGH, Senior Research Fellow, CIRCIT RMIT, *Australia*
The Effective Use of Corporate Email

M.1.1.3
FRANCIS PEREIRA, Research Fellow and ELIZABETH FIFE, Research Fellow, Center for Telecommunications Management, University of Southern California, *USA*
Socio-Economic Considerations in the Adoption of New Technologies: A Cross Country Analysis

M.1.2

Application Service Providers

Chair:
TBC

M.1.2.1
LUNG-SING LIANG, Managing Director and CHIH-CHENG CHIEN, Senior Project Manager, Telecommunication Laboratories, Chunghwa Telecommunication Corporation, *Taiwan*
Call Center Based Mobile Commerce

M.1.2.2
JOCHEN DINGER, Senior Consultant, MARC SCHNEIDER, NORMAN KOWALEWSKI; and STEFAN WILHELM, Detecon GmbH, *Germany*
Application Service Providing—A Chance for Carriers in Take-Off Countries?

M.1.2.3
KEITH J RHEA, CEO, IPX, *USA*
The ABCs of being a CASP

M.1.2.4
PETER BARLETTO, Managing Director, Network Services & Operations, TyCom, *USA*
New Advances in Network Operation Support Systems

M.1.3

South Pacific Islands

Participants To Be Confirmed

M.1.4

New Satellite Initiatives I

Chair:
EDWARD SLACK, Lockheed Martin and Comsat, *USA*

M.1.4.1
MIKE WILLIAMS, President & GM, Systems & Technology Lockheed Martin Global Telecommunications, *USA*
Broadband InfoComm in the Early 21st Century—What's Coming?

M.1.4.2
BRUCE S MIDDLETON, Managing Director, Asia Pacific Aerospace Consultants, *Australia*
Trends and Prospects for Commercial Launch Services

M.1.4.3
DANIEL AZAREN, WILLIAM COURTNEY, JOSEPH FREITAG, PETER HADINGER, DOUGLAS SHANNON, TERENCE SMIGLA, and ERIC WISWELL, TRW Space & Electronics Group, *USA*
Economics of VSAT Networks: Bent Pipe vs. Processed Payloads

M.1.5

Interconnection Issues

Chair:
TBC

M.1.5.1
JIM HOLMES, Principal Consultant, Ovum Pty Ltd *Australia*
Interconnect in the Asia Pacific—Millennial Trends

M.1.5.2
MYUNGJA YANG, Researcher, Korea Telecom, *Republic of Korea*
Does Cost-Oriented Pricing Mean Cost Standardization?

M.1.6

Infrastructure Development

Chair:
ELLEN HOFF, President, W.L. Pritchard & Co., L.C. *USA*

M.1.6.1
RICHARD TAYLOR, Palmer Chair in Telecommunication Studies, The Pennsylvania State University and MEHEROO JUSSAWALLA, Senior Fellow/Emerita, East-West Center, *USA*
Asian Technology Parks: Lessons for the Digital Divide

M.1.6.2
JEAN-CHARLES LEZEAU, Head of Strategy & Analysis Alcatel Submarine Network, *France*
Integrated Services and Business Plans

M.1.6.3
ROBERT MORRIS Program Manager Futron Corporation *USA*
Business Plans for Telecom Ventures

M.1.6.4
GLENN GERSTELL, Managing Partner and ALISA FIDDES Senior Associate Milbank Tweed, Hadley & McCloy LLP *USA*
Techniques for Financing Telecoms and Internet Infrastructure Buildout in Asia

1130–1630

Exhibits Open

1250–1400

Lunch in Exhibit Area

1230–1400

Researchers' Lunch

1230–1400

PTC Education & Seminars Meeting

1360–1800

Poster Sessions

THOMAS W COOPER, The Young Center Elizabethtown College & Visual and Media Arts, Emerson College, *USA*
Breaking the Fast: Close Encounters of the Media Kind

THOMAS J MCKEOWN JR., President and SAM VELARDE Vice President, Vista Group International *USA*
Digital Global Marketplace

CAROLE ALCOCK, Lecturer and PENNEY MCFARLANE, Offshore Coordinator, University of Wollongong, *Australia*
E Learning—Moving from Traditional Learning World to the E-Learning World

Concurrent Sessions

M.2.1

Emerging Global Telecommunications

Chair:
ROBERT WALP, Vice Chairman, GCI, *USA*

Speakers and discussants will address the need for change in non-governmental and inter-governmental non-profit telecommunication organizations to meet the rapid changes in the telecommunication industry Issues of membership finances use of technology in member services and relevance to business will be discussed Special attention will be given to the need to address deep-rooted long-term global problems prior to their emergence as major crises

Speakers:
RICHARD BARBER, Adjunct Fellow, East-West Center, *USA*
Non-Profit Organizations Meet Challenges of a Changing Telecommunication World

DAN WEDEMEYER Professor, Department of Communication, University of Hawaii, *USA* and RYOTA ONO, Associate Professor, Aichi University, *Japan*
Describing and Reducing Global Telecommunications Problems

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GEORGE LISSANDRELLO, Information Products International, *USA* and ZOILO JESUS M DELA CRUZ III President & CEO Infoserve, Inc *Philippines*
Needs for and Benefits of a Private Telecommunication Operating Foundation

Discussant:
L S HARMS, Professor Emeritus, Department of Communication, University of Hawaii *USA*

M.2.2

The End of the Line

Chair:
TBC

M.2.2.1
THOMAS C AGOSTON, Esq Asia Pacific Service Delivery Manager IBM Global Services, *USA*
Pervasive Computing—Connecting the World

M.2.2.2
TBC

M.2.2.3
ROBYN LINDLEY Vodafone *Australia* LOIS BURGESS Lecturer & PhD Candidate and JOAN COOPER, Professor School of IT and Computer Science University of Wollongong, *Australia*
The Potential of WAP for the Delivery of Health Online

M.2.3

Meet Competitors in China Telecom/Data Market

Chair:
TAO YUN, Managing Director Q-east *Peoples Republic of China*

M.2.3.1
KAILI KAN Dean School of Business Management Beijing University of Posts & Telecommunications *Peoples Republic of China*
Policy Research and Practice in China Telecom Deregulation

M.2.3.2
CHANGXING ZHENG COO China Netcom *People's Republic of China*
Competition from "New SOE" Telecom Companies in China

M.2.3.3
GUANGYU WANG VP Beijing CapitalNet, *People's Republic of China*
Competition from Alternative Telecom (Data) Companies in China

M.2.3.4
GUXING HUANG CEO and QILIN XIE VP Guangdong South Satellite Telecommunication Service Co *Peoples Republic of China*
Involvement of Wireless Players in China Telecom Market Deregulation

M.2.4

New Satellite Initiatives II

Chair:
TIMOTHY LOGUE Space & Telecom Policy Analyst Goudert Brothers, *USA*

M.2.4.1
KLNG-JIN LIAN Senior Applications Engineer Hughes Network Systems *USA*
Satellites: The "Extra-Terrestrial" Advantage

M.2.4.2
EDDIE HSU & CHAW HUNG Jet Propulsion Laboratory California Institute of Technology *USA* PATRICK SHOP-BELL GRETCHEN WALKER & DENNIS WELLWITZ California Institute of Technology and University of Maryland *USA*, GILBERT CLARK & MAKOTO YOSHIKAWA Mt Wilson Institute and Institute of Space & Astronautical Science *Japan* RICHARD DESJARDINS National Aeronautics & Space Administration NASA Research & Education Network, *USA* NAOTO KADOWAKI NAOKO YOSHIMURA & TAKASHI TAKAHASHI Communications Research Laboratory Ministry of Posts & Telecommunications *Japan* PAT GARY National Aeronautics & Space Administration Goddard Space Flight Center, *USA*, and MIKE GILL & HARUYUKI TATSUMI National Library of Science and Sapporo Medical University *Japan*
Wide-area Technologies and Services in the Trans-Pacific High Data Rate (HDR) Satellite Communications Experiments

M.2.4.3
SHUICHI YOSHINO Chief and YOSHITSUGU YASUI Senior Manager, Media Technology Factory NTT Communications Corporation, *Japan*
Satellite Internet: Technical Advancement and Business Scope

M.2.4.4
JOHN M PUETZ President MasterWorks Communications and MARK DANKBERG President & CEO ViaSat Inc *USA*
Waveform Advances for Satellite Data Communications

M.2.5

Regulatory Reform Processes

Chair:
TBC

M.2.5.1
WHAJOON CHO Director and YONG KYU LEE Researcher Korea Telecom, *Republic of Korea*
3G Licensing in Korea: Auction vs. Comparative Selection

M.2.5.2
A SUJATHA, Secretary, Center for Telecom Management & Studies and T H CHOWDARY Information Technology Advisor Government of Andhra Pradesh & Director, Center for Telecommunications Management and Studies Hyderabad *India*
Telecommunications and Information Policies and the New Regulatory Regime in India

M.2.5.3
CHUCK COSSON Senior Counsel Public Policy Vodafone Group Plc *USA*
Best of Both Worlds: A Comparative Analysis of the Universal Service Challenge from a Wireless Perspective

M.2.6

IP/Next Generation Networks

Chair:
AILEEN PISCIOTTA Kelley Drye & Warren LLP *USA*

M.2.6.1
BERNADETTE JEW, Partner ANGUS HENDERSON Partner and ROB NICHOLLS, Partner Gilbert & Tobin *Australia*
Enabling Consumers: Impact on the Future Interconnection of Networks

M.2.6.2
PETER FALSHAW Director of Consultancy-Asia Pacific Ovum Pty Ltd *Australia*
Nextgen Networks and Services

M.2.6.3
RANDY ZADRA President & Chief Operating Officer Orclynx *USA*
Localizing the Global Internet: Improving Cost of Access and Quality of Service for Asia

1500-1530

Afternoon Break

Sponsored by 1CyberNetwork Services Ltd

1530-1730

Plenary Session

(Webcast Sponsored by Compaq)

Speaker:
NOBUYUKI IDEI Chairman & CEO Sony Corporation, Japan

Tuesday, 16 Janaury 2001

0730–0830

Speakers' Breakfast

0900–1030

Concurrent Sessions

T.1.1

Education and Use of New Technology

Chair:
TBC

T.1.1.1
JOHN WITHERSPOON, Senior Advisor, Western Cooperative for Educational Telecommunications (WCET) & Professor Emeritus, School of Communication, San Diego University and SALLY JOHNSTONE, Founding Director, WCET, Western Interstate Commission for Higher Education, *USA*
Quality in Online Education: Results from a Revolution

T.1.1.2
ARLENE KREBS, President, Orbit Communications & Author of "The Distance Learning Funding Sourcebook", LEV GONICK, Chief Technology Officer, Cal State University Monterey Bay; and SCOTT ZIMMER, President, Educating Everyone, *USA*
Wireless Multimedia Education for All

T.1.1.3
ANN HILL DUIN, Associate Provost & Director, Extended & Continuing Education, Iowa State University and LINDA L. BAER, Senior Vice Chancellor, Academic & Student Affairs, Minnesota State Colleges and Universities, *USA*
A Call for Partnering in the Learning Marketspace

MARINA, Network & Service Engineer-Distance Learning Project Department Manager, PT TELKOM, *Indonesia*
Facing the Challenges, Getting the Right Way with Distance Learning

T.1.2

Infrastructure

Chair:
TBC

T.1.2.1
PETER D. RUBY, Lawyer, Goodman Philips & Vineberg, *Canada*
Industrial Convergence: Energy, Telecommunications and the Internet

T.1.2.2
TBC

T.1.2.3
H.S. KULLAR, Senior Vice President, Sales & Marketing and JAMES STRACHAN, Vice President, Strategic Planning & Development, COLO.COM, *USA*
At the Network Edge: Carrier-Neutral Colocation for Next Generation Internet Services

T.1.2.4
JOHN PUETZ, President, MasterWorks Communications, *USA* and DAVID BLANKS, CTO, Planetel, *Australia*
Smart Networking Techniques Provide Operational and Economic Incentives in Implementing Hybrid Wide Area Networks

T.1.3

South Pacific Islands

Participants To Be Confirmed

T.1.4

Wireless Communications

Chair:
PERTTI JOHANSSON, Senior Vice President, Leader of Global Account Management, Motorola, *USA*

With 3G wireless networks near implementation and Voice Data, and Video convergence, new networks will be required to deliver higher speed data and multimedia services. The next generation network will be capable of delivering a whole lot of new services with an improved end consumer experience. Use of unlicensed spectrum will also be part of this next generation explosive growth.

Along with converged networks, there will be improved and multifunctional end consumer devices, which will enable new applications and open new market segments for personal area networks with a few operating in unlicensed spectrum

Panelists:
LAWRENCE HENDERSON, Vice President & Director, Solutions Engineering, Motorola, *USA*
Subject:
Next Generation Wireless Networks
3G, UMTS, Multimedia IP Networks, Applications

AMER HUSAINI, Director, Product Development & Device Strategies, AT&T Wireless, *USA*
Subject:
Devices, Personal Networks, and Applications: Home RF, Home Gateway, and Next Generation Devices

TAKAGI, Executive Director, Gateway Business, NTT DoCoMo, *Japan*
Subject:
iMode Applications and Services. What Makes iMode Successful? Future of iMode and Next Generation Services and Applications.

T.1.5

Digital TV Regulation

Chair:
RYOTA ONO, Associate Professor, Aichi University, *Japan*

T.1.5.1
ANDREAS GRUENWALD, Research Fellow, Institute for Information, Telecommunications & Media Law, University of Muenster, *Germany*
Analogue Switch-Off: Spectrum Auctions in the Digital Age

T.1.5.2
JANE FORSTER, Partner and CAROLINE LOVELL, Communications Legal Practice Group, Clayton Utz Lawyers *Australia*
"Sorting Out the Bits" Digital Television and Datacasting in Australia—A Study in Policy and Regulatory Development

T.1.6

Wireless Development

Chair:
FRANK ROBERT, Associated Vice President, ATK/CSI, *USA*

T.1.6.1
ALLEN H. KUPETZ, Director, International Business Development, Triton Network Systems, Inc., *USA*
The Death of Holes: Why Fixed Wireless Access Will Succeed in South Korea

T.1.6.2
PETER STENZEL, JAMES MYERS, PETER VAREND, ERIC WISWELL and JOSEPH FREITAG, TRW Space & Electronics Group, *USA*
Venture Development for Broadband Satellite Networks

T.1.6.3
TBC

T.1.6.4
R.W. SCHULTHEIS, Managing Director, Mission Group LLC *USA*
Telecommunications Network Architecture Integrating New Emerging Technologies into the Network Architecture

1030–1100

Morning Break

Sponsored by Next Level Communications

1100–1230

Concurrent Sessions

T.2.1

Going Digital in Developing Countries

Organized by:
World Broadcasting Union

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T.2.2

Application Implications

Chair:
TBC

T.2.2.1
NOBUYOSHI TERASHIMA, Waseda University *Japan*
LALITA RAJASINGHAM and JOHN TIFFIN, Victoria University of Wellington *New Zealand*, and ANNE GOOLEY, Queensland Open Learning Network, *Australia*
An Experiment of Cultural Heritage Presentation System

T.2.2.2
NASWIL IDRIS, Head of Educational Laboratory
The Indonesian Open Learning University, *Indonesia*
Prospective Situations (Innovative Ways) to Fully Utilize the Limited Multimedia (Internet) Access for Distance Learning/Open University in Indonesian Education

T.2.3

Latin America

Chair:
TBC

T.2.3.1
THOMAS R SPACEK, Executive Director, Internet & Global Information Infrastructure Initiatives Telcordia Technologies, *USA*
Internet Growth Trends in Latin America

T.2.3.2
ARTHUR S GLOSTER II, Vice Provost & CIO, Florida International University, *USA*
Advanced Internet Connectivity in the Americas: AmericasPATH (AmPATH)

T.2.3.3
FABIO FERREIRA KUJAWSKI Counsel, Telecommunications, Public & Corporate Law and OSCAR PETERSEN. Carvalho de Freitas e Ferreira Attorneys at Law, *Brazil*
Internet Market Opportunities in Latin America

T.2.3.4
PRAVIN JAIN, Vice President, Enron Broadband Services, *USA*
Will the US Infrastructure Build Pattern Repeat Itself in Developing Nations?

T.2.4

New Developments in Submarine Cable Technology

Chair:
SEIICHI TSUGAWA, Senior Deputy Director, International Strategy Dept , DDI Corporation, *Japan*

T.2.4.1
HITOSHI YAMAMOTO, Senior Managing Director; KOJI GOTO, Director, E NAZUKA Director HIDEKI HOMMA, Director K ASAKAWA, and HIDENORI TAGA, Deputy Director KDD Submarine Cable Systems, Inc , *Japan*
Large Capacity Submarine Cable System using DWDM Technology

T.2.4.2
TONY FRISCH, General Manager, Product Marketing, Alcatel Submarine Networks Division *United Kingdom*
Technology for Future Subsea Super-Highways

T.2.4.3
KATSUTOSHI TAMURA General Manager Submarine Networks Business Division International Telecommunications Business Group TATSUO MATSUMOTO Senior Director Submarine Telecommunications Engineering Division and COLIN ANDERSON, Business Development Manager Submarine Networks Sales & Marketing Department International Telecommunications Business Group Fujitsu Limited *Japan*
Latest Enabling Technologies for Tera-bit/s Optical Submarine Networks & Their Impacts on Performance & Cost

T.2.4.4
WILLIAM C MARRA, Senior Managing Director, Global Network Planning & Design HOWARD D KIDORF Director, Services Engineering Division, FRANK KERFOOT, and NEAL S. BERGANO, Managing Director System Research & Selected Development TyCom, *USA*
Traffic, Services and Technology Drive New Approaches to Global Undersea Networks

T.2.5

Internet and IT Governance

Chair:
TBC

T.2.5.1
LIZ WILLIAMS Doctoral Scholar, Faculty of Information Technology, Queensland University of Technology, *Australia*
ICANN: Shifting the Fulcrum of Regulatory Power

T.2.5.2
JOHN OLUROTIMI AYOADE Doctorate Student and TOSHIO KOSUGE, Professor University of Electro-Communications *Japan*
A Strategic Policy Idea That Achieves Balance Between Online Users' Privacy Concern and Lawful Access

T.2.5.3
GEORGE RICHARD BAIER M S Telecommunications Program (matriculating) & SAF PacTec Communications Inc *USA*
GRECOS—Global Responsibility, Encrypted Coordinate, Operating System

T.2.6

The Digital Divide: How Can Developing Nations Jointly Pursue Telecommunications and Internet Development

Chair:
TBC

This session will consider whether nations can accrue both telecommunications and Internet development objectives or whether the two goals cannot always occur jointly Many nations in the region only recently have achieved double-digit telephone line penetration per one hundred inhabitants. Can these nations use improved telephone line density to establish an improved telecommunications/information processing infrastructure? The session will address this question from both technological and business perspectives

Presenters:

HEATHER HUDSON Director, Telecom Management & Policy Program, University of San Francisco *USA*

MILTON MUELLER Syracuse University *USA*

DERRICK COGBURN Center for Strategic & International Studies University of Michigan *USA*

1130–1800

Exhibits Open

1230–1430

Lunch in the Exhibit Area

1230–1430

Educators' Lunch

1230–1430

Lawyers' Lunch

Facilitated by Coudert Brothers

1430–1600

Concurrent Sessions

T.3.1

Cultural Use of Online Technology

Chair:
TBC

T.3.1.1
QIU ZHIPU, Department of Chinese Language & Literature and NAMBA MIYUKI, International Scholars & Students Department Nanjing University, *Peoples Republic of China*
Distance Learning for Chinese as a Foreign Language Between China and Japan— A Case Study

T.3.1.2
JISUK WOO Assistant Professor, Seoul's Womens University *Republic of Korea*
Invasion or Giving Up of Internet Privacy?: A Personal Divide Emerges

T.3.1.3
MICHAEL JANIGAN, Executive Director/General Counsel, Public Interest Advocacy Centre, *Canada*
Coming to Terms With the Digital Divide

T.3.2

Managed Session

Chair:
JIM HEBERLE VP Sales & Marketing, Monterey Telecommunications Technology Inc , *USA*

T.3.2.1
LARRY SCHWARTZ Vice President, Telecommunications Industry Applications Business Unit, Compaq Computer Corporation, *USA*

T.3.3

Southeast Asia

Chair:
TBC

T.3.3.1
GENE MESHER, Assistant Professor, MIS Department College of Business, California State University, *USA*
Malaysia's Multimedia Super Corridor Project: A Critical Success Factor Analysis

T.3.3.2
NIR B. KSHETRI, Assistant Professor, Marketing Kathmandu University, Nepal & Doctoral Student, College of Business Administration, University of Rhode Island, *USA*
The Dynamics of Government Regulations and E-Commerce Development. A Comparison of Malaysia and Singapore

T.3.3.3
DIETER ERNST, Senior Fellow, Economics, East-West Center, *USA*
The Internet, Global Production Networks and Knowledge Diffusion. Challenges and Opportunities for Developing Asia

T.3.4

Global Internetworking

Chair:
GREGG DAFFNER Chief Strategic Officer q-east broadband *USA*

T.3.4.1
ANTHONY P "TONY" HOUSTON Chief Technology Consultant, Mindlinx Technology Consultants *USA*
Convergence Technology—A Users Market

T.3.4.2
MELISSA CRAIG Founder and President, General Telecom, *USA*
Independent Partition Switching: Fast, Low Cost Access to National and International Networks

T.3.4.3
MANI CHAWLA, Director, Business Development Echostar Data Networks, *USA*
Content Distribution—A Broadcast Internet Application

T.3.4.4
KAZUSHIGE MORI, Engineering Manager, Submarine Systems Division, NEC Corporation, *Japan*
Emerging Submarine Cable Systems to Benefit Telecom Users

T.3.5

What are the Risks and Rewards of B2B Commerce?

Chair:
MEHEROO JUSSAWALLA, Senior Fellow/Emerita East-West Center *USA*

An explosion of B2B Commerce on the Internet promises perfect competition and friction free commerce for various types of industries particularly for the electronics sector. It promises to usher in efficiency gains for both buyers and sellers. However, regulators and some of the participants in this form of exchange are beginning to have their doubts The question is whether such commerce really frees up competition or does it create monopolies or even oligopolies? In June 2000, the Federal Trade Commission is scheduled to hold hearings on the anti-trust implications of B2B Commerce There are three exchanges that are to be scrutinized, namely airlines, automobiles and aerospace companies

In economic theory, open, transparent online markets make monopolistic behavior much harder than normally assumed Yet the economics of the Internet works differently. It can create powerful online marketplaces overnight, which are causing concern Can such marketplaces rig prices for consumers? It is also possible for consumers to defy such marketplaces and form Oligopsony from the buyers side There is no law against buyers asking suppliers to fulfill their orders by just using the fax instead of going online The buyers can see the prices which the suppliers paid for their own parts or components and use that information to beat down the prices Such issues of risks and rewards in B2B Commerce will be presented and discussed in this session.

Presenters:

MARK HUKILL, Associate Professor, School of Travel Industry Management, University of Hawaii, *USA*

DAVID LASSNER Director of Information Technology, University of Hawaii, *USA*

GORDON BRUCE Director Administration, Estate of James Campbell *USA*

T.3.6

Fiber Optic Cable Development

Chair:
YALE BRAUNSTEIN Director Kalba International, Inc . *USA*

T.3.6.1
ANDY KOWALIK Director Strategic Information TyCom Networks Ltd. *USA*
Bandwidth, Fiber or Systems
The New Economics of Acquiring Bandwidth

T.3.6.2
LISA DADOURIS Vice President Business Development Global Crossing Development Co., *USA*
The Virtuous Cycle of Undersea Systems Economics—From Consortia to Privately Owned & Operated to Strategic Partnering

T.3.6.3
PIERRE TREMBLAY Area Manager, Alcatel Submarine Networks (Asia Pacific Region), *Singapore*
Evolution of the Asia Pacific Submarine Cable Market

1645–1800
Exhibitors' Reception

Wednesday, 17 January 2001

0730–0830
Speakers' Breakfast

0830–1130
Exhibits Open

0830–1600
Concurrent Sessions

W.1.1

Ethical, Legal and Other Socio-Cultural Issues Surrounding New Technology Emergence in the Pacific

Chair:
THOMAS W. COOPER, Publisher, MEDIA ETHICS magazine and Professor, Emerson College, *USA*

The emergence of new technologies and related products in the Pacific raises ethical, legal, and other socio-cultural issues for provider and user alike. This session provides vision from national (Fiji, U.S , UK, Singapore, Chile) and socio-cultural—ethical, social, journalistic, legal—perspectives alike To provide these several perspectives which constitute the areas within "socio-cultural" awareness— a lawyer ethicist, journalist, technology expert/businessman, Foundation Vice President, consultant, professor and Chamber of Commerce President have all prepared to cooperate so as to provide multi-disciplinary and multi-national insights

Presenters:

TAITO WARADI Manager New Business and Marketing Telecom Fiji Ltd & President Suva Chamber of Commerce *Fiji*
Ethical Issues in Telecommunication in Fiji

TARA GIUNTA Partner Telecommunication and IT Practice Group Coudert Brothers *USA*
B-to-C E-commerce Transactions: International Legal Development; Ethical Quandaries

ABRAHAM SANTIBANEZ Professor and Professional Area Coordinator & Ethics Coordinator Media Studies Center, Diego Portales University *Chile*
Emerging Ethical Issues in Telecommunication in Chile

JOHN PAVLIK, Visiting Professor Nanyang Technological University *Singapore* & Executive Director, The Center for New Media Columbia University *USA* and ADAM CLAYTON POWELL III, Vice President Technology and Programs The Freedom Forum *USA*
Telecommunication Issues and Ethics in Journalism: New and Old Issues Raised by the Internet

Respondent:
DIANA SHARPE, Senior Consultant to Omega Partners *UK* & Chairman INTUG

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W.1.2

Distance Learning

Chair:
TBC

W.1.2.1
REGGIE SMITH III EDS Lead, Advanced Distributed Learning (ADL Co-Lab)/Network Shared Usage, Electronic Data Systems Corporation (EDS) *USA*
Distributed Learning Programs & Partnerships Helping to Close the "Digital Divide"

W.1.2.2
G A REDDING Analyst Institute for Defense Analyses and WILL S PERATINO Director of Distance Learning Defense Acquisition University, *USA*
From DL POTS to DL PANS: Leveraging Emerging Technologies to Create the Future Learning Environment

W.1.2.3
T CRAIG MONTGOMERIE Professor and VALERIE IRVINE, PhD Student/Research Associate University of Alberta and MIKE DAVENPORT Superintendent, Fort Vermilion School Division No 52 *Canada*
Design and Implementation of a Next Generation Distance Education System

W.1.2.4
JOHN H SOUTHWORTH, Laboratory School, Curriculum Research & Development Group, University of Hawaii *USA*
From Cambodia to Slovakia...A Telecommunications-Based Model for Global Awareness Education at the Secondary School Level

W.1.3

East Asia

Chair:
TBC

W.1.3.1
LIANGYI CUI Associate Professor Shanghai Jiaotong University *Peoples Republic of China*
From Expectation to Emergence: Telemedicine in China

W.1.3.2
TBC

W.1.3.3
RAYMOND H M LEUNG, Senior Advisor Q L DING Senior Engineer and VINCENT W HUNG 1 Trend Net Ltd *Hong Kong China*
Designing and Planning of National Optical Network in China

W.1.3.4
SIMON BUREAU Managing Director, Vectis International Inc *Canada*
Evaluating the Market for Internet, Access Services and E-Commerce in South Korea

W.1.4

Enhancing Wireless

Chair:
RAMIN KHADEM Director Finance & Administration Inmarsat Ltd *United Kingdom*

W.1.4.1
TBC

W.1.4.2
CHANG-YEUN ONE Researcher and HYUNG-ROCK PARK Senior Manager, SK Telecom, and HWAN-WOO KIM Professor Chungnam National University *Republic of Korea*
Efficiency Improvement of Channel Elements Utilization Through Proposing a New RAN Architecture of IMT-2000 System

W.1.4.3
BO HEDFORS Executive Vice President Global Telecom Solution Sector Motorola Inc *USA*
Bringing IP to Mobile: The Network Revolution of Internet and Wireless Convergence

W.1.5

Mobile Satellites
Global Regulation & Market Access

Chair:
WILLIAM K COULTER, Partner Telecommunications & Technology, Coudert Brothers *USA*

Panelists To Be Confirmed

W.1.6

Fear and Loathing in the Peering Process

Chair:
DAVID ALLEN Principal World Collaboration for Communications Policy Research *USA*

This session will examine the terms and conditions under which Internet Service Providers interconnect their networks. As the Internet matures into a commercial medium its structure has become more hierarchical with the largest so-called Tier-1 ISPs able to charge smaller ISPs for network access and transit services. This system of payments contrasts with a previous "sender keeps all" arrangement as well as the traditional settlement arrangement among telecommunication correspondents. This new system imposes comparative higher financial burdens on smaller ISPs including the ones physically distant from desirable content hosted by North American Tier-1 ISPs. The session will examine both the equity and business factors supporting and opposing the new payment system.

Presenters:
ERIC LEE VP Commercial Internet Exchange *USA*
TIM DENTON, Principal, T.M. Denton Consultants *Canada*

1000–1030

Morning Break

Sponsored by Wherever.net

1030–1200

Concurrent Sessions

W.2.1

Overcoming the Digital Divide

Chair:
MICHAEL OGDEN Associate Professor Film & TV Studies Communications Department Central Washington University *USA*

W.2.1.1
T H CHOWDARY Information Technology Advisor, Government of Andhra Pradesh & Director Center for Telecommunications Management and Studies Hyderabad *India*
Information Technology For Education, Governance and E-Commerce

W.2.1.2
CLAUDIA SLEGERS, Associate Research Fellow, Center for International Research on Communication and Information Technologies CIRCIT RMIT and JANICE KNUCKEY, Coordinator Center for Excellence for Students Who are Deaf and Hard of Hearing, Access Department, Preston Campus Northern Metropolitan Institute of TAFE, *Australia*
Sign Language Users and Visual Communications: The Deaf Australia Online Projects

W.2.1.3
CAROLE ANNE ALCOCK Lecturer School of IT & Computer Science University of Wollongong *Australia*
The Dilemma of Digital Delivery: Assuring Access to Digital Resources as Technologies Change

W.2.2

[illegible]

Chair:
SALLY JOHNSTONE, Director Western Cooperative for Educational Telecommunications *USA*

The education landscape is being radically transformed not just by new technologies but by dot com approaches to doing business in what is emerging as a lively education marketplace. New companies strive to meet the universal need for lifelong learning in the information age. Virtual universities in a range of configurations are succeeding and failing in Internet time, new startups are disintermediating student support services out from under traditional universities, and traditional universities are spinning off for-profit subsidiaries to capitalize on their names and intellectual resources. This panel will bring together experts in this changing marketplace to share their observations and speculations with attendees in a lively and interactive session.

Speakers:
GORDAN FREEDMAN President Knowledge Base LLC *USA*

W.2.3

South Asia

Chair:
TBC

W.2.3.1
SRI PADMA REDDY, Consultant on Technical Training Matters, Tata Teleservices Ltd and T.H. CHOWDARY, Information Technology Advisor, Government of Andhra Pradesh & Director, Center for Telecommunications Management and Studies, *Hyderabad, India*
Telecom Deregulation in India—Changes in Policies and the Fortunes of the Private Telephone Companies

W.2.3.2
SANTUSHI KURUPPU, Managing Director, Tinggal Interactive (Pvt) Limited, *Sri Lanka* and JULIE S.Y. CHAR Knowledge Manager, The Weber Group, Inc , *USA*
Barriers and Opportunities to IT Development and Leadership in South Asia—Sri Lanka: A Case Study

W.2.3.3
FAZLUR RAHMAN, Chairman, South Asia Multi Media, *Bangladesh*
Emergency Telecommunications for Disaster Mitigation in Bangladesh

W.2.3.4
N.K. CHHIBBER, Secretary-General, PTC India Foundation, *India*
Stimulating the Growth of Internet for Accelerating Development in South Asian Countries

W.2.4

Networking Technologies

Chair:
YASUHIKO KAWASUMI, General Manager, Japan Telecom Co., Ltd, *Japan*

W.2.4.1
TBC

W.2.4.2
TIMOTHY HULT, Senior Product Manager, Ditech Communications, *USA*
Voice Quality in Next Generation Networks

W.2.4.3
WILLIAM R ERICKSON, VP-Transport & Network Operations Planning, PAUL R. MORKEL, Director-Long Haul Photonic Products, and DONALD P. FREY, Professional Engineer & Principal Strategic Planner, Fujitsu Network Communications, Inc., *USA*
Advances in Optical Networking Technologies and Its Benefits to Service Providers and End Users

W.2.4.4
JINGSHA HE, Member of Research Staff and TAKAFUMI CHUJO, Manager, Fujitsu Laboratories of America, Inc., *USA*
A Framework for End-to-End Quality of Service

W.2.5

Intellectual Property

New Policy Standards for Digital Broadcasting and Telecoms Universal Service

Organized by:
World Broadcasting Union

W.2.6

Data Networking

Chair:
JACK BORSTING, Executive Director, Center for Telecom Management & E. Morgan Stanley Professor of Business Administration, Marshall School of Business, University of Southern California, *USA*

W.2.6.1
TBC

W.2.6.2
TOMOHIRO ISHIHARA, Manager; MASATO OKUDA; and JUN TANAKA, Fujitsu Laboratories Ltd , *Japan*
Access Network for Ubiquitous Broadband

1200–1400

Lunch with Speaker

Sponsored by SK Telecom

1200–1400

Nominations & Elections Committee Meeting

1430–1515

Plenary Session

(Webcast Sponsored by Compaq)

Theme:
The Role of Government in the Governance of the Future of Internet

(Visit www.ptc.org for this update on 27 November 2000)

Participants To Be Confirmed

1515–1545

Afternoon Break

Sponsored by Subic Telecom

1545–1700

Closing Plenary

(Webcast Sponsored by Compaq)

Participants To Be Confirmed

1800–1930

Closing Reception

Thursday, 18 January 2001

0800–1000

PTC Committee Meetings
- **Membership Committee**
- **Media and Communications Committee**
- **Research Committee**

1000–1200

PTC Committee Meetings
- **Conference Committee**

1200–1330

PTC Coordination Meeting

1400–1800

PTC Executive Board Meeting

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附件三

分組討論摘要

Session Summaries

PTC 2001

PTC2001 From Convergence to Emergence: Will the User Rule?

14–18 January 2001
Hilton Hawaiian Village
Honolulu, Hawaii, USA

Sponsored by
COMPAQ

M.1.1
Adoption of New Technologies
Chair: Barry Brown, Professor, College of Education, University of Saskatchewan, *Canada*

M.1.1.1
Stakeholder Considerations for Implementation of e-Commerce Applications: A Health Care Industry Case Study
Elizabeth More, Director, Macquarie Graduate School of Management, Macquarie University and G. Michael McGrath, Deputy Director, CSIRO-Macquarie University Joint Research Centre for Advanced Systems Engineering, *Australia*

The health industry case study outlined in this paper explores stakeholder management, mismanagement, and partnering in Australia's first business-to-business Internet trading community, the *Project Electronic Commerce and Communication for Healthcare*, otherwise know as *PeCC*. The Project emerged in 1996 from the Federal Government's concern over burgeoning costs in Australia's $40 billion health sector and focuses on introducing e-commerce practices into the health sector. The Project's major success so far has been in setting up the *Pharmaceutical Extranet Gateway* (*PEG*), e-commerce competitive collaboration among the five major pharmaceutical wholesalers and a building block in establishing standard trading documents for the healthcare industry.

The authors identify and discuss some of the more significant stakeholder conflicts observed during their study. These would appear to have particular significance for many healthcare industry players within the Pacific region.

M.1.1.2
The Effective Use of Corporate E-mail
Supriya Singh, Senior Research Fellow, CIRCIT, RMIT, *Australia*

Summary Unavailable

M.1.1.3
Socio-Economic Considerations in the Adoption of New Technologies: A Cross-Country Analysis
Francis Pereira, Research Fellow and Elizabeth Fife, Research Fellow, Center for Telecommunications Management, University of Southern California, *USA*

The advent of the digital age coupled with the accelerated development of transmission technologies has led to a proliferation of new devices and applications such as on-line account payments and receipts, just-in-time inventory management, tele-medicine, and tele-education. Some of these applications have been shown to provide the economically disadvantaged with better access to health care and education while others, such as cellular phones and other wireless devices, have improved the life styles of both residential and business users. The adoption rates of these applications and devices have been extremely uneven in different countries and are attributable to a myriad of non-technological factors, including economics, culture, politics, and other specific national traits that must be considered.

The case of Singapore demonstrates the potential of a "champion" (as manifested by government initiatives) to change an entire society's mode of operation. On the other hand, despite favorable economic and social considerations, Cable and Wireless HKT's inability to achieve its target goals for interactive multimedia service illustrates the importance of understanding end-users' "value system" as demonstrated by i-mode's success in Japan. Ultimately, widespread and rapid adoption of new communication technologies will depend upon the interaction between the "champion," social, and cultural factors, and finally, the end-user.

M.1.2
Application Service Providers
Chair: Robert Harbison, *USA*

M.1.2.1
Call Center-Based Mobile Commerce
Lung-Sing Liang, President and Chih-Cheng Chien, Senior Project Manager, Telecommunication Laboratories, ChungHwa Telecommunication Corporation, *Taiwan*

ChungHwa Telecom, the dominant telecommunication operator in Taiwan, has nearly 20 million subscribers including wireline, wireless, and Internet users. In order to meet emerging customer needs and provide high quality services, an integrated multi-function and multi-site call center has been successfully implemented. Vertical and horizontal methods have been integrated to provide business consulting, billing inquiries, complaint handling, trouble-shooting, and some order-taking capabilities. Thanks to the flexibility and scalability of the fundamental system architecture design, the authors were able to develop an electronic commerce business model to provide Internet access for customers to make transactions via the call center. Based on the electronic commerce business model, they have also applied wireless access ability (*e.g.*, WAP) through mobile phone technology to construct a mobile commerce business model, *i.e.* Call Center Based Mobile Commerce.

The Call Center Based Mobile Commerce currently provides logo/ringtone down load service, mobile banking, mobile stock broker service, mobile travel agent, economy update, entertainment, social services, *etc.*, with planned extensions. In this paper, the authors describe the business model, method of development and system architecture of the Call Center Based Mobile Commerce. In addition, they address a future customer service for mobile commerce.

M.1.2.2
Application Service Providing - A Chance for Carriers in Take-Off Countries?
Jochen Dinger, Senior Consultant; Marc Schneider; Norman Kowalewski and Stefan Wilhelm, Detecon GmbH, *Germany*

ASP is the current buzz word in the IT world and hardly a day passes without a company announcing its entrance into the ASP market where growth rates of 100% *per annum* and more are the rule, not the exception. Carriers everywhere are trying to position themselves in this fast developing market. This paper evaluates the following question: *Is Application Service Providing a chance for carriers in take-off countries to generate additional revenues or will the market continue to be a playing field for highly specialized ASPs and software vendors?*

M.1.2.3
The ABCs of being a CASP
Keith J. Rhea, CEO, ipx, *USA*

New service markets are attractive to entrepreneurs thanks to gross margins that may range upwards of 60% to 78%. To obtain such margins will usually involve investments and time frames that are too much and too long, thereby negating what initially appears to be very attractive. The author presents an "instant service" model that effectively pools resources to allow Internet service providers, carriers, enterprises and others to have instant access to the technology with the right-size infrastructure and without significant capital or resources. The "T-Portal" is the first cross-industry collaboration that unites hardware manufacturers, software providers, service providers, access providers and application providers to radically change the way Internet-related communication services are deployed around the world.

M.1.2.4
New Advances in Network Operation Support Systems
Peter Barletto, Managing Director, Network Services and Operations; Michael G. Kelly, Director, Customer Care, TyCom, *USA*

The future of Operation Support Systems (OSS) lies in developing a tool that bridges the time *vs.* information dilemma such that all information is available in real time, with the ability to take action across the same system either within the enterprise or by an external customer. The robustness of the OSS becomes a competitive tool that can be leveraged by the network owner as well as the customer. This competitive tool is emerging as a new vehicle for customer retention, creating value by accessing existing customer data to provide comprehensive customer care. The value of such comprehensive customer care leads to improved customer satisfaction, thereby retention, and finally increased revenue per customer. New market entrants have an opportunity to develop a future proof solution with a short duration from conception to deployment. These new solutions may well become the electronic glue that bonds a customer to a specific global network. The amazing part about these solutions is that, in reality, they create value through the collation and presentation of data that has always existed within the network. The development of integration software aligned along business processes has shifted the focus to the "whys" of the network's existence. The author shows why the flexibility afforded by this new generation of OSS becomes an enabler to new levels of customer satisfaction.

M.1.3
Latin America
Chair: Please Refer to Planet PTC for Updates

M.1.3.1
Internet Growth Trends in Latin America
Thomas R. Spacek, Executive Director, Internet & Global Information Infrastructure Initiatives, Telcordia Technologies, *USA*

We have developed innovative capabilities to measure, monitor, and forecast Internet growth. This paper briefly describes the measurement capabilities and then focuses primarily on results from applying these capabilities to Latin America. Results include Internet users and hosts in Latin America over time; Internet user and host growth in Latin America with comparisons to the United States; and past, current, and predicted host counts and hosts *per capita* for six Latin American countries. The results lead to some interesting insights that are presented. Key factors impacting Internet growth in Latin America are identified and discussed followed by trends and challenges for Internet growth in Latin America. Emphasis is placed on two of the key trends -- the huge potential of wireless Internet access and carrier cost reductions including creating Internet Network Access Points (NAPs).

M.1.3.2
AmPATH
Arthur S. Gloster, Vice Provost & CIO, Information and Resource Management, Florida International University (FIU), *USA*

The AmPATH project was undertaken by FIU in collaboration with Global Crossing. It exists to interconnect the Research and Education networks in South America, Central America, the Caribbean, Mexico, and other international countries to Internet2, and US and non-US Research and Education networks through its Miami GigaPOP. FIU was able to establish its relationship with both Global Crossing and participating countries by recognizing the need for advanced Internet connectivity in the region and providing an achievable vision to establish the necessary infrastructure.

The author describes the project's objectives, configuration and operation.

M.1.3.3
Internet Market Opportunities in Latin America
Fabio Ferreira Kujawski, Counsel, Telecommunications, Public & Corporate Law and Oscar Petersen, Carvalho de Freitas e Ferreira, Attorneys at Law, *Brazil*

Internet users and services are growing rapidly in Latin America thanks to free Internet access coupled with bank, content providers and telecommunication service provider associations. Moreover, operators are offering broadband services, including data transmission services through WAP (Wireless Application Protocol) technology. By February 2000, Latin America reached 7 million users, mostly in Brazil, and the growth rate of electronic commerce was 117% per year. In Brazil, the number of users jumped from 1.4 million in January 1998, to 4.5 million in July 1999. At the beginning of 2000, there were more than 6 million users.

The authors provide a detailed overview, mainly of the Brazilian market, that includes current and projected electronic commerce and other Internet activities for the next several years. They conclude that Voice over IP is one of the principal challenges for the telecommunication sector, a factor that has been contributing greatly to the technological advancement of solutions that increasingly permit communication development.

M.1.3.4
Will the US Infrastructure Build Pattern Repeat Itself in Developing Nations?
Pravin Jain, Vice President, Enron Broadband Services, *USA*

The author describes how the United States has moved from an all-analog monopoly-provider network to a digital network with competition at several levels. He examines the technology, political and financial elements that are involved in such a process. He notes that most of the content the data world needs to access, at least for now and the foreseeable future, resides on servers based in the United States. For a new player to have a viable business model, international network access is a must. Lack of international reach is going to continue to be a significant factor in the ability of a new player in regions like Brazil to get funded and therefore be able to add to the infrastructure. He concludes that we should expect to see completely different patterns of infrastructure development unfold in emerging nations.

M.1.4
New Satellite Initiatives I
Chair: Edward Slack, Lockheed Martin and Comsat, *USA*

M.1.4.1
Broadband Infocom in the Early 21st Century - What's Coming?
Mike Williams, President & General Manager, Systems & Technology, Lockheed Martin Global Telecommunications, *USA*

The author presents a "chicken and egg" cycle of events that is forcing more and more involvement by traditional business in Internet activities. Globalization affects more enterprises so that risks from being left out increase. More businesses go on line to avoid being left out, so that opportunities for electronic inter-business commerce grow. This leads to the development of improved software and business applications, so that more intensive and frequent electronic transactions can be conducted., and this will further require businesses to be on-line or left out.

By the year 2010, there will be nearly 100 million addressable small and medium enterprises (SMEs) globally, which compares to a little more than 2 million today. This means that the number of SMEs will rise to become fifteen to twenty percent the size of the global household market by 2010. The global addressable SME market reaches over US$120 billion by 2010, not significantly smaller than the US$450 billion household market.

The author addresses how the satellite industry can serve the future large SME market. He describes the "SuperPOP" that provides broadband satellite access via an international satellite gateway, Internet data centers, wireless extension services, and integrated operations and business support functions. He describes low cost earth terminals and the shift from transport to services that will be required to make future satellite communications viable. He concludes by describing how the Internet is now the platform for global enterprise

growth and explains why providing new productivity with better and more timely information will be the key to successful services to future SMEs via wireless, including satellites.

M.1.4.2
Trends and Prospects for Commercial Launch Services
Bruce S. Middleton, Principal, Asia Pacific Aerospace Consultants Pty Ltd (APAC), *Australia*

Up until 1999 the commercial geosynchronous-orbit (GEO) launch market was characterized by a shortage of launch capability. This permitted prices to remain high and encouraged new investment. That situation changed in 1999 and today the annual launch rate capability in this market segment exceeds demand at an increasing rate. The market for commercial launches into low Earth orbit (LEO) did not exist before 1997. In May 1997 the first Iridium satellites were launched, followed by others. Today, after the spectacular financial failure of the Iridium system, it is becoming clear that the LEO launch market is smaller than was expected, and highly competitive.
The author examines in detail the current and projected situations until 2010 in these two principal launch service markets and concludes that there is likely to be a substantial excess of supply over demand for launches in the small Delta class in that time frame.

M.1.4.3
The Multimedia Migration: Transponder Versus Processing Payload VSAT Networks
Eric Wiswell, Daniel Azaren, William Courtney, Joseph Freitag, Peter Hadinger, Douglas Shannon, and Terence Smigla, TRW Space & Electronics Group, *USA*

A previously published TRW paper demonstrated that multi-beam processing payloads offer significant business advantages to top-level network service providers (NSPs). In this paper, the authors explore processing payloads from a user perspective.

With their flexibility, increased capacity, and performance benefits, processing payloads will open the door for many exciting new broadband multimedia applications. But processing payloads are not just an enabler for future applications - they already offer distinct advantages for existing VSAT applications.

The authors compare the user costs of a typical VSAT network using existing transponder technology to the same network implemented using the new generation processing payload technology. Unlike proposed future applications for which no quantitative data exists, the properties of existing VSAT networks are well known and can be easily evaluated. The results demonstrate that processing payloads represent a superior solution for both today's VSAT networks as well as for more sophisticated future applications and network topologies.

M.1.5
Interconnection Issues
Chair: Please Refer to Planet PTC for Updates

M.1.5.1
Interconnect in the Asia Pacific–Millennial Trends
Jim Holmes, Principal Consultant, Ovum Pty Ltd, *Australia*

Interconnection is an absolutely necessary – even though not a sufficient – condition for the development of effective competition and of a robust multi-operator telecommunication environment. This paper explores recent developments in regulations and practices for interconnection globally, and especially in the Asia Pacific region. These developments include the basis on which regulators are permitting interconnection to occur and interconnection charge trends. The two major developments that are especially explored in the paper are the focus that some regulators are now giving to mobile interconnection, and especially to mobile terminating access; and the focus that is starting to be given to the requirements for interconnection at broadband levels in an IP environment. Both of these developments have major implications not only for

interconnection but also for overall policy in relation to the scope and efficacy of telecommunication regulation as a whole.

M.1.5.2
Does Cost-Oriented Pricing Mean Cost Standardization?: WTO Agreement and Long-run Incremental Cost
Myungja Yang, Researcher, Korea Telecom and Soocheon Kweon, ETRI, *Republic of Korea*

Since the WTO Agreement in 1997, the global telecommunication industry has tried to adopt a costing methodology known as *Long-Run Incremental Cost* (LRIC). Historically, however, countries have developed their costing methodology for their own purposes: *e.g.*: network expansion, universal service and other macro economic policies, as well as economic efficiency. The definition of cost and the estimating methodology is, therefore, influenced by each country's social and economic situations. Nevertheless, WTO is making history with standardization in costing methodology.

The purpose of this paper is to present the major issues regarding the implementation of LRIC. According to the findings, few countries have the ability to develop their own LRIC. They tend to adopt a costing methodology without fully examining the appropriateness. Secondly, the mark-up system used in LRIC does not solve the common cost problem. Proportioning mark-ups based on direct investment could cause irrelevant recovery of common cost if the direct cost is not appropriately collected. Thirdly, country specific characteristics such as traffic patterns and market size are usually overlooked. The uniqueness of each country is frequently attacked as "inefficient operation". Fourthly, radical changes in the universal service system and pricing structure are inevitable. As LRIC decreases the level of interconnection rate and local revenue, end-user charges and universal service fund need to be increased, as a result. Macro economic policies such as network expansion and universal service could be disabled in low-income countries. As no social and political cost other than economic cost is allowed to be recovered in the LRIC methodology, public polices could be critically injured. These findings lead us to recommend implementing LRIC in a more considerate way: 1) Do not hurry, 2) Be sure it's a better way, 3) Prepare back-up systems and 4) Create clever macro-economic policies.

M.1.6
Infrastructure Development
Chair: Ellen Hoff, President, W.L. Pritchard & Co., L.C., *USA*

M.1.6.1
Asian Technology Parks: Lessons for the Digital Divide
Richard Taylor, Palmer Chair in Telecommunication Studies, The Pennsylvania State University and Meheroo Jussawalla, Senior Fellow/Emerita, East-West Center, *USA*

The task of redressing global inequalities in access to communications technologies is an Herculean one calling for huge investments in infrastructure and human resources. The benefits to society and the economy are equally enormous and worth striving for. Collection and analysis of strategies to benefit from globalization are being implemented that can, at minimum, significantly inform policy makers on strategies for reducing the Global Digital Divide(GDD), advancing distributional equity, and softening some of the negative effects of economic globalization. There is a digital divide in the advanced countries just as much as there is in the developing countries. But the determinants are different. The authors discuss the differences and conclude that, although the tools and methods used by the advanced countries can be used as models for the emerging countries to find solutions, the differences in political systems, stages of economic development and cultures will have to be taken into account.

In the technologically advanced nations, universal access is the goal and disparities are being reduced through an active role played by the private sector and its contribution to the National Information Infrastructure and via regulation and liberalization. Therefore, the digital divide may be reduced faster in advanced countries than in those with low incomes. This paper describes a study undertaken by the East-

West Center to tackle some of the development issues for reducing the GDD and the role of information technology in economic development.

M.1.6.2
Services to Entrepreneurs in the Undersea Cable Industry
Jean-Charle Lezeau, Head of Strategy & Analysis, Alcatel Submarine Network, *France*

Building a business plan in itself is a project. It requires resources, funds and time. A business plan is not just about spreadsheets showing expected financial results. It's initially inspired by the visions projected by entrepreneurs. At the end of the day, fund raising is based on a strong belief, by venture capital and suppliers, in the leadership of the project: People first, technology second.

It is therefore a must for entrepreneurs to establish long-term relationships with their suppliers (financial and technological) so that long term business strategies and requirements can be integrated into in the project's structures from the outset. This paper gives an overview of experiences in developing business plans in the submarine industry and promotes an integrated service approach in this field. It describes the different activities undertaken and the content of a full business plan that gives entrepreneurs the means to sell their vision. The author outlines the relationships between the development of a business plan and the supply of services, along with how the two can be combined in a win-win proposition.

M.1.6.3
Internet Commerce Models in Asia: Case Study on Singapore and South Korea
Kang Wongsuk, Assistant Professor and Brian Lee, Ph.D. Candidate, Nanyang Technological University, *Singapore*

The Business-to-Business (B2B) and Business-to-Commerce (B2C) Internet Commerce Model proposed by Kang, Lee and Chua (2000) is used to examine the Internet commerce development of Singapore and South Korea, which enjoy similar levels of economic development and Internet infrastructure. It is found that Singapore and South Korea develop two different Internet commerce models: Internet commerce in South Korea is inclined toward the B2C model, whereas Singapore tends toward the B2B model. This paper, which won the first-place award in the PTC Essay Prize competition in 2000, is an attempt to explain why and how these two countries have evolved their own Internet commerce models, from the economic development perspective.

M.1.6.4
Techniques for Financing Telecoms and Internet Infrastructure Buildout in Asia
Glenn S. Gerstell. Managing Partner and Alisa Fiddes, Senior Associate; Milbank, Tweed, Hadley & McCloy LLP, *USA*

Asian markets have seen explosive growth in demand for telecommunication capacity, stemming from a range of factors, such as increases in voice and data traffic and the Internet phenomenon. All available evidence suggests that this demand will continue to grow, putting increased pressure on the infrastructure market to provide this region with robust platforms for Internet and telecommunication services. This mounting demand can only be fulfilled through the completion of capital-intensive infrastructure projects. Funding for such projects, however, is not always readily available, especially in emerging markets, where the elevated risk associated with these projects discourages the participation of commercial lenders. Even for projects in developed markets such as Japan, Australia and Hong Kong, there are even more pressing demands for infrastructure development and, in turn, a demand for capital that exceeds the capacity available from commercial lenders or other traditional financing methods. Creative financing solutions are therefore critical if infrastructure development in Asia is to keep pace with demand.

The authors examine several approaches to raising capital for infrastructure development in emerging markets. Specifically, they provide an overview of several financing methods and sources, including vendor finance, project finance, the commercial bank market, the capital markets and strategic partnering. They examine the significant issues encountered in each approach and also discusses the benefits of combining

these approaches to maximize access to capital while retaining the operational flexibility so critical to an industry where markets and strategies change overnight and the ability to respond quickly is paramount.

M.2.1
Reducing Global Telecommunication Problems
Chair: Robert Walp, Vice Chairman, GCI, *USA*

Speakers and discussants will address the need for change in non-governmental and inter-governmental non-profit telecommunication organizations to meet the rapid changes in the telecommunication industry. Issues of membership, finances, use of technology in member services, and relevance to business will be discussed. Special attention will be given to the need to address deep-rooted, long-term global problems prior to their emergence as major crises.

M.2.1.1
New Bottles for New Wine: Non-Profit Organizations Meet Challenges of a Changing Telecommunication World
Richard J. Barber, Adjunct Fellow, East-West Center, *USA*

This paper examines the changing roles of non-profit organizations active in the international or regional telecommunication/information technology arena. Beginning with a synopsis of the current telecommunication landscape, the establishment of new organizations and the changes made in existing groups to meet the altered requirements of the industry will be discussed. The changing requirements for information technology in meeting member or client needs will be noted. Likewise, attention will be given to the use of new telecommunication technology in the conduct of the affairs of the non-profit organization. Differing types of non-profit entities will be discussed, looking at the roles they play. The author concludes with speculation regarding the future of non-profit organizations.

M.2.1.2
Describing and Reducing Global Telecommunication Problems
Dan J. Wedemeyer, School of Communication, University of Hawaii, *USA*; Ryota Ono, Associate Professor, Department of Business Administration, Aichi University, *Japan*; Jenifer Winter, Ph.D. Candidate, Communication and Information Sciences, University of Hawaii, *USA*

This paper addresses the complexities of identifying, profiling and projecting slowly emerging, complex global telecommunication problems. We explore the needs for expanding timeframes, methodologies/methods, potential contributing theories, new institutions and participation in the process. Examples are provided which set out existing and growing problems as well as potential, yet to be profiled, world telecommunication problems.

M.2.1.3
Needs for and Benefits of a Private Telecommunication Operating Foundation
George J. Lissandrello, Information Products International, *USA* and Zoilo Jesus M. Dela Cruz III, President & CEO, Infoserve, Inc., *Philippines*

It is understood by those involved in applications and services dependent on telecommunication, and those that provide telecommunication products/systems/services, that there is a need for the early identification of the problems being created by this ever-expanding telecommunication-based world. Governments and regulators, the telecommunication industry and its customers need organizations that are impartial, objective and expert to identify such problems and reduce them to a manageable point. These are problems of telecommunications and those caused by telecommunications. A private operating foundation fulfills such a need by addressing problems that range from the technical to those that are caused by telecommunications in the economic, social, cultural and political realms. By addressing and coming up with methods to reduce such problems, as well as implementing problem reduction projects, the proposed foundation will provide economic benefits in a multitude of ways to all those affected. The authors describe the justifications for such a

foundation, the problem-identification mechanisms and the ways in which a international foundation could address identified problems.

Session Discussant: L. S. Harms, Professor Emeritus, Department of Communication, University of Hawaii, *USA*

M.2.2
The End of the Line
Chair: Please Refer to Planet PTC for Updates

M.2.2.1
Pervasive Computing–Connecting the World
Thomas C. Agoston, Asia Pacific Service Delivery Manager, IBM Global Services, *USA*

Many of us have heard about Internet-connected vending machines and refrigerators, but how can we reach the promise of "Pervasive Computing" -- a billion people interacting with a million institutions on-line via a zillion intelligent, interconnected devices? This paper examines the market environments, emerging technologies and some specific scenarios for networked applications enabled by Pervasive Computing, the environment created when computing power and network connectivity are embedded in virtually every device humans use.

The author discusses the market environment, technologies and how these developments affect more and more of the world's population as we move towards an increasingly networked world. He examines these issues and developments to date, with a particular focus on services geared to the Asia-Pacific markets, a discussion comparing social and cultural factors affecting technology adoption in two major markets (Japan and the United States), and an overview of a pioneering "Pervasive" service in Japan.

M.2.2.2
Please Refer to Planet PTC for Updates

M.2.2.3
The Potential of WAP for the Delivery of Health Online in Australia
Robyn A. Lindley, Vodafone Australia; Lois Burgess, Lecturer & PhD Candidate and Joan Cooper, Professor, School of IT and Computer Science, University of Wollongong, *Australia*

The rapid development and commercialization of WAP (Wireless Application Protocol) communication systems provides unlimited possibilities for online health services, particularly in regional and remote areas in countries like Australia. The WAP protocols are based on Internet standards such as hypertext transfer protocol (HTTP) but have been optimized for the unique constraints of the wireless environment. WAP documents are written in wireless markup language (WML), similar to hypertext markup language (HTML), and derived from extensible markup language (XML). A main advantage of WAP is the ability for the user to move locations and for the information to be obtained and or/sent without needing to be in a fixed location. The objective is to embrace WAP in an effort to enhance the possibilities for the general practitioner (GP) to improve the responsiveness and level of services available to rural patients.

The first objective of this paper is to consider the open architectural requirements for Web enabled distributed networks required by the Australian healthcare system in order to participate in the new WAP environment. A proposed joint research and development project involving two universities and a number of healthcare providers, and designed to establish Australia's first test-bed for WAP mobile telematics services in Australia will be described. The authors also report briefly on the possibilities, the barriers and the benefits of WAP for GPs in their uptake of new mobile telematics applications.

M.2.3
Explore Opportunities in China Telecom/Data Market
Chair: Tao Yun, Managing Director, Q-east, *People's Republic of China*

M.2.3.1
Towards 3G Mobile Communication in China
Qilang Zhu, Professor, Beijing University of Posts & Telecommunications (BUPT) and Deputy General Director, BUPT Telecom R&D Center, *People's Republic of China*

For evolution to the 3G system based on the GSM network, the strategy by operators should aim to eliminate the high investment required to set up a new core network. The author describes three proposed steps to achieve this objective and he also suggests that operators who will introduce the 3G mobile system in China should be concerned with the following:

- Standardization and harmonization
  - Support ITU to finalize IMT-2000 standards.
  - Initiate and become actively involved in HOG.
  - Promote the harmonization of IMT-2000 CDMA DS/MC and IMT-2000 CDMA TDD service.
- Service
  - Develop new service and applications, beginning with the 2G network, to activate the market and to lay a solid foundation for 3G broadband, multimedia and high-speed data services.
- Operation
  - Introduce 3G system trials in time and prepare for commercial use.
  - Conduct a planning study of the required radio network as early as possible.
  - Conduct a study on new requirements to make the network system suitable for the introduction of 3G services and systems.
- Resources and service license
  - Predict the 3G market needs and research spectrum demand.
  - Apply in time to the government of China for licensing 3G operation.

M.2.3.2
Please Refer to Planet PTC for Updates
Qiang Cheng, Vice President, Corporate and Business Development, Capital Networks, *People's Republic of China*

Summary Unavailable

M.2.3.3
Current Status and Development of Satellite Communication in China
Guxing Huang, CEO and Qilin Xie, VP, Guangdong South SatelliteTelecommunication Service Co., *People's Rep of China*

The authors summarize the current status of the private satellite communication network owned by telecommunic companies. They then address the difficulties of satellite communication development in China, including market segmentation and the high cost of satellite communications. They also make a comparison of satellite communica and fiber cable in China. Next, they present development opportunities in satellite communications in China, such the advantages of satellite communications for Internet Protocol (IP) and Digital Video Broadcasting (DVB). They observe that the Internet also provides new opportunities in satellite communications, as does mobile satellite communications. They conclude with a description of cooperation and development with the SST project which includes:

- Satellite IPLC cooperation
- Content exchange
- CHINANET/INTERNET access
- International long-distance education cooperation and
- Cooperation for mobile satellite communications in the Asia-Pacific area.

M.2.3.4
Challenges from Competitive Telecom Companies in China
Jay Hu, Vice President, Strategic Advisory Services, Xin De Telecom International Venture Co. Ltd., People's Republic of China

Summary Unavailable

M.2.4
New Satellite Initiatives II
Chair: Timothy Logue, Space and Telecom Policy Analyst, Coudert Brothers, *USA*

M.2.4.1
Satellites: The "Extra-Terrestrial" Advantage
Keng-Jin Lian, Senior Engineer, Hughes Network Systems, *USA*

The demand of new applications often drives advancements in hardware capabilities. The same is true for network solutions, where customers are demanding improved access to information for competitive advantage, increased productivity and decreased costs. Many of today's emerging applications, from live video to Web page delivery, represent heavy outbound bandwidth requirements and relatively light, if any, inbound requirements.

The author discusses market trends, Internet performance issues and a new Internet Infrastructure Service. He explains several unique advantages of satellites, particularly in delivering streaming media, which he sees as a major Internet application in the future, and one in which satellites have the advantage in terms of pervasive coverage and broadcast delivery cost.

M.2.4.2
Wide-area Technologies and Services in the Trans-Pacific High Data Rate (HDR) Satellite Communications Experiments
Eddie Hsu and Chaw Hung, Jet Propulsion Laboratory, California Institute of Technology, *USA*; Patrick Shopbell, Gretchen Walker and Dennis Wellwitz, California Institute of Technology and University of Maryland, *USA*; Gilbert Clark and Makoto Yoshiwaka, Mt. Wilson Institute and Institute of Space and Astronautical Science, *Japan*; Richard Desjardins, National Aeronautics & Space Administration, NASA Research & Education Network, *USA*; Naoto Kadowaki, Naoko Yoshimura and Takashi Takahashi, Communications Research Laboratory, Ministry of Posts and Telecommunications, *Japan*; Pat Gary, National Aeronautics & Space Administration, Goddard Space Flight Center, *USA*; Mike Gill and Haruyuki Tatsumi, National Library of Science and Sapporo Medical University, *Japan*

In 1993, a proposal at the Japan-U.S. Science, Technology, and Space Applications Program (JUSTSAP) workshop, organized by the State of Hawaii, lead to a subsequent series of satellite communication experiments and demonstrations, under the title *Trans-Pacific High Data Rate Satellite Communications Experiments*. These experiments and demonstrations were designed to help explore and develop satellite communication techniques, standards, and protocols in order to determine how best to incorporate satellite links with fiber optic cables to form high performance global telecommunication networks.

This paper describes the technologies and services used in the experiments and demonstrations using the trans-Pacific high data rate satellite communication infrastructure, and how the environment tasked protocol adaptability, scalability, efficiency, interoperability, and robustness. In subsequent work, the use of IPv6 differentiated services, reliable multicast, high-definition multi-party conferencing and data sharing, and increasing types of distributed application services over a combination of broadband satellite links and terrestrial dense-mode wavelength division multiplexing connections will be examined.

M.2.4.3
Satellite Internet: Technical Advancement and Business Scope
Shuichi Yoshino, Sub Manager and Yoshitsugu Yasui, Senior Manager, Media Technology Factory, NTT Communications Corporation, *Japan*

The rapid technical development and popularity of cellular telephones and the Internet are changing the shape of telecommunications. Internet content is becoming larger and more complex, especially because of demand for real-time streaming audio and video. The cellular telephone is turning into a personal data assistant (PDA). Transmission performance parameters such as throughput and instantaneous response will be crucial even though a high-speed network will be available. Although optical fibers are deployed for major links, the end-to-end performance evaluation has to include customer devices and their access links. Therefore, efficient transmission techniques to maximize network resources are required. For this purpose, queuing, caching, load balancing and multicasting techniques are being developed to control traffic and alleviate congestion.

On the other hand, the direct broadcast satellite (DBS) market is expanding very rapidly thanks to its ubiquitous and broadband transmission capabilities. Also, satellites are favored for certain Internet applications because of instantaneous network deployment capability, broadcast ability and broad bandwidth to the customer. Satellites can become an efficient delivery medium within the framework of the convergence of the Internet and DBS. In this paper, a multicast satellite Internet system is described that can maximize the advantages of a satellite delivery system. The technical features and actual commercial application of the system are explained.

M.2.4.4
Waveform Advances for Satellite Data Communications
John M. Puetz, President, MasterWorks Communications and Mark Dankberg, Chairman, President & CEO, ViaSat Inc., *USA*

Broadband data and Internet transmissions are the fastest growing applications for satellite communications. The sheer volumes of data and the high speeds involved are increasing the motivation to get the highest data throughput possible from existing satellite transponders. The good news is that modern advanced satellite ground system technology can make significant improvements over the prior state of the art. But, as usual, there's not a single, broad brush, solution. Different technical solutions provide the best results depending on the purpose and configuration of the satellite link. This paper considers advances in satellite modem signaling (such as 8-PSK), error correction coding (such as turbo codes), and interference cancellation techniques (Paired Carrier Multiple Access – PCMA) to show how they compare in increasing data transmission speeds and benefiting service economics.

M.2.5
Regulatory Reform Processes
Chair: Yoshiko Kurisaki, Policy Analyst, SITA EQUANT, *France*

M.2.5.1
3G Licensing in Korea: Auction *vs.* Comparative Selection
Whajoon Cho, Director and Yongkyu Lee, Researcher, Korea Telecom, *Republic of Korea*

For innovative 3G services, various methods of licensing have been actively discussed in Korea. Among the principal methods proposed, various parties prefer comparative selection to frequency auction. Many worry about the "winner's curse": low or no motivation for R&D. In addition to the difficulty involved in value assessment, the authors analyze differences in financial ability and technology advancement. If the licenses are issued by frequency auction, only conglomerates and/or international enterprises that could raise huge funds could be candidates. Operators that cannot raise such huge amounts of money would be excluded regardless of expertise and/or advanced technology. Conglomerates with widely diversified lines of business can pursue profits as a group by submitting a high auction bid for licenses. For example, even if sales of 3G services would not generate enough revenue to cover costs, sales of equipment and advertising could do well

enough to cover the losses. In other words, cross subsidy among companies in a group could take place. Some in Korea are even afraid of the influx of foreign capital, since it could be a threat to domestic vendors. Active mergers and acquisitions are expected because the financial burden for the auction may be too big for a single company to bear. Too much spending on an auction does not leave enough room for sufficient investment in infrastructure.

Other reasons put forth against an auction include the public nature of the radio frequency spectrum and the lack of time for designing the auction. In an Internet survey done by the National Assembly, 70% of 3,067 participants were against the auction.

A quantitative analysis of the business cases results in similar conclusions. The auction puts a great burden on operators and likely increases prices for new services. Rather than introducing a frequency auction, the authors propose to find complementary measures to cure the problems identified in comparative selection. Conditional licenses for a limited time period and/or a reasonable level of R&D contribution are possibilities. Conditions could be different case by case, but the logic underlying the licensing mechanism is common to other countries.

M.2.5.2
Telecommunications and Information Policies and a New Regulatory Regime in India
A. Sujatha, Secretary, Center for Telecom Management & Studies and T.H. Chowdary, Information Technology Advisor, Government of Andhra Pradesh and Director, Center for Telecommunications Management and Studies & Chairman, Telecom Users Group of India & Chairman, Pragna Bharati & Fellow, Satyam Computer Services & Tata Consultancy Services, *India*

This paper traces very critically the liberalization of and competition in the telecommunications manufacturing and services sector in India since the late 1980s. The authors discuss the impact of the National Telecom Policy set forth in 1994, its revision and supersession by another New Telecom Policy in 1999. They also describe the historic Internet Service Policy of 1998, which is the most liberal and fully competition-promoting policy amongst all the policies of the Government of India; the liberalization and demonopolization of television and radio broadcasting and, finally, the evolving Regulatory Regime in Telecommunications. The regulator, first placed in position in 1997 after all licenses were issued, was superseded by another regulatory body in 2000. The reasons are presented for the rapid succession of regulators and for a new regulatory body that is about to be constituted to deal with the convergence of computers, communications, and broadcasting. The paper also discusses the effect on the consumer of all these changes.

M.2.5.3
Best of Both Worlds: A Comparative Analysis of the Universal Service Challenge in the US and Australia from a Wireless Perspective
Charles D. Cosson; Senior Counsel, Public Policy, Vodafone Group Plc., Americas Asia Region, *USA* and Chris Dalton, General Manager, Government Affairs, Vodafone Australia, *Australia*

This paper analyzes, in a comparative way, how the United States and Australia - two large democratic and industrial countries on opposite sides of the Pacific - are coming to terms with similar issues regarding competition in local telephony and the role of universal service programs. Universal service programs are taxation schemes that, through varying degrees of regulation, assign costs to, or assess fees on, certain services in order to subsidize more affordable rates for other services. As a general matter, it is not the practice of making basic service affordable that is controversial but, rather, the "elsewhere" from where the carriers' costs are recovered.

Universal service issues that now require attention have less to do with promoting a role for mobile carriers as wireline competitors than they do with addressing two basic problems: 1) how to preserve and encourage competition by keeping the level of subsidy flows from competing carriers to incumbents low; 2) how to nevertheless expand the effectiveness of universal service programs to ensure that urban/rural or wealthy/poor disparities are not exacerbated in the race to the digital Internet age. This article describes, in turn, how Australia and the United States are coming to grips with these two important issues.

M.2.5.4
Calibrated Regulation: Putting to Rest the New Zealand Experiment
Grant Forsyth, Manager, Industry & Regulatory Affairs, CLEAR Communications Ltd., *New Zealand*

New Zealand was one of the first countries to liberalize its telecommunication market. At the time there were few tested models to follow and New Zealand's Experiment was considered bold. But after ten years of regulatory wilderness, living an experiment that all others rejected, the result is a regime mired by protracted legal disputes that delivered a mediocre score card and stagnant growth. New Zealand had the opportunity this year to learn from the extensive experience of the rest of the world and to implement reforms that would catapult it into the burgeoning, bandwidth hungry, knowledge economy.

With the exception of not recommending unbundling of the incumbent's local loop, the Ministerial Inquiry into telecommunications largely fulfilled that opportunity. Its light approach of calibrated regulation, keen eye to the future information society needs, as well as recognition of the enduring power of the local loop, provided for a comprehensive, complimentary set of reforms. It is now up to the Government to put New Zealand up with the leading telecommunication markets of the world.

By January 2001 when this paper is presented at PTC 2001, the question of whether New Zealand's Experiment has been put to rest will be known.

M.2.6
IP/Next Generation Networks
Chair: Aileen Pisciotta, Kelley Drye & Warren LLP, *USA*

M.2.6.1
Enabling Consumers - Impact on the Future Interconnection of Networks
Bernadette Jew, Partner; Angus Henderson, Partner; and Rob Nicholls, Partner, Gilbert & Tobin, *Australia*

The convergence of telecommunications and computing technologies is creating the potential for an entirely new range of services for consumers. With the emergence of intelligent network functions and user interfaces, it is possible to provide customers with access to network databases - resulting in greater control and flexibility for the customer, with minimal administration on the part of the operator. In effect, the 'intelligence' is moving 'out to the edges' of the various networks and into the hands of consumers. The authors present a comprehensive and enticing description of the future interconnected consumer and the devices that will interact both with the consumer and the intelligent network.

M.2.6.2
Next Generation Networks and Services
Peter Falshaw, Director of Consultancy-Asia Pacific, Ovum Pty Ltd, *Australia*

All telecommunication carriers are now planning and implementing next-generation (Nextgen) Internet Protocol (IP) networks. This will have a revolutionary impact on the functionality of services offered and the structure of the telecommunication industry. Carriers are implementing Nextgen networks for a range of reasons, including the integration of all of their network platforms for greater operational efficiency, reduction in costs, and increasing their ability to generate new services that will reinforce their individual competitive advantages. No carrier can ignore the challenge – although the authors discuss various approaches that are being adopted in the Asia Pacific. They explore the various forms that the opportunities and challenges take, and the special circumstances that incumbents need to address in moving from existing legacy networks and customer markets to a new broadband service environment, including pricing and service migration issues.

M.2.6.3
Localizing the Global Internet: Improving Cost of Access and Quality of Service for Asia
Randy Zadra, President & Chief Operating Officer, Orblynx, *USA*

Summary Unavailable

T.1.1
Education and Use of New Technology
Chair: Christina Higa, Associate Director, PEACESAT, *USA*

T.1.1.1
Quality in Online Education: Results from a Revolution
John Witherspoon, Senior Advisor, Western Cooperative for Educational Telecommunications (WCET) and Professor Emeritus, School of Communication, San Diego University and Sally M. Johnstone, Founding Director - WCET, Western Interstate Commission for Higher Education, *USA*

The global information economy and its marketplace are moving educators to reshape higher education around the world. Universities and businesses alike are re-examining their relationships and their futures. As they implement updated strategies they are redefining venue and pedagogy, which means they must also redefine measures of quality. The result is turning out to be both positive and important – for their institutions, for their students, and for the societies they serve. This paper summarizes current developments in on-line higher education – both the problems that arise and the considerable benefits that may accrue to students and educational institutions alike.

T.1.1.2
Wireless Multimedia Education for All
Arlene Krebs, President, Orbit Communications and author of "The Distance Learning Funding Sourcebook", Lev Gonick, Chief Technology Officer, Cal State University Monterey Bay and Scott Zimmer, President, Educating Everyone, *USA*

This paper analyzes the increasing use of satellite and wireless technologies to provide broadband multimedia educational content accessible to end users via the Internet and television. The authors discuss how technology infrastructure, educational content, strategic alliances with hardware and software vendors and enterprise funding opportunities can help communities "stop gap" the Digital Divide.

From direct broadcast satellite systems to one pound laptop computers with wireless connectivity to the Internet, to the use of I-drives for information storage to audio conferencing via cell phones, the concept of knowledge management and access to knowledge is shifting dramatically. New hardware, coupled with high-speed wireless connectivity, offers a cost-effective, timely solution for those citizens who previously had minimal access to information and communications.

T.1.1.3
Facing the Challenges – Getting the Right Way with Distance Learning
Marina, Network and Service Engineer-Distance Learning Project Department Manager, PT TELKOM, *Indonesia*

Distance Learning has been employed as an alternative to traditional, campus-based, classroom instruction for over a century. A flood of new communication devices and services are coming our way while we are still trying to accept the older technologies and applications. The author summarizes these technologies, describes how they are being used and gives a history of distance learning in Indonesia. The major telecommunication provider in Indonesia, TELKOM, has been serving the needs for telecommunications in all areas, including education. As part of TELKOM, RisTI initiated a project in early 1998 on distance learning called TeleEducation with a main objective to promote distance learning, make it happen and further to make it an effective and common way of conducting training and education in Indonesia. The author describes current RisTI activities and concludes that TELKOM has to work together with the business sector and educational

institutions. Through strategic and mutual partnerships, TELKOM can bridge the gap between educational institutions and industry by working with corporate training programs, which, at the same time, integrates the educational sector into the program and gets them closer to the technology-based solutions.

T.1.2 Infrastructure

Chair: Reva Leung Say, Executive Director, NGN Business Development, Telcordia Technologies, *USA*

T.1.2.1
Industrial Convergence: Energy, Telecommunications and the Internet
Peter D. Ruby, Lawyer, Goodmans LLP, *Canada*

In the telecommunications world when people mention convergence they often mean convergence between telecommunications and broadcasting. In the energy industry, convergence often means convergence between electricity utilities and natural gas businesses. In the rapidly evolving Internet industry, key players use the term convergence to describe the blending of bricks and mortar businesses with new technologies to create e-business ventures. A great deal of attention has been devoted in the media and academic circles to convergence within each of these industries. However, convergence between these three industries ("cross-industry convergence") has not been examined in depth to date. The telecommunications, energy and Internet sectors are all network based, *i.e.* their value increases as more people are added to the network.

With the introduction of competition into the electricity industry in countries such as Canada, the United States, the United Kingdom and Australia, cross-industry convergence is accelerating. This complex form of convergence can be described as having two major facets and this paper describes each of these two aspects of cross-industry convergence, drawing mainly from the American and Canadian experiences. In the United States, this convergence has manifested itself primarily in new business developments. In Canada, this form of convergence is most noticeable in the legal context. The authors examine two major types of cross-industry convergence. First, energy industry participants have entered the telecommunications market by providing both facilities and services. Second, the energy business has started to move itself into cyberspace, using telecommunications and Internet technologies.

T.1.2.2
Internet Data Centers
Stephen W. Coughlan, Marketing Director, Telecom Solutions, Compaq Telecommunications, *USA*

Internet Data Centers (IDCs) are the most recent advance in converging the services of the Internet, information technology, and telecommunications. A successful IDC must build on the strengths of each discipline by implementing the capabilities and advantages of each. Correctly implemented, an IDC will combine the best features of each service to offer effective, efficient, reliable, and comprehensive services to the market. IDCs are popping up all over the Pacific, raising many questions. What are the features of a marketable IDC? Why build one? If you build it right, will customers come?

T.1.2.3
At the Network Edge: Carrier-Neutral Collocation for Next Generation Internet Services
Jim Smith, Chief Technology Officer and James Strachan, Vice President, Strategic Planning & Development, COLO.COM, *USA*

Over the past 12 to 18 months, collocation has become one of the fastest growing segments of the Internet hosting marketplace. Various estimates predict that collocation will grow from as little as US$710 million in 2000 to as much as US$4.4 billion in 2003. Collocation provides cost savings compared to having to build, equip and operate private mission critical facilities. Collocation provides peace of mind by giving the customer access to state-of-the-art systems for fully redundant power, climate control, fire suppression, security, on-site monitoring, and the qualified technicians to oversee these facilities. And collocation places the customer closer to businesses and consumers who are end users - to provide optimum performance and quality of service.

The collocation industry is set to play an exciting and crucial role in helping network service providers deploy next generation services rich in content and interactivity - from Voice Over Internet Protocol and streaming media and broadcasting to caching and bandwidth trading. Best-in-class collocation facilities are facilitating the deployment of broadband content and applications through end-to-end optical networking. Some collocation providers are taking broadband deployment a step further by building multiple locations within certain heavy-traffic metropolitan markets.

The authors conclude that perhaps one of the most important long-term benefits of carrier-neutral collocation is the high-tech marketplace they can create for customers in these truly exciting times for the telecommunication and Internet industries.

T.1.2.4
Smart Networking Techniques in Implementing Broadband Hybrid Wide Area Networks
John Puetz, President, MasterWorks Communications, *USA* and David Blanks, Chief Technology Officer, Avalon Inc., *Australia*

Hybrid networks, comprising satellite, fiber-cable and wireless-local-loop technologies, are becoming more commonplace as service providers and enterprise IT managers seek out the best-fit network implementation for Internet access, wide area networking and virtual private networks. Economics and performance factors demand that hybrid systems be investigated and seriously evaluated. This paper presents two case studies of hybrid networks that have been implemented in the past year. For each case an overview of the technology trade-offs is presented, along with the network details and underlying technology advances that made the network implementation possible. In addition, the economics of the implementation are provided.

T.1.3
Satellite Systems
Chair: Roger Naff, Vice President, Boeing Satellite Systems, *USA*

T.1.3.1
The Vast New Potential for Satellite Communications in 2001
Osvaldo Bergstein, Senior Vice President & General Manager, China, Gilat Satellite Networks, *People's Republic of China*

Summary Unavailable

T.1.3.2
First Pan-Asia Broadband Multimedia Satellite for B2B and B2C Services
Eui K. Koh, Vice President for Asia Pacific, New Skies Satellites N.V., *Singapore*

Summary Unavailable

T.1.3.3
Please Refer to Planet PTC for Updates
Larry Valenciano, Group Director Asia & Pacific, INTELSAT, *USA*

Summary Unavailable

T.1.4
Wireless Communications
Chair: Pertti Johansson, Senior Vice President, Leader of Global Account Management, Telecom Carrier Solutions Group, Motorola, *USA*

With 3G wireless networks near implementation and voice, data, and video convergence, new networks will be required to deliver higher speed data and multimedia services. The next generation network will be capable of

delivering many new services with improved consumer experience. Use of unlicensed spectrum will also be part of the explosive growth of this next generation. Along with converged networks, there will be improved and multifunctional consumer devices that will enable new applications and open new market segments for personal area networks with some of these operating in unlicensed spectrum

T.1.4.1
3G - Next Generation Networks Applications and End-user Devices
Lawrence Henderson, Vice President & Director, Solutions Engineering, Telecom Carrier Solutions Group, Motorola, *USA*

T.1.4.2
Devices, Personal Networks, and Applications: Home RF, Home Gateway, and Next Generation Devices
Amer Husaini, Director, Product Development (Terminals) and Strategy, AT&T Wireless, *USA*

T.1.4.3
DoCoMo's I-mode Toward Mobile Mulitmedia in 3G
Kazuhiro Takagi, Director, Gateway Business Department, NTT DoCoMo, *Japan*

T.1.5
Digital TV Regulation
Chair: Ryota Ono, Associate Professor, Aichi University, *Japan*

T.1.5.1
Analog Switch-Off: Spectrum Auctions in the Digital Age
Andreas Grünwald, Research Fellow, Institute for Information, Telecommunications and Media Law, University of Münster, *Germany*

The advent of digital technologies will significantly change television as we know it today and will provide new interactive services that integrate features from both the broadcasting and the Internet world. Viewers will not only receive live and on-demand television programming, they will also be able to access their e-mail accounts, Web-based e-commerce sites and new e-government services via their television sets. Although its introduction will not be without a cost to programmers, broadcasters and consumers, digital television clearly is the medium of the future. Subsequently, it will replace analog broadcasting.

With broadcasting, an analog switch-off will happen, fundamentally changing the television landscape not only for the consumer, but also for regulators. This paper examines the relevant regulatory challenges by looking at the Australian and New Zealand experiences. Both countries can serve as role models not only for the Pacific region, but in a global context: While Australia presented a precise timeline for the conversion from analog to digital television, New Zealand became the first country in the world to use auctions to assign broadcasting frequencies. Before turning to these regulatory approaches, however, a brief technological overview of digital television is given in order to highlight its advantages and potential compared to an analog broadcasting system.

T.1.5.2
"Sorting Out the Bits" Digital Television and Datacasting in Australia–A Study in Policy and Regulatory Development
Jane Forster, Partner, and Caroline Lovell, Senior Associate, Communications Legal Practice Group, Clayton Utz Lawyers, *Australia*

Over the last two years Australia has engaged in an extraordinarily complex process to develop arrangements for conversion from analog to digital television. The process has involved almost a complete revision of what broadcasting means in Australia and has resulted in regulatory arrangements and concepts unique to

Australia. It remains to be seen whether the arrangements will be successful or unworkable because they are too complex.

The authors predict that the arrangements will prove to be unworkable. They contend that the arrangements do not deal with the various new concepts or elements in a consistent manner. For example, distinctions between broadcasting and datacasting are based on content or genre. The same basis is used to distinguish between enhanced services and multi-channelling (together with considerations of timing and location). On the other hand, Webcasting has been distinguished from broadcasting by reference to its means of delivery. They present a thorough analysis with copious references to support their conclusions.

T.1.6
Wireless Development
Chair: Frank Robert, Associated Vice President, ATK/CSI, *USA*

T.1.6.1
The Death of Holes: Why Fixed Wireless Access Will Succeed in South Korea
Allen H. Kupetz, Director, Asia Pacific, Triton Network Systems, Inc., *USA*

South Korea remains a desirable marketplace for high-tech foreign companies to do business. It finished in the top 30 overall in the 2000 edition of the *World Competitiveness Yearbook*, ahead of Italy, Brazil, and Mexico, among others. According to the Korea Society, "South Korea has experienced the fastest and most enthusiastic explosion in Internet growth. Although they earn less than half of Japan's per capita income, Koreans spend more than their richer neighbor shopping online. Cyber-trading accounts for half of the trades on Korea's stock market. (*Editor's Note:* See the 1Q2001 edition of the *PTR*® for additional information.)

The author presents a comprehensive and comparative description of fixed wireless access (FWA) and makes a thorough analysis of the Korean situation to support his conclusions. He contends that, when deregulation allows true competitive local exchange carriers (CLECs) in the South Korean market, these new companies will be able to deploy FWA faster than incumbent fiber-based operators, reach buildings where fiber is not cost justified, and provide lower cost service to current fiber users.

T.1.6.2
Venture Development for Broadband Satellite Networks
Peter Stenzel, Director, Business Development, James Myers, Peter Varend, Eric Wiswell and Joseph Freitag, TRW Space & Electronics Group, *USA*

TRW has significant expertise in satellite system venture planning gained through its involvement with numerous commercial, satellite-based telecommunication ventures. This expertise includes evaluation of GEO, MEO, LEO and hybrid satellite-based network architectures for both narrowband and broadband applications.

The author describes a venture development process that involves three stages: developing a Business and Venture Plan, garnering Strategic and Financial Investor commitment, and proceeding to Implementation and Service Provision. The Business and Venture Plan process itself has three phases that deal with the market planning, program planning, and venture and business planning aspects of the venture. These phased activities identify and quantify risk and structure the business venture with the appropriate partners.

T.1.6.3
Telecommunications Network Architecture Integrating New Emerging Technologies into the Network Architectures
R.W. Schultheis, Managing Director, Mission Group LLC, *USA*

Telecommunications today promises to be the great leveler of economic opportunity on a global basis in this new century. The new Internet Protocol (IP) based networks provide the means for timely links of all economies, large and small, in both highly developed and developing nations. A connection to the World Wide

Web provides instant access to any location with the ability to access information without restriction. The new telecommunications networks will offer ubiquitous broadband access digital connectivity to support a wide range of new seamless multimedia applications featuring bandwidth on demand tuned to the unique attributes of the end user device, economics and user priorities on a session by session basis. With the immediacy of IP-enabled access to the world's economic data and resources, users may transport large files of data and work interactively on a global scale without significant barriers regardless of geographic location.

The author discusses the critical importance of advanced telecommunication capabilities in developing nations and presents several myths of telecommunication network development. He describes and compares the technology families that are competing in network architectures and gives several examples of lessons learned in customizing advanced network architectures to specific market conditions. He concludes that the multi-mode network architectures will use a combination of fiber, narrowband and broadband wireless, HFC, satellite and legacy resources to create a market-specific multi-mode network solution and presents several critical "success factors" in future telecommunications.

T.2.1
Going Digital in Developing Countries
Chair: Please Refer to Planet PTC for Updates

Panelists:

Please Refer to Planet PTC for Updates
MANUEL RAMIREZ, Director, Special Events, Televisa, *Mexico*

Summary Unavailable

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NESTOR CRISCIO, Chairman, Technical Committee, International Association of Broadcasting, *Uruguay*

Summary Unavailable

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ELIAS RODRIGUEZ, Director, Technical Operations, Televisa, *Mexico*

Summary Unavailable

T.2.2
Communications In The Pacific Rim, Five Years Into The Future
Chair: Jim Heberle, VP, Sales & Marketing, Monterey Telecommunications Technology, Inc., *USA*

T.2.2.1
Roles of Mobile Service in Global Internet
Seon Jong Chung, President, ETRI, *Republic of Korea*

Combining wireline with wireless will provide the consumer with the ultimate global Internet service. The presentation includes estimates of global, Asia-Pacific and Korea mobile subscribers and sales for the next ten years. Descriptions are given of how 3G services will be introduced in Korea and the associated costs. The presentation looks ahead to move closer to terrestrial Internet compatibility through the evolution to 4G and 5G IMT systems that will provide personalized global services, location oriented services, universal information access, e-Commerce, public services, new international trade orders, and personalized Internet and telephone numbers. The presentation concludes with a description of the issues that the industry faces to move on to these advanced systems.

T.2.2.2
Please Refer to Planet PTC for Updates

T.2.2.3
Please Refer to Planet PTC for Updates
Mitesh Desai, Vice President, Marketing and Business Development, Compaq Telecom, USA

Summary Unavailable

T.2.3
South Pacific Islands
Please Refer to Planet PTC for Updates

T.2.4
New Developments in Submarine Cable Technology
Chair: Seiichi Tsugawa, Senior Deputy Director, International Strategy Dept., DDI Corporation, *Japan*

T.2.4.1
Large Capacity Submarine Cable System using DWDM Technology
Hitoshi Yamamoto, Senior Managing Director; Koji Goto, Director; E. Nazuka, Director; K. Asakawa; and Hidenori Taga, Deputy Director, KDD Submarine Cable Systems, Inc., *Japan*

10 Gbit/s based Dense Wavelength Division Multiplexing (DWDM) submarine cable systems are promising to meet the increasing traffic demand with short-term delivery including research and development time. We have successfully developed 10Gbit/s, 96 channel technology for both middle-haul and long-haul transmission. This paper describes key technologies for 10 Gbit/s based systems and shows the transmission test results.

T.2.4.2
Technology for Future Subsea Super-Highways
Tony Frisch, Director, Product Marketing, Alcatel Submarine Networks Division, *United Kingdom*

Driven by factors such as deregulation of telecommunications and the growth of the Internet (and the applications used on it) the demand for transmission capacity has increased in a dramatic fashion in recent years. Cables currently under construction will offer a few Tbit/s (1 Tbit/s = 1000 Gbit/s), but there is pressure for even more. At the same time there is more focus on economic aspects (overall cost per Gbit/s) and practical issues such as the size and consumption of equipment.

This paper examines some of the issues involved. The author considers economic and operational features as well as the obvious question of what are the limits to transmission capacity.

T.2.4.3
Latest Enabling Technologies for Terabit/s Optical Submarine Networks & Their Impacts on Performance & Cost
Katsutoshi Tamura, General Manager, Business Development, International Engineering, International Telecommunications Business Group; Tatsuo Matsumoto, Senior Director, Submarine Telecommunications Engineering Division; and Colin Anderson, Business Development Manager, Submarine Networks Sales & Marketing Department, International Telecommunications Business Group, Fujitsu Limited, *Japan*

The authors give an overview of the latest new enabling technologies and update the situation regarding extensions of existing enabling technologies, for high-capacity long-haul international submarine cable networks. They make some estimates of when the new technologies are likely to become commercially available based upon today's knowledge, and they estimate the impact that these enabling technologies will have on system cost, both overall cost and cost per bit when equipped at various capacities.

T.2.4.4
Traffic, Services and Technology Drive New Approaches to Global Undersea Networks
Howard D. Kidorf, Director, Services Engineering Division; William C. Marra, Senior Managing Director, Global Network Planning & Design; Frank Kerfoot; and Neal S. Bergano, Managing Director, System Research & Selected Development, TyCom, *USA*

Demonstrations of ever increasing transmission capacity on a single fiber have become the engine behind the continued increase in trans-oceanic system capacity and the attendant decline in data transport cost. Techniques to increase the channel count in dense wavelength division multiplexed (DWDM) systems continue to evolve. Large capacity undersea links create the opportunity for creative network designs. Over the last 5 years, undersea networks have migrated from basic point-to-point connections to ring networks that have been fueled by enhancements in SDH and SONET technologies. Network solutions need to include equipment platforms that add value to end-customers, are scalable and are not cost burdened by the inefficient use of restoration capacity nor aggregation or circuit grooming equipment except where needed.

The authors examine all facets of undersea networks. First, the benefits and challenges of next generation undersea network terminal and wet plant designs, which are being considered for increasing capacity. Second, the need to provide transparent transmission for traditional services and packet services which support new protection mechanisms that allow end-customers to decide how to best balance their capacity and restoration needs. Next, equipment platforms that support these needs and provide scalable solutions. Finally, the Operations and Support Systems (OSS) that are needed to facilitate these complex networks.

T.2.5
Internet and IT Convergence
Chair: Hansuk Kim, Vice President, Management Research Lab, Korea Telecom, *Republic of Korea*

T.2.5.1
ICANN: Shifting the Fulcrum of Regulatory Power
Liz Williams, Doctoral Scholar, Faculty of Information Technology, Queensland University of Technology, *Australia*

This paper is part of doctoral research into the development of global regulatory frameworks in electronic commerce. It focuses on the tensions between governments, regulators and the private sector as the globalization of business transactions increases in volume and value, particularly in the domain names and numbers industry. The work examines in detail the development of the Internet Corporation for Assigned Names and Numbers (ICANN). It provides some insights into approaches to regulatory convergence and the transfer of regulatory functions into the private sector.

The changing roles of governments and corporations are important to understand as power shifts between the two. In addition, consumers of domain name services and the technical implications of, for example, the management of DNS also need to be taken into account.

T.2.5.2
Balancing Lawful Access and Privacy Concerns
John Olurotimi Ayoade, Doctorate Student and Toshio Kosuge, Professor, Graduate School of Information Systems, University of Electro-Communications, *Japan*

Internet makes communications easy, fast, convenient and comfortable among people either far or near, in developed or in developing countries and in the entire World as a whole. However, many people online are concerned about the protection of their privacy/confidentiality in all ramifications, especially in areas such as business, research, governmental administration, welfare, medical care, finance, e-commerce and personal communications in all walks of life. This shows that high priorities must be given to the issues of privacy/security of information and communications on the Internet, if we really want complete development in e-commerce.

This research work addresses the issue at stake in communication security and the users' right to their privacy, taking into account legal and social ramifications. It evaluates the threat caused by intrusion/violations of privacy rights in times of sabotage/crime and how balance could be realized between individual privacy and public safety in communications by proposing SPLC- Solution to Privacy and Lawful access Conflict. SPLC is an organization that will register any group or individual that wants to send and receive secret information. This group or individual will use techniques suitable for the protection of such information without handing over the secret key to the SPLC. Perhaps, if messages sent were detected to be illegal, the legal authority could trace the sender/receiver through SPLC. In a nutshell, the total privacy of individuals will be realized by using this idea without compromising public safety.

T.2.5.3
GRECOS™ - Global Responsibility, Encrypted Coordinate, Operating System
George Richard Baier, M.S. Telecommunications Program (matriculating), State University of New York, Institute of Technology and Senior Account Executive, PaeTec Communications, Inc., *USA*

The Internet as we know it today has evolved over the last decade into an extremely powerful societal tool that helps the world to communicate. It is now commonplace for people to go onto the Net and purchase books, fine tune their stock portfolios, schedule their airline flights, and even replenish their stock of contact lens. In the years ahead the Internet will continue its inexorable journey deeper into our day to day lives. The activities that are supported by the Internet will invariably stratify into many levels of importance and utility as usage increases. As the dependence on the Web for information and execution of work become more critical, there will be less tolerance for hackers and the accompanying viruses that have recently shaken the confidence of the computing world.

- What can be done to secure the Internet from these attacks?
- Can we protect the Internet from cowardly and potentially evil attacks?

This paper concentrates on the practices and methods that can be applied using existing technology to retool the Internet, making it more secure, reliable, and better utilized than it can claim to be today. This paper has been chosen as the means to introduce a new development in the way we look at Internetworking. We shall call it GRECOS™.

T.2.6
The Digital Divide: How Can Developing Nations Jointly Pursue Telecommunications and Internet Development
Chair: Robert Frieden, Professor of Telecommunications, Pennsylvania State University, *USA*

This session will consider whether nations can accrue both telecommunications and Internet development objectives, or whether the two goals cannot always occur jointly. Many nations in the region only recently have achieved double-digit telephone line penetration per one hundred inhabitants. Can these nations use improved telephone line density to establish an improved telecommunications/information-processing infrastructure? The session will address this question from both technological and business perspectives.

Subjects and Panelists:

Towards Digital Dividends in the Developing World: Lessons in Telecommunications Policy and Practice
Heather Hudson, Professor and Director, Telecom Management & Policy Program, University of San Francisco, *USA*

The author's analysis assumes a broadening of information infrastructure issues to include rural as well as urban access, a range of levels and targets for services, and pricing to ensure affordability of access to a range of telecommunication services, including access to the Internet. It involves the potential benefits of access to education and social services, the impact of geographical as well as income-related disparities, and the potential benefits of affordable access to information for social and economic development. The author

concludes that changing the policy environment to create incentives to serve previously ignored populations may significantly increase access among these groups.

The Digital Divide and the Distribution of Wealth: Guidelines for Formulating Reasonable Public Policies
Milton Mueller, Associate Professor, Syracuse University, School of Information Studies, *USA*

The author starts with the simple point that disparities in access to telecom and information technologies - the so-called digital divide - are really disparities in wealth. Public policies designed to remedy the so-called digital divide usually propose various forms of wealth redistribution. Understanding that digital divide policies are forms of wealth redistribution gives one a more realistic view of the proper scope and limits of the policies. Such policies, at best, can play a supplementary role. Economic reforms that encourage investment, growth, and robust competition are more fundamental to the development of a healthy Internet economy than government subsidies. The redistribution of wealth via telecommunications and information can ameliorate inequalities, but it cannot eliminate their causes, and advocates should stop pretending that it can. Furthermore, advocates of policies to "bridge" the digital divide must become more aware of the political and economic risks inherent in the process of wealth redistribution.

The Digital Divide Beyond the Globalization Hype: Confronting the Challenges and Exploiting the Opportunities for African SMMEs in the Information Economy
Derrick Cogburn, Assistant Professor, School of Information, University of Michigan, *USA*

The author presents an analysis of Globalization, the Information Economy and the emergence of a "digital divide" in access to information infrastructure, human capacity development and global policy formulation. He seeks to contribute to an African-driven agenda to confront these challenges and maximize the opportunities. He argues that Globalization is neither inherently negative, nor inherently positive, but that we must go beyond the "hype" of globalization to develop strategic approaches to maximize the opportunities and meet the challenges its presents. Further, the author argues that appropriate strategies include three key areas that he categorizes and explains. Data for the paper are drawn from published reports, participant-observer and observer analysis, and structured interviews.

Among key findings of the study are:
- Numerous initiatives are underway that will contribute to the more rapid development of information and communication infrastructure in the Africa region;
- Several creative uses of information and communication technologies have contributed to potentially revolutionary advances in tertiary education; and
- Through policy initiatives and entrepreneurial thrust, several SMMEs have been able to take advantages of opportunities presented by Globalization and the Information economy and establish thriving businesses, thus contributing to employment creation and socio-economic development.

T.3.1
Cultural Use of Online Technology
Chair: Please Refer to Planet PTC for Updates

T.3.1.1
Distance Learning for Chinese as a Foreign Language between China and Japan - A Case Study
Qiu Zhipu, Department of Chinese Language & Literature and Namba Miyuki, International Scholars & Students Department, Nanjing University, *People's Republic of China*

This paper reviews distance learning for Chinese as a foreign or a second language at Nanjing University. Distance learning is becoming increasingly popular as an alternative method of instruction. Chinese language study is also becoming increasingly important as international relations and world trade continues to grow at a rapid pace. Distance Learning for Chinese Language at Nanjing University responds to the need for culturally based instruction using the Internet and multimedia. Creative course work was developed using new

approaches to behavioral and cognitive learning theory. In addition, this study describes instructional experiments between Japan and China for language learning through the Internet.

T.3.1.2
Invasion or Giving Up of Internet Privacy? - A Personal Divide Emerges
Jisuk Woo, Assistant Professor, Department of Communication, Seoul Women's University, *Republic of Korea*

Computer and telecommunication technologies have generated great concerns regarding the protection of privacy on global networks. Many scholars, policy-makers, and netizens have discussed appropriate methods to protect privacy in e-transactions and to ensure protection of personal information on the networks. International organizations such as OECD have also been active in providing relevant principles. Recent development in Internet privacy is to suggest various government policies and industry codes of conduct, and respective responsibilities among governments, businesses, users, and international organizations have been a focus of the recent debates.

The networks as a new communication environment may change the concept of privacy, regarding what values people find necessary to ensure their dignity and autonomy as human beings. In a 1996 survey, 90% of the respondents answered that they are very or somewhat concerned about privacy concerns on the Internet. But it reality, it was found that they were willing to sacrifice privacy on the networks if they get some monetary rewards such as sample products or discount coupons by revealing their personal information. Still, concerns about privacy and security are ranked as one of the most serious factors that deter people from participating in electronic commerce. So what is really happening in people's minds regarding privacy on the networks?

This paper explores how the development of information technology, especially interactive, networked computers, changes the privacy environment as experienced by individuals on the network. And it attempts to re-conceptualize the privacy issue when people tend to willingly give up their privacy for consumer convenience and other monetary benefits. The previous privacy concept that focused on the "invasion" of privacy will not work in this scenario. What is at work is not any longer any external entities such as governments and commercial industries that "invade" the people's rights to be alone, but rather voluntary giving up of privacy and willing participation in the provision of personal information. This paper discusses how a new privacy concept could capture this new phenomenon and its cultural implication for people's autonomy and dignity on the Internet.

T.3.1.3
Please Refer to Planet PTC for Updates

T.3.2
Application Implications
Chair: Please Refer to Planet PTC for Updates

T.3.2.1
An Experiment of Cultural Heritage Presentation System
Nobuyoshi Terashima, Dean, Graduate School of Global Information and Telecommunications Studies, Waseda University, *Japan*; Lalita Rajasingham and John Tiffin, Victoria University of Wellington, *New Zealand*; Anne Gooley, Queensland Open Learning Network, *Australia*

In accordance with the advancement of information technology, tele-education and on-line collaborations have emerged. However in these activities, a number of problems have arisen, such as time difference, language barriers and differences of cultural backgrounds. Time difference will be avoided by using avatars or computer agents. Language barriers will be overcome by adopting translation technology. The most important issue is how to have mutual understanding across different cultural backgrounds. To achieve this, Waseda University of Japan, Victoria University of Wellington of New Zealand, Global Virtual University of New Zealand and Queensland Open Learning Network of Australia are now conducting joint research and an experiment on how to develop a platform on which cultural exchange can be carried out. They call the platform *the cultural*

heritage presentation system. In this paper, the system concept, the technologies that have been developed and used and the experimental results are described.

T.3.2.2
Prospective Situations (Innovative Ways) to Fully Utilize the Limited Multimedia (Internet) Access for Distance Learning/Open University in Indonesian Education
Naswil Idris, Chairman of Educational Laboratory, The Indonesian Open Learning University, *Indonesia*

Many serious and critical viewers of Indonesian national development believe that one of the most serious problems facing the country in the new millennium is the development and acceptance of national identity by all Indonesians from diverse ethnic, cultural and religious backgrounds. With almost 400 ethnic groups and languages and more than 17,000 islands there are numerous factors or reasons for disunity and division in Indonesia. The process of nation building in Indonesia is very difficult and cannot be achieved in a very short period of time.

The author present statistics on the availability of telecommunications and Internet access to ordinary citizens in Indonesia. Because of the vast distances between the many islands, a very large number of different cultural and ethnic groups, the low teledensity in the country and the low *per capita* income, distance learning is facing a daunting challenge in the country. Yet, the Internet may offer real hope to improve many of the problems that exist. In spite of Indonesia being the fourth largest user of satellite communications in the world, most classrooms do not have access to even basic telecommunication services. The author hopes to identify potential solutions to improve distance education and Open University activities in Indonesia during PTC2001, since improved communications may contribute significantly to the nation-building process.

T.3.3
Southeast Asia
Chair: Please Refer to Planet PTC for Updates

T.3.3.1
Please Refer to Planet PTC for Updates

T.3.3.2
The Dynamics of Government Regulations and E-Commerce Development: A Comparison of Malaysia and Singapore
Nir B. Kshetri, Assistant Professor, Marketing, Kathmandu University, *Nepal* and Doctoral Student, College of Business Administration, University of Rhode Island, *USA*

The development of electronic commerce depends upon two interdependent factors: the rate of diffusion of the Internet and investment in Internet related businesses and infrastructures. The regulatory framework strongly influences both of these factors. Governments in many of the Asian nations have identified information technology (IT) as a priority sector. They are welcoming electronic commerce by encouraging investment in Internet related businesses and enacting new laws. However some of the authoritarian regimes in this region see the Internet, "the greatest democratizer the world has ever seen" as a serious threat to their ruling institutions. While an appropriate regulatory framework facilitates electronic commerce, over-regulation, as found in these authoritarian regimes, is slowing down diffusion of the Internet.

Among the Asian countries, the governments of both Malaysia and Singapore have visions to develop their countries as premier technological centers. However, they also see the Internet as a potential threat to their right to rule, and have therefore adopted several means to control the free flow of information on the Internet. Both governments are classified as soft-authoritarian regimes and both have invested heavily in the development of infrastructures for electronic commerce. However, these two are not the only countries in Asia with an IT development plan. India, Korea, Taiwan, Thailand and Hong Kong are also promoting high-tech districts. Thus, these two countries have to compete with each other as well as with other countries in the region in attracting investment in Internet related businesses. Since all of the competing countries have competitive advantages in different areas, regulatory factors play a deciding role in the decisions of investors.

The primary objective of this paper is to provide an insight into the interaction of authoritarian political structure and the development of electronic commerce with a comparison of Malaysia and Singapore.

T.3.3.3
The Internet, Global Production Networks and Knowledge Diffusion: Challenges and Opportunities for Developing Asia
Dieter Ernst, Senior Fellow and Theme Leader, Economics Studies, East-West Center, *USA*

By transmitting information in digital format instantly, and at much lower cost than earlier technology generations, the Internet reduces the friction of time and space for economic transactions. This has accelerated the spread of global production networks that provide international corporations with quick access to lower-cost capabilities overseas that are complementary to their own core competencies. The key is the open-ended structure of the Internet, which allows extra networks to be added at any point, creating almost unlimited opportunities for outsourcing and the diffusion of knowledge. But the Internet has also brought an emerging global divide between those who have and those who do not have access to information and knowledge that are necessary to reap the benefits of network participation. Only 6% of the world's population is online; even in industrialized countries, the figure is only 35%. Developing Asia, with more than half of the world's population, accounts for a meager 7% share of the total Internet population, which is projected to increase to no more than 9% in 2003.

These trends have major - but as yet uncertain - implications for developing countries and their development strategies. Multilateral development agencies (*e.g.*, World Bank, UNDP, UNCTAD, UNIDO) and regional development banks have established ambitious programs for bridging the global digital divide. However, these programs all suffer from a limited perception of the nature of the challenge. They focus too narrowly on technology, and neglect the much broader issue of knowledge creation; they focus on business-to-consumer dotcoms, while neglecting the fundamental transformation in global production and innovation systems; and they lack empirical research that establishes how corporate strategies and policies are shaping the divide. This paper tries to fill these gaps, and explores how placing global production networks on the Web affects knowledge diffusion to Developing Asia. Part 1 describes the challenge. Part 2 introduces a stylized model of global production networks as carriers of knowledge diffusion. The author assesses conflicting claims on how the region will be affected by an increased use of the Internet to manage global production networks (part 3), and concludes with policy implications.

T.3.4
Global Internetworking
Chair: Gregg Daffner, Chief Strategic Officer, q-east broadband, *USA*

T.3.4.1
Convergence Technology–A Users' Market
Anthony P. "Tony" Houston, Chief Technology Consultant, Mindlinx Technology Consultants, *USA*

This paper and presentation will focus on next generation service providers, the extensive planned service offerings and the required next steps in the evolution of convergence systems. The influence of the existing national infrastructure on planning those steps as well as the cultural and economic demand for these new services will be discussed.

T.3.4.2
Independent Partition Switching: Fast, Low Cost Access to National and International Networks
Melissa Craig, President, General Telecom, *USA*

Deregulation is opening Asia-Pacific markets to new competitive carriers and is spurring the investment of billions of dollars in broadband fiber optic and satellite transmission facilities inter-linking the region with itself and the rest of the world. These developments are encouraging the region's traditional and new network

operators to expand their services into lucrative markets abroad. At the same time, carriers in the Americas, Europe and elsewhere are looking to offer services into and throughout the Asia-Pacific.

While there is no doubt that competition is taking hold in the region, one issue that has not been widely addressed is interconnection. It has been proven in the U.S. and is being proven elsewhere that switching can be a major deterrent to new and existing carriers entering new markets. Reasons relate chiefly to costs and network management issues. Until recently, choices have been limited to investing in a switch (plus housing and staffing) or leasing unbundled services from facilities-based underlying carriers.

The author describes a new option called the Independent Gateway Service Provider by comparing and contrasting its independent partition switching and network management services to alternatives that include programmable switches. IGSPs can be viewed as Application Service Providers. They allow network operators entering new markets to function with the same independence as the world's largest tier-one facilities-based international carriers. But because IGSPs are not themselves carriers, they are not in competition with their customers.

T.3.4.3
Content Distribution–A Broadcast Internet Application
Mani Chawla, Vice President, Global Marketing, TCSI Corporation, *USA*

The last two years have seen the dramatic emergence of a new kind of industry in Internet space - the business of content distribution. Fueled primarily by the popularity of the Internet and the standardization of the world wide Web (WWW) as the common medium for audio, video and data communications, content distribution is all about bridging the gap between content publishers and content consumers.

This paper looks at the trends in content distribution and content consumption from a satellite broadcasting point of view. It discusses how the success of the Internet and the World-Wide Web has led to the ballooning of Web sites that need to be distributed in order to improve end-user experience. It also discusses the "edge" of the network where the next battle lines are being drawn, and finally it looks at emerging business models and industry trends in the business of content distribution.

T.3.4.4
Emerging Submarine Cable Systems and Networks to Benefit Telecom Users
Kazushige Mori, Engineering Manager, Submarine Systems Division, NEC Corporation, *Japan*

The explosion of Internet traffic has made the lifespan of existing submarine cable systems much shorter than originally anticipated due to their relatively small bandwidths. Competing cable systems are being deployed simultaneously in the same region, yet investors are confident that there will be sufficient traffic demand for each system. This rapid expansion by competing operators will most likely benefit the user. Such an environment will force telecom operators to minimize the bandwidth cost, while providing a variety of bandwidths and quality of service to choose from. The user no longer needs to stick to a sole operator or service, but has the option to subscribe to multiple competing operators and services in order to establish the most cost-effective and reliable circuits for critical services.

In this paper, the author first examines the growth of traffic demand expected in the Asia-Pacific region. Then he reviews the recent submarine cable systems in the region, including those under construction and those in planning. He also discusses the latest developments in submarine cable technologies that eventually will define the bandwidths available in the foreseeable future. Lastly he presents a new trend of network architecture that takes advantage of the availability of multiple cable operators. Such an approach includes subscription to 10Gb/s wavelengths with network protection and bandwidth self-management by the user.

T.3.5
What Are the Risks and Rewards of B2B e-Commerce?

Chair: Meheroo Jussawalla, Senior Fellow/Emerita, East-West Center, *USA*

An explosion of B2B Commerce on the Internet promises perfect competition and friction free commerce for various types of industries, particularly for the electronics sector. It promises to usher in efficiency gains for both buyers and sellers. However, regulators and some of the participants in this form of exchange are beginning to have their doubts. The question is whether such commerce really frees up competition or does it create monopolies or even oligopolies? In June 2000, the Federal Trade Commission is scheduled to hold hearings on the anti-trust implications of B2B Commerce. There are three exchanges that are to be scrutinized, namely airlines, automobiles and aerospace companies.

In economic theory, open, transparent online markets make monopolistic behavior much harder than normally assumed. Yet the economics of the Internet works differently. It can create powerful online marketplaces overnight, which are causing concern. Can such marketplaces rig prices for consumers? It is also possible for consumers to defy such marketplaces and form Oligopsony from the buyer's side. There is no law against buyers asking suppliers to fulfill their orders by just using the fax instead of going online. The buyers can see the prices which the suppliers paid for their own parts or components and use that information to beat down the prices. Such issues of risks and rewards in B2B Commerce will be presented and discussed in this

Presenters:

E-Commerce: A Southeast Asia Perspective
Mark Hukill, Associate Professor, School of Travel Industry Management, University of Hawaii, *USA*

The presenter states that the answer to the question on whether e-commerce is a serious idea may be surprising to some because it cannot be other than an emphatic "yes". He explains why he believes this to be true, in general, and then discusses the development of e-commerce in Asia, especially in Southeast Asia. He concludes that e-commerce in this region will come to fore, especially in greater government services availability, enhanced efficiencies in government linked businesses and B2B activities of multi-national organizations. Private enterprise e-commerce will also grow, but not at the exponential rates seen elsewhere, *e.g.*, in the western world.

Please Refer to Planet PTC for Updates
David Lassner, Director of Information Technology, University of Hawaii, *USA*

Summary Unavailable

Please Refer to Planet PTC for Updates
Gordon Bruce, Director, Administration and Information Services, Estate of James Campbell, *USA*

Summary Unavailable

T.3.6
Fiber Optic Cable Development
Chair: Yale Braunstein, Director, Kalba International, Inc., *USA*

T.3.6.1
Bandwidth, Fiber or Systems - The New Economics of Acquiring Bandwidth
Andy Kowalik, Director, Strategic Information, TyCom, *USA*

The demand for bandwidth capacity is a global phenomenon that has had considerable impact on all areas of the industry, especially the economics of how carriers acquire the requisite bandwidth at the wholesale level to satisfy their end-user retail demand. In today's market, carriers are faced with many options related to the purchase of capacity including capacity purchases and leases, dedicated fiber pairs, and complete system purchase. These options, when coupled with varied predictions for capacity prices, the desire to establish a

global footprint and the need to develop long term planning of capital expenditures, have created new economic models for the purchase of bandwidth capacity. While this study focuses primarily on trends, activities and examples within the wholesale portion of the undersea market, the principals are evident in the retail segment and terrestrial market as well.

The new paradigm for acquiring bandwidth is dependent upon several key elements of the market: Price of bandwidth, demand for bandwidth (including forecasting), supply of bandwidth (including various bandwidth products) and wholesale purchasing behavior. These elements are very inter-related and constitute the crux of what is commonly referred to today as the Virtuous Circle of Bandwidth. This paper expands on each of these elements.

T.3.6.2
The Virtuous Cycle of Undersea Systems Economics–From Consortia to Privately Owned & Operated to Strategic Partnering
Lisa Dadouris, Vice President, Business Development, Global Crossing Development Co., *USA*

The author presents the progression of trans-oceanic cable installation from the original consortia model, to sole private ownership, to the present strategic partnering and, possibly, back to sole private ownership. She concludes that there is an ever-increasing demand for bandwidth that will fuel future system installations, whatever the model of ownership.

T.3.6.3
Evolution of the Asia Pacific Submarine Cable Market
Pierre Tremblay, Area Manager, Alcatel Submarine Networks (Asia Pacific Region), *Singapore*

2000 has the hallmark of a bumper year for submarine cable investments in the Asia Pacific region. Approximately 4 billion dollars worth of contract or binding Letters of Intent are expected to be signed in 2000 alone. This compares to a world market worth 8 billion dollars according to the latest forecast. When comparing investment in the Asia Pacific region to the rest of the world, it transpires that the share of investment in Asia Pacific stands at about 52 % in 2000. This level of investment, above the historical average of 45 %, can be attributed to a number of factors, namely:

- Internet boom and technological breakthroughs.
- Deregulation in the telecommunications industry and the arrival of the new entrants.
- The premise that Telcos can not afford to run out of capacity.
- Recovery effect.

The author discusses each of these factors. He then reviews the major contracts or Letters of Intent signed in 2000 and examines the future trends and benefits to the Asia-Pacific region. He goes on to note that the role of suppliers of undersea cables has changed dramatically. He concludes that the Asia Pacific submarine cable market is evolving at a staggering pace and overall the short-term outlook for submarine cable investments in the region is positive. This climate is expected to be sustained through technological innovation, increased competition, the Internet, and the Asia Pacific economies in general. Slower take up rate of broadband technologies, higher interest rates, reduction in the availability of capital, and sluggish economic growth could, if they happen, have a dampening effect on the current pace of investments in submarine systems.

T.3.6.4
Submarine Solutions – Global Submarine Networks Evolution
Sylvie Gonzalez, Director, Strategic Marketing, Nortel Networks Optical Internet, *Canada*

Submarine networks have evolved from the consortium model and have begun to take advantage of network efficiencies available in terrestrial network deployments. As the available network elements evolve to include higher capacity bandwidth management and sophisticated service management capabilities such as Automatically Switched Optical Network (ASON), the global mesh will become the dominant network architecture. Mesh based NPEs will provide the core for these global mesh applications and will interwork with existing integrated ring-based systems as well as new deployments of photonic cross-connects.

W.1.1

Ethical, Legal and Other Socio-Cultural Issues Surrounding New Technology Emergence in the Pacific
Chair: Thomas W. Cooper, Publisher, MEDIA ETHICS magazine and Professor, Emerson College, *USA*

The emergence of new technologies and related products in the Pacific raises ethical, legal, and other socio-cultural issues for provider and user alike. This session provides vision from national (Fiji, U.S., UK, Singapore, Chile) and socio-cultural–ethical, social, journalistic, legal–perspectives alike. To provide these several perspectives which constitute the areas within "socio-cultural" awareness– a lawyer, ethicist, journalist, technology expert/businessman, Foundation Vice President, consultant, professor, and Chamber of Commerce President have all prepared to cooperate so as to provide multi-disciplinary and multi-national insights.

Subject and Presenters:

Ethical Issues in Telecommunication in Fiji: From Monopoly to Competition
Taito Waradi, Manager, New Business and Marketing, Telecom Fiji Ltd and President, Suva Chamber of Commerce, *Fiji*

While there are significant benefits to be realized by deregulating telecommunications and introducing competition in telecommunications in Fiji, the process must be managed to provide a smooth transition from a monopolistic market structure to a competitive one. The process of opening the market to competition must ensure that the market structure will be sustainable in future. Hence there is a need to rebalance tariffs and to ensure that efficient interconnect prices are established.

Competition is expected to lead to benefits for the average consumer. However, since there is no such thing as an average consumer, competitive entry increases the risk of widening the gap between the haves and the have nots. In order to prevent/reduce this gap, some universal service obligations could be imposed on all carriers to ensure that some sections of the community are not left out of the information age.

B-to-C E-commerce; Is the Consumer Protected? An Overview of Legal Development in International E-Commerce
Tara Giunta, Partner, Telecommunication and IT Practice Group, Coudert Brothers, *USA*

From 1990 to early 2000, it is estimated that the number of Internet users worldwide increased from approximately one million to around 300 million. Researchers believe that the global Internet economy will be worth US $3.2 trillion in 2003. In the third quarter of 2000, business-to-consumer ("b-to-c") electronic-commerce ("e-commerce") retail sales in the United States reached US $6.373 billion. International b-to-c e-commerce retail sales also are expected to increase. In the Asia-Pacific region (excluding Japan), it is estimated that b-to-c e-commerce will reach US $50 billion by 2004. Not represented in any of these figures, however, is what percentage of the total is attributed to international b-to-c e-commerce transactions. B-to-c e-commerce sales have increased significantly in developed and developing countries. More than 100 businesses in 42 developing countries have collaborated to create the International Federation for Alternative Trade ("IFAT"). Using the Internet, IFAT members market goods worth US $200-400 million yearly from low income countries.

Regardless of who is providing the goods or services, retail e-commerce has altered b-to-c transactions. The growing popularity of e-commerce greatly increases the need for predictable, compatible national and international legal regimes that govern e-commerce transactions. Moreover, despite growing popularity, many Internet users (potential retail e-commerce consumers) are distrustful of conducting extensive business over the Internet. Anecdotal evidence suggests that, while a great number of Internet users research products of interest on-line, most still prefer to make in-store purchases. Therefore, Internet users, as well as current retail e-commerce consumers, must believe that adequate legal safeguards exist to protect their interests. This paper addresses the legal issues confronting b-to-c e-commerce. With the increase in international e-commerce, certain international organizations and some countries are addressing emerging legal and

consumer protection issues. For instance, international organizations such as the Organization for Economic Co-operation and Development ("OECD") and the Asia-Pacific Economic Cooperation ("APEC") have made o are considering recommendations to promote consumer protection in e-commerce transactions.

Emerging Ethical Issues in Telecommunication in Chile
Abraham Santibáñez, Professor and Professional Area Coordinator & Ethics Coordinator, Media Studies Center, Diego Portales University, *Chile*

Chile has one of the most stable economies in Latin America and is fertile ground for Internet development. After an early but slow start, Internet usage is growing rapidly with more than 1.2 million users in July of 2000. In spite of great interest in using the Internet for education and business, there are concerns about cultural anc language erosion and content-related issues such as pornography, plagiarism, copyright infringement and theft of credit card or identity information. The author presents a general view, with a positive approach, but also reflects the dangers - real or potential - of new technologies in a medium size society like the Chilean community.

Digital Technology and Journalism Ethics in the Pacific
John V. Pavlik, Visiting Professor, Nanyang Technological University, Singapore and Executive Director, The Center for New Media, Columbia University, *USA* and Adam Clayton Powell III, Vice President, Technology and Programs, The Freedom Forum, *USA*

Digital technologies present a variety of opportunities for journalists and news organizations in the Pacific. Among these is a greater potential public voice, via the Internet, to help balance the traditional flow of mediated information dominated by the West, especially the United States. But at the same time, digital technologies also raise serious ethical concerns for Pacific journalists and news organizations. These ethical issues can be grouped into four broad areas. First is how journalists do their work. Second is the content of the news. Third is the structure of the newsroom, as well as other organizational factors. Fourth has to do with the relationship between journalists and their publics, especially sources.

In this paper, ethics are defined as the moral compass that guides journalists in deciding what is right and wrong. Moreover, the authors do not examine the full range of ethical issues facing journalists in the Pacific, Since there are a number of good papers that already have been written on this subject, referenced by the authors. Instead, they focus on the particular ethical issues raised by digital technologies for journalists in the Pacific. Digital refers to those technologies that are computer-based, including the Internet, digital cameras, digital hand-held communications devices (such as pagers, digital cell phones, or Wireless Application Protocol, or WAP, phones) computers and computer software (including everything from word processing to non-linear video editing).

Respondent: Diana Sharpe, Senior Consultant to Omega Partners, UK and Chairman, INTUG

W.1.2
Distance Learning
Chair: Hae Okimoto, Manager, University of Hawaii, Distance Learning and Institute of Technology, *USA*

W.1.2.1
Distributive Learning Programs & Partnerships Helping to Close the "Digital Divide"
Reggie Smith III, EDS Lead/Certified Videoconferencing Engineer, Advanced Distributed Learning (ADL Co-Lab)/Network Shared Usage, Electronic Data Systems Corporation (EDS), *USA*

The author discusses how the United States National Guard is using distributive technology to enhance readiness with distributive standards and partnerships with the Advanced Distributed Learning (ADL) Initiative. The ADL Initiative will ensure that academic, business, and government users of learning software gain the best possible value from the materials they purchase by making learning software accessible, interoperable, durable, reusable, adaptable, affordable, anywhere, anytime for anyone while helping America to close the "Digital Divide."

W.1.2.2
From DL POTS to DL PANS: Leveraging Emerging Technologies to Create the Future Learning Environment
G.A. Redding, Adjunct Staff Member, Institute for Defense Analyses and Will S. Peratino, Director of Distance Learning, Defense Acquisition University, *USA*

In November 1997, the White House Office of Science and Technology Policy and the United States Department of Defense launched the Advanced Distributed Learning (ADL) Initiative. This effort sought to leverage emerging object-oriented databases and commercially available Internet technologies to better manage and deliver education and training products and services. With respect to management and delivery systems there have been wholesale infrastructure changes as organizations move from distance learning programs using "plain old telephone service" (POTS) to distributed learning environments using "powerful, advanced network solutions" (PANS). By better managing instructional content using standardized meta-data tagging procedures and expanding delivery options the ADL vision will ensure that learners will have "access to the highest quality education and training, tailored to needs, wherever and whenever it is required."

In deference to "distance learning" wherein the instructor and the learner are physically separated by distance - but electronically connected by the Plain Old Telephone System (POTS) technologies - "distributed learning" in an ADL context, encompasses educational and training activities orchestrated via emerging information technologies. The principle emphasis involves Internet protocols (TCP/IP) applied across classrooms, workplaces, homes, and community settings. The control of the educational process is fundamentally moved to the control of the learner who will be able to choose from a mixture of presentational and "constructivist" (guided inquiry, collaborative learning, mentoring) pedagogues to meet individual needs wherever and whenever needed.

W.1.2.3
Design and Implementation of a Next Generation Distance Education System
T. Craig Montgomerie, Professor, and Valerie Irvine, Ph.D. Student/Research Associate, University of Alberta; and Mike Davenport, Superintendent, Fort Vermilion School Division No. 52, *Canada*

For years, the design of distance education has been constrained by available bandwidth, which has limited the instructional techniques, course content, and the imagination of course designers. Millions of dollars have been spent designing distance education systems that would deliver quality distance education over low bandwidth networks. The landscape of communication technology is changing, however, and, spurred on by proposed provision of "high-speed broadband Internet services available to businesses and residents", greater consideration is now being given to high bandwidth applications.

Staff at the Fort Vermilion School Division, located in the remote, Northwest corner of Alberta, and researchers at the University of Alberta decided to change their approach. Rather than design a distance education system based upon bandwidth constraints, they decided to design a system that incorporates the best instructional models, desired features, and excellent course content. They are working towards the creation of "virtual presence learning environment" that provides remote students with an educational experience that is equivalent to, or better than, that provided to their peers in traditional, urban classrooms.

The authors provide background to the problem and state their philosophy of distance education. They then describe 1) the different models of instruction that they intend to deliver, 2) specifications for the capabilities of, and equipment required for synchronous and asynchronous delivery, and 3) the physical network that has been designed.

W.1.2.4
From Cambodia to Slovakia...A Telecommunications-Based Model for Global Awareness Education at the Secondary School Level
John H. Southworth, Director, Distance Education, Curriculum Research and Development Group/UH Laboratory School, University of Hawaii, *USA*

The University of Hawaii Laboratory School Computer/Technology class has made geographic distance irrelevant through telecommunication interaction that ranges from across campus to around the world. This paper will focus on the past three years of an elective class for students ranging grades 9 to 12. The course was managed by an Internet on-line resource called Nicenet Internet Classroom Assistant. Teachers with very limited prior knowledge or use of the Internet can easily set up a virtual classroom with this software. Options labeled Conferencing, Documents, Link Sharing, and features such as internal/external Nicenet messaging provide the class members a total asynchronous communications environment. Invited guest experts coordinate Conferencing topics. These may involve students within the class, staff members of the University of Hawaii, or persons from literally anywhere in the world.

Students gain appreciation for the diversity within their own classroom and generally find themselves surprised with how many international and cross-cultural experiences they have gained by the end of the school year and how much they have increased their personal communication and telecommunication skills.

W.1.3
East Asia
Chair: John Spence, John A. Spence & Associates, *Australia*

W.1.3.1
From Expectation to Emergence: Telemedicine in China
Liangyi Cui, Associate Professor, and Kaisu Zhuang, Student, Shanghai Jiaotong University, *People's Republic of China*

The 5-year history of telemedicine in China has produced some agreement on its significance and potentials. The following ideas are among this consensus:

- Telemedicine helps to accomplish the goal of "Medical Care for Everyone by the Year 2000" in China.
- The policy of "Constructing and Operating Hand in Hand" is adopted in telemedicine in China.
- Implications of telemedicine involve technological, medical, economical, psychological and cultural dimensions.

Next generation networks are seen to merge the best attributes of circuit and packet switched networks. These networks will deploy equipment and technology that is driving excellence and cost efficiency in today's intelligent data networks and the Internet. These networks consist of the best components and applications from intelligent networks and the Internet, as reflected in existing telecommunications and ISP infrastructures. The new landscape for these networks, based on standards-based architectures, will allow carriers and private users alike to reap the benefits of innovation and improvements, efficiency, and the new value-added features and services.

W.1.3.2
The Growing Demand for Flexible Outsourcing Solutions for the Emerging SME Market in Japan
Simon Krieger, Executive Vice President, Service Development, Vectant, Inc., *USA*

Summary Unavailable

W.1.3.3
Designing and Planning of National Optical Network in China
Raymond H.M. Leung, Senior Advisor; Q.L. Ding, Senior Engineer; and Vincent W. Hung, Engineer, One Trend Net Ltd, *Hong Kong, China*

In recent years, network applications have been evolving towards a more bandwidth-demanding fashion. Services like multimedia conferencing, video-on-demand (VOD) and Virtual Private Networks (VPN) are gradually gaining popularity. Facing these changes, network providers must not only guarantee that their optical transport networks can provide sufficient bandwidth for current demands but also ensure the bandwidth of their networks can be scaled up and meet the growing needs of the future. As the cost of laying new optical

fibers is expensive, optical transport networks are moving towards a crucial milestone in network evolution: a network which provides higher and scalable capacity with reduced cost for network implementation and upgrade. This trend is also affecting the network planning and implementation in China.

China is one of the biggest countries in the world having a total area of 9,670,000 m2. In recent years, the market share of data communication in the entire telecommunication sector in China has grown tremendously. For example, the number of Internet users in China in December 1999 was about 3.5 million; it will reach 40 million users by 2002. Various data services such as metropolis access networks; X.25; dedicated digital data lines; frame relay and ATM have also experienced tremendous growth in the range of 70~200% from 1998 to 1999 throughout the whole country because of the economic growth. Therefore, the biggest telecommunication market in the world cannot be missed.

For years, the telecommunications infrastructure in China has been monopolized by government-owned enterprises. In recent years, in the effort to gain WTO accession, China has undergone a series of reforms in telecommunication industry. The reform has resulted in opportunities for foreign telecom operators and network investors to invest in the telecom business in China.

W.1.3.4
Evaluating the Market for Internet, Access Services and E-Commerce in South Korea
Simon Bureau, Managing Director, Vectis International Inc., *Canada*

Fueled by the economic recovery, Korean Internet and e-Commerce companies have transformed the structure of the market, creating significant opportunities to profit in this increasingly competitive environment. Judging from some of the world's fastest rate at which Koreans have in the past adopted new technologies such as wireless telephony services, Internet and more recently broadband access, the development of e-Commerce should accelerate in the near future. In addition, having just recovered from the economic crisis and with a market at times inefficient, e-Commerce has enormous potential to change companies and the way they do business.

W.1.4
Enhancing Wireless
Chair: Ramin Khadem, Chief Financial Officer, Inmarsat Ventures Limited, United Kingdom

W.1.4.1
Please Refer to Planet PTC for Updates

W.1.4.2
Efficiency Improvement of Channel Element Utilization Through a New Radio Access Network (RAN) Architecture of IMT-2000 System
Chang-Yeun One, Researcher, and Hyung-Rock Park, Senior Manager, IMT-2000 Development Group, SK Telecom; and Whan-Woo Kim, Professor, Chung-Nam National University, *Republic of Korea*

Most mobile communication systems consist of three parts: Node-B (*i.e.*, the base transceiver system), the radio network controller (RNC), and the core network (CN). The RNC and CN systems are located at the same site and are operated and maintained by operators. On the other hand, the Node-B system is installed in the most optimum site as determined by cell coverage, distribution of call volumes and the quality of voice. Sometimes it is relocated or increased because of traffic volume. Also, it is operated without operators. When channel element resources can be flexibly allocated to a call requested by a subscriber regardless of Node-B, it is then possible to increase the efficiency of channel element utilization.

Based on the analysis of the current structures and functions of mobile communication system, this paper proposes a new mobile system architecture to give improved utilization efficiency of channel elements by allocating flexibly the resource pool named 'channel bank' independent on Node-Bs. The author focuses on the advantages and defects of the proposed structure and improving the method of utilization efficiency for the channel bank structure.

W.1.4.3
Bringing IP to Mobile: The Network Revolution of Internet and Wireless Convergence
Bo Hedfors, Executive Vice President, Motorola and President, Global Telecom Solutions Sector (GTSS), Inc *USA*

This paper describes the next wave of opportunity for the communications industry, the "Wireless Internet". This major inflection point will bring rapid development of mobile services leveraging the Internet, as the industry shifts from hierarchical, circuit-switched technology to wireless peer-to-peer networks based on packet routing and TCP/IP transport. It will enable worldwide operators to create common network backbones Imagine conducting banking transactions, answering e-mail, browsing the Web, and participating in videoconferencing all from the palm of your hand. When you integrate high-speed data transport, Internet access, and multimedia into one wireless, end-to-end solution - then add new technologies such as voice recognition and location technology - anything is possible.

Today's communication providers must be able to lead the way toward the wireless Internet and the personal networks of the future that will make these subscriber services possible. In essence, today's providers must be able to transform the nature of communications to deliver the future - faster.

W.1.5 The Global Regulation of Mobile Satellite Systems: The Users' Plight, The Need For Truly Open Access and The Lessons To Be Learned
Chair: William K. Coulter, Partner, Telecommunications & Technology, Coudert Brothers, *USA*

The Millennium Year 2000 brought not only the much-awaited introduction of Mobile Satellite Services (MSS) to many quarters of the Pacific, but also the just as prompt demise of several of the most promising mobile satellite systems. What now lies in store for these systems and services? What caused the convergence and emergence? Clearly, a number of lessons have been learned, or have they? This panel of satellite regulatory experts will examine the MSS regulatory landscape in the major markets and will attempt to draw some conclusions that will help users and new applicants to better understand the role that market access and regulatory barriers play in the offering of any new service. The lessons they uncover will have a startling impact on new entrants into almost every field of communication endeavor, particularly into the highly regulated, multi-country ones.

Much more has to be done to remove artificial barriers to entry for MSS systems. This includes addressing licensing barriers, authorization delays, spectrum shortages, and international access in virtually every country around the globe. The cost of ground equipment and service regulation also continues to be a primary concern for medium and d small users and suppliers that prevail in this industry. And there seems to be a consensus that, in order for the industry to flourish, one must recognize that regulatory parity among competitive services, not simply within the MSS but among all services as well, does not exist and is of paramount importance. This panel "will throw stones!"

Panelists:
F. Thomas Tuttle, Vice President & General Counsel, Iridium Satellite Corporation, *USA*

Patricia Mahoney, Vice President, Regulatory Policy, Final Analysis, *USA*

Donald C. Kennedy, Vice President, Regulatory Affairs, INMARSAT Ventures, *UK*

William Adler, Vice President, Global Regulation, GlobalStar, LLC, *USA*

W.1.6
Fear and Loathing in the Peering Process
Chair: David Allen, Co-Principal, World Collaboration for Communications Policy Research, *USA*

This session will examine the terms and conditions under which Internet Service Providers interconnect their networks. As the Internet matures into a commercial medium, its structure has become more hierarchical with the largest so-called Tier-1 ISPs able to charge smaller ISPs for network access and transit services. This system of payments contrasts with a previous "sender keeps all" arrangement as well as the traditional settlement arrangement among telecommunication correspondents. This new system imposes comparatively higher financial burdens on smaller ISPs, including the ones physically distant from desirable content hosted by North American Tier-1 ISPs.

The session will examine both the equity and business factors supporting and opposing the new payment system.

Presenters:

Refer to Planet PTC for Updates
Eric Lee, VP, Commercial Internet Exchange, *USA*

Summary Unavailable

Fear and Loathing in the Peering Process
Tim Denton, Principal, T.M. Denton Consultants, *Canada*

The Internet represents a fundamental reconstruction of communications technology: there are are no calls, no circuits, no minutes of use - only packets guided by routers. There is no guarantee of delivery - "best efforts" only. Failure of packets to arrive is the only feedback mechanism.

The global Internet is composed of about 70,000 smaller networks. Most are privately owned. There are no rules or laws defining how they are to be connected, except private contracts. About seven very large carriers dominate the Internet in the United States. Smaller carriers connect to them either at public exchanges or through private arrangements. These arrangements are kept secret.

The presenter defines peering and presents a list of the major peering carriers. He explains why peering is an effective and economical solution in North America, but presents difficulties when the number of packets being exchanged becomes unbalanced. In conclusion, he hypothesizes that demand and technology advances will ameliorate the present problems before international regulation steps in.

W.2.1
Overcoming Digital Divide
Chair: Please Refer to Planet PTC for Updates

W.2.1.1
Information Technology For Education, Governance and E-Commerce
T.H. Chowdary, Information Technology Advisor, Government of Andhra Pradesh and Director, Center for Telecommunications Management and Studies, & Chairman, Telecom Users Group of India & Chairman, Pragna Bharati & Fellow, Satyam Computer Services & Tata Consultancy Services, *India*

The Federal and State Governments in India are almost in a competitive spirit using Information Technology for good and effective governance and for promotion of education and for the production of a large pool of IT professionals for deployment within India and for the production and supply of IT and software services to the world markets. The Indian Government's policies are largely facilitative and co-optive of private sector company efforts.

The author describes the use of information and communication technologies for electronic governance, for extending literacy and improving the quality of education in India in general and in the State of Andhra Pradesh in particular. Some significant benefits to citizens due to electronic governance in the State of Andl Pradesh are presented. The emergence of a broadband information infrastructure and its use for various purposes like Internet service and e-commerce is described. The liberalized telecommunication and information policies that are facilitating the growth of IT and software services are also presented.

W.2.1.2
Sign Language Users and Visual Communications: The Deaf Australia Online Projects
Claudia Slegers, Associate Research Fellow, Center for International Research on Communication and Information Technologies, CIRCIT, RMIT and Janice Knuckey, Coordinator, Center for Excellence for Studer Who are Deaf and Hard of Hearing, Access Department, Preston Campus, Northern Metropolitan Institute of TAFE, *Australia*

Sign language, a visual-gestural language, is the primary means of communication for deaf communities across the world. Signing deaf people in many nations identify as a cultural and linguistic minority, not as a disability group. Qualitative research on the use of online services by deaf Australians has found a strong cultural preference for visual communication channels that support sign language, such as videoconferencing However most online services available to date are based on sound and/or text, and so cannot be used effectively by sign language users: text is often problematic because of highly variable literacy levels in written languages among this group. Follow-up research involves testing a PC-based multi-function unit, enabling communication via video, text and/or voice. The video feature, using ISDN transmission at 128 kbit/s, provide effective sign language communication, and is a huge improvement over text-based devices. This leading edge use of online visual communications provides a potential channel of development for more general services in Australia and the Asia-Pacific region, led by pursuing the technical and practical requirements of the deaf communities.

W.2.1.3
The Dilemma of Digital Delivery: Assuring Access to Digital Resources as Technologies Change
Carole Anne Alcock, Lecturer, School of IT & Computer Science, University of Wollongong, *Australia*

Effective access to digital resources is the challenge for the next decade. While emerging technologies promise greater access to information resources, digitally stored information becomes vulnerable in ways that may defy solution. Indeed, these resources are vulnerable to the very changes embodied in the new technologies. Efficient storage of digital resources is an urgent concern for both private and public sector organizations. However, focus on storage alone is not sufficient. It is essential that the issue of long-term access be addressed at the point of creation of the digital resource. This paper discusses problems arising from the move to digital access. In particular, it suggests that if new standards are not established for the storage and maintenance of resource collections, the advantages of electronic delivery will be lost. While the initial focus is on libraries and public record agencies, this problem is not unique to those sectors. It is one that must also be addressed by business and industry: that is, by public and private sectors alike.

W.2.1.4
Sustainability and Training in the Community Telecenter Movement
Royal D. Colle and Raul Roman, Cornell University, *USA*

The initiation, diffusion and adoption of the telecenter idea has been an enormously eclectic process, largely devoid of systematic research and planning. The approach has generally been one of pilot projects - trying out models to see what works to achieve a diversity of objectives. In some cases the approach has been simply entrepreneurial, with enterprising business people exploring new opportunities for profit making.

W.2.2
EDU-COMMERCE–Where Education meets Commerce
Chair: Sally M. Johnstone, Director, Western Cooperative for Educational Telecommunications, *USA*

The education landscape is being radically transformed not just by new technologies, but by dot.com approaches to doing business in what is emerging as a lively education marketplace. New companies strive to meet the universal need for lifelong learning in the information age, virtual universities in a range of configurations are succeeding and failing in Internet time, new startups are disintermediating student support services out from under traditional universities, and traditional universities are spinning off for-profit subsidiaries to capitalize on their names and intellectual resources. This panel will bring together experts in this changing marketplace to share their observations and speculations with attendees in a lively and interactive session.

Panelists:

Gordan Freedman, Executive Vice President, Prometheus.com, *USA*

Terry Hilsberg, Chief Executive Officer, NextEd Ltd, *Hong Kong SAR China*

Phillip Clark, General Manager, Strategy and Global Solutions, SCT, Inc., *USA*

W.2.3
South Asia
Chair: Please Refer to Planet PTC for Updates

W.2.3.1
Telecom Deregulation in India–Changes in Policies and the Fortunes of the Private Telephone Companies
E. Padma Reddy, Consultanton Technical Training Matters, Tata Teleservices Ltd. and T.H. Chowdary, Information Technology Advisor, Government of Andhra Pradesh and Director, Center for Telecommunications Management and Studies and Chairman, Telecom Users Group of India and Chairman, Pragna Bharati and Fellow, Satyam Computer Services and Tata Consultancy Services, *India*

The authors discuss how the well-meant liberalization and deregulation policies of the Government of India have been, in practice, distorted by the implementer, *viz.* Department of Telecommunications (DOT). DOT is the incumbent and besides being a service provider, it was also the licenser and the regulator until all the licenses were issued. The authors explore the reasons for the difficulties being faced by all of the licensed private telephone companies within two to three years of their launch. The Government's efforts to correct the distortions and the current state of the corrections is presented.

In August 2000, a new policy was enunciated that spells end to all the vestiges of monopoly and provides scope for full-scale and unlimited competition in every sector of telecommunications, as well as a new system for funding universal access. A bill in recognition of the convergence of computers, communications and broadcasting and providing for the creation of a new regulator to cover information, telecommunications and broadcasting is being prepared for presentation to the Parliament. The authors finally give an assessment of the fortunes of the companies as a result of the past distortions and the prospective free competition and explain the distinction between simple infrastructure providers and service providers.

W.2.3.2
Barriers and Opportunities to IT Leadership in South Asia–Sri Lanka, A Case Study
Santushi Kuruppu, Director, Tinggal Interactive (Pvt) Limited, *Sri Lanka* and Julie S.Y. Char, Knowledge Manager, The Weber Group, Inc., *USA*

The Internet and Web-based technologies are giving developing economies a new lease on life. South Asian countries, and more specifically India and Sri Lanka, are ready for this new challenge. However, political differences and economic variables may produce vastly different results. Given the highly skilled labor force, coupled with the highest literacy rate in the region, Sri Lanka had the potential to be the IT hub in South Asia. However, with a 17-year civil war intensifying in the north, the focus has shifted from concerted infrastructure growth and economic prosperity to military strategies, political diplomacy, and short-term economic prosperity

The lack of infrastructure coupled with the prohibitive cost of computers for the average household also limits the ability for the digitized environment to penetrate the household. Additionally, from a business perspective the cost of implementing e-commerce or supplementing the business with a Web-centric model far exceeds the benefits due to poor utilization of the Web from potential local customers. Currently 90 percent of local Web sites in Sri Lanka target an external, international audience.

By comparison, India is successfully attracting foreign investors; many are Indian expatriates in prominent positions in Silicon Valley companies returning to establish technology operations in their home country. With formal IT policies and favorable regulations in place, India is poised to take a leadership position in the region Despite its current situation, Sri Lanka has many opportunities to establish itself as an IT stronghold. It must overcome its current image as a country unable to resolve an ethnic issue and leverage its skilled workforce and lower production and development costs to attract foreign investment. Refocusing government attention on infrastructure and IT policy will also expand Sri Lanka's opportunities and bring it out of the shadows of its larger neighbors.

W.2.3.3
Emergency Telecommunications for Disaster Mitigation in Bangladesh
Fazlur Rahman, Chairman, and Rumana Tasnim Rahman, South Asia Multi Media, *Bangladesh*

This is the story of challenges being made by Bangladesh, one of the poorest and most disaster-prone countries in the world. Despite resource constraint Bangladesh has developed amazing disaster management competence to survive natural calamities and telecommunications plays a vital part of that capability.

W.2.3.4
Stimulating the Growth of Internet for Accelerating Development in South Asian Countries
N.K. Chhibber, Secretary-General, PTC India Foundation, *India*

About 1.4 billion people live in South Asian countries and two-third of these people live below the world average level of standard of living. Telephone penetration in these countries is one of the lowest in the world; and as access to Internet is mainly through telephone connection, less than one percent of the people have Internet access. Even in big cities and metros, where telephony services and Internet services are available, high costs of PCs and high Internet access/usage charges come in the way of growth. The new economy with its promised innovation and wealth is Internet based. Poor growth of the Internet in suburban and rural areas is likely to widen the gap of the digital divide, depriving access to the vast majority of population to a fascinating world of knowledge and opportunities for improving their economic conditions. Internet access through cable TV connections is yet to take off on a commercial scale, as cable TV connections are mostly uni-directional and have sub-standard hardware. With the increasing recognition of the importance of the Internet in accelerating development, a number of recent initiatives by the decision makers have improved the prospects for wider access to information and communication networks in these countries. The growth of the Internet and Internet related services in these countries can be further stimulated by jointly enforcing effective cyber laws, following international standards, allowing Internet telephony, designing the system for local languages and making rules and regulations to facilitate use of bandwidth.

W.2.4
Networking Technologies
Chair: Yasuhiko Kawasumi, General Manager, Japan Telecom Co., Ltd, *Japan*

W.2.4.1
Carriers Network Infrastructure in the New Millennium
Gihyouk Lee and Wonhee Sull, Information Technology Center, SK Telecom, *Republic of Korea*

In the new millennium, data traffic volume is expected to surpass that of voice traffic in the public network. To meet the needs of the rapidly growing Internet-based services, carriers need to ensure that their network infrastructures accommodate heavy volume of data traffic in the near future. At the same time, voice services today still account for more than 80% of the revenues of full service providers' revenue stream. Therefore, service providers are looking into various ways of enhancing their revenue stream by offering high profit-margin services. To meet the carrier's needs in building data service enabling networks while offering voice services with cost reduction in mind, the authors present different alternatives for existing and new carriers to build and/or evolve their network infrastructure.

W.2.4.2
Voice Quality in Next Generation Networks
Timothy Hult, Senior Product Manager, Echo Products, Ditech Communications Corporation, *USA*

Net Heads, Bell Heads, ATM, IP, WAP, VoP, xDSL, and Convergence; in the long debate over protocols, applications, standards and connection speeds, a basic necessity is often overlooked – voice quality. This paper examines the problems and solutions to voice quality issues in both established and emerging next generation networks, such as wireless, Voice over Packet (VoP), xDSL, and satellite. Voice quality conditions are defined and categorized, and a solution is presented. That solution is then applied to various next generation network topologies.

W.2.4.3
Advances in Optical Networking Technologies and Its Benefits to Service Providers and End Users
William R. Erickson, Senior Vice President Planning; Paul R. Morkel, Director Photonic Product Planning and Donald P. Frey, Strategic Planner, Optical Network Solutions, Fujitsu Network Communications, Inc., *USA*

The world of optical transmission is currently undergoing rapid change as a result of explosive growth in Internet and other data traffic. To meet the demand of the 21st Century network, new transmission and switching technologies are being planned and implemented at an unprecedented rate. With the widespread adoption of optical amplification and the advent of all optical switching, the era of the photonic network has arrived, providing transport and switching for voice and data traffic with bandwidth costs at a fraction of only a few years ago. The authors conclude that optical networking advances such as terabit transport, ultra-long-haul transmission and MPLS will provide unprecedented bandwidth in the transport network with substantial reductions in the unit bandwidth cost. NG DWDM, DOADM and OXC are all expected to be deployed in the near future. They anticipate that the price of a 10 Gb private line by the middle of the decade will be the same as that of an OC-3 today. Looking at a 10Gbit/s service between New York City and Washington D.C., they expect the price to reduce to the region of US$1000 per month compared with several hundred thousand US$ per month today.

W.2.4.4
Framework for End-to-End Quality of Service
Jingsha He, Member of Research Staff and Takafumi Chujo, Manager, Fujitsu Laboratories of America, Inc., *USA*

The authors propose a new framework for end-to-end quality of service for the Internet. The framework is based on policy-based networking (PBN) architecture with network measurement capabilities. The PBN architecture allows the specification of resource requirements by application and decision-making regarding the current available resources. The network measurement capability periodically updates the PBN about resource utilization and availability in the current network. Consequently, before an application is started, the

PBN can be consulted to find out if the required resources for the application are available. Even if resource reservation is required, the information on resource availability can help the application determine where the available resources are and, therefore, can lead to an intelligent and fast resource reservation process. This compares to the current approach where resource reservation needs to be invoked to try to find out if sufficie resources are available. The application has to wait for the reservation process to complete before it can realize that required resources are not available and alternatives must be taken. Since the reservation may take a long time to complete, the traditional approach could result in low efficiency in resource and applicatio management.

W.2.5
Commercial Launch Services Industry Panel
Moderator: Ed Ward, Vice President, International Launch Services (ILS), *USA*

PTC2001 will reach beyond earth bound telecommunications and extend itself into space with wide participation by the communications satellite industry and the commercial satellite launch services industry as well.

The Commercial Launch Services Panel for PTC 2001 will consist of executive level representatives of the largest commercial launch services providers in the world today and will be asked to address the issues faced by the satellite and launch industry for the coming year. The panel moderator will present the issues to each panel member and will direct questions from the PTC participants to the panel members.

The Commercial Launch Services Panel will represent Arianespace–Ariane (Europe), Boeing–Delta (USA), The China Great Wall Company–Long March (China), International Launch Services–Atlas and Proton (USA and Russia), Rocket Systems Company–The H-2A, (Japan) the Sea Launch Company-Sea Launch (USA and Ukraine).

Please Refer to Planet PTC for Updates

W.2.6
Data Networking
Chair: Jack Borsting, Executive Director, Center for Telecom Management and E. Morgan Stanley Professor of Business Administration, Marshall School of Business, University of Southern California, *USA*

W.2.6.1
Please Refer to Planet PTC for Updates

W.2.6.2
Access Network for Ubiquitous Broadband
Tomohiro Ishihara, Manager; Masato Okuda; and Jun Tanaka, Fujitsu Laboratories Ltd., *Japan*

Only a few years ago, the advent of the World Wide Web (WWW) triggered the explosion of Internet population and traffic. Before the explosion, the Internet was one of the research topics for academic experts. The WWW and the start of commercial Internet services have led to the growth of users among those who use the Internet for fun. Now, because it is a platform for network-based new businesses such as electronic commerce and Internet-based data centers, the Internet is increasing its importance as a key social infrastructure for the next decade. This rapid change is also forcing telecommunication systems, which have been built mainly for telephone services, to converge on IP (Internet Protocol)-based traffic and services. In this paper, the authors first describe the architecture of their proposed broadband access network. Secondly, they discuss subscriber line technologies followed by descriptions of an ATM ring and multiple QoS switching technologies. Finally, they conclude that their proposed access network architecture meets the demands for the next generation network infrastructure and would make "ubiquitous broadband" a reality.

附件四

韓國3G發照：
拍賣制 v. s. 審議制

3G Licensing in Korea: Auction vs. Comparative Selection

Whajoon Cho and Yongkyu Lee

Abstract

www.imt2000.co.kr

At the end of 19th century, Marconi invented wireless communication technology. It has been widely used for telecommunication and broadcasting for military purposes in the beginning. In most cases, therefore, request for using certain blocks of radio frequency was approved by the regulatory agency. The purpose was unique and frequency blocks were enough for demand.

For the last 10 years or so, mobile telephony has become quite popular and telecommunication service providers are suffering from lack of bandwidth. In order to avoid interruption, frequency for a certain block has to be exclusively allocated for a certain person at a certain time period. Growth of wireless telecommunications (mobile telephone and paging services) expands the demand for radio frequency, which leads to imbalance between demand and availability of radio frequency.

I. Allocation of Scarce Resources

There are three ways of resource allocation under information uncertainty; market mechanism, bargaining, and auction. Auction is defined as a mechanism that allocates goods, services, or special rights to the entity that value them properly. It is widely used in private sectors for assigning rights of mining or oil drill. Auction can be conducted in four different types; two open-bid types (English auction and Dutch auction) and two sealed-bid types (first-price auction and second-price auction).

English auction is most popular and proceeds as the participants raise their bidding amounts. When there is no higher bidding, then the previous bidder gets the assets at the price s/he bid. Dutch auction proceeds the opposite way. Auction starts with the initial price(possible maximum) and goes it down until the bidder shows up. Previous mentioned versions are conducted on an open place where all participants are gathered. Under two sealed-bid types, the participants write their bidding, sealed, and submit. After the round, the result is announced. The highest bidder gets the asset at the bidden price under first price auction, but at the second highest price at the second price auction.

Assuming bidders' risk-neutrality, probabilistic independence and information symmetry, expected returns are logically similar for the auctioneer. English auction and second-price auction are ended up with same results and the other two versions are supposed to show the same result [1].

Knowing that the major cost to the participants is that for information gathering, English auction is best. All participants are able to observe others' behavior. But it is vulnerable for collusion among participants. Several researchers analyzed characteristics of auction results. Logically risk-averse participants submit more aggressive bidding than risk-seeking or risk-neutral participants do in order to increase probability of success than others. Though it is evaluated as a transparent and efficient way of allocating limited resources, there is a logical flaw so-called Winner's Curse. Without systematic error, the average of all bids from each participant is likely to be the real value for the resource auctioned. However, the winner's bidding is the highest or next to the highest based on types of auction under operation. It means the winner's bid is naturally overestimation of real value. In other words, winner is end up in loss. This outcome denies generally accepted rationality of economic entity. In order to avoid such a situation, one has to make bid lower than his estimation.

II. Allocation of Radio Frequency by Auction

With the growth of mobile telephony, increased demand for radio frequency for commercial purposes overwhelmed the available frequency blocks. Regulatory agencies need to have criteria for selecting the entities out of all applications. Comparative hearing, lottery, and first-come-first-serve had been utilized until 1993.

Comparative hearing is criticized for taking too much time and effort. When the number of application is doubled, the time taken also has to be doubled. Since it is difficult to have clearly objective criteria for

evaluation, legal cost is considerably high in case of dispute. Lottery has been introduced in 1982. The number of application increased tremendously. First-come-first-serve was used for a long time but criticism against it has been active. Like lottery, winning depends on luck or speed in taking action. It is hard for selecting the efficient applicants by those methods.

For allocating radio frequency, technological perspective has been dominant. Economical approach has been introduced at the stage of carrier selection. Herzel (1951) suggested pricing mechanism. Coase (1959) insisted that there should be property right for radio frequency when government still had a power to decide who uses the specific band for what purposes.

Though New Zealand and Australia had experienced auction in early 1990s, a well-designed frequency auction was introduced first in the U.S. in 1994. Radio Act of 1927 set up Federal Radio Communication, which had reorganized as Federal Communications Commission (FCC) according to the Communications Act of 1934. Radio Act of 1927 allows the right to allocate radio frequency used by the federal government to the President, the right for the other frequencies to the FCC. In 1993, Congress allows FCC to use auction for allocating radio frequency. Frequencies for PCS and Interactive Video Data Services were determined to be auctioned. First auction was held in July 1994. The highest bidder obtained the right.

Transaction cost can be minimized. It can be done in a shortest time period, and minimize rent seeking behavior. If any rent still exists, the government could absorb it.

In the U.S, it took about a year to design frequency auction. In order to provide various chances for selection and enough information to the participants for flexible adjustment during auction period, simultaneous multi-round auction was designed. Initial deposit for maximum eligibility, withdrawal penalty for canceling previous bidding, minimum increments, bidding rules, and spectrum cap were implemented to avoid any known disadvantages of auction.

There were limits in the number of licenses that any entity can apply for. Discount of bidding price, tax shelter, and installment payment for the bidding price were allowed for Designated Entities in order to motivate participation from certain group of people, such as women or minorities.

In October and November, for 30 licenses in 900MHz, auction ended up after 104 rounds and the government revenue reached US$ 449 million. In December, auction for 102 PCS licenses in 2GHz band was started and ended in March 1995 after 112 rounds with a revenue of US$ 7 billion, 15 dollars for each person in the area. Oral Outcry auction was completed for 594 interactive video data services licenses in bands of 218-219 MHz, and in 1996, direct broadcast satellite licenses were auctioned.

The whole process was evaluated successful. In general, winning bid prices were similar for similar types of licenses, which means that auctions formed market prices for the licenses, one price for one good. It showed that auction was fair to everybody who participated in, and it was an efficient way to allocate frequency. Bidders were able to flexibly cope with the changes in bidding prices and bidder composition. It only took about 3 months for major area auction, and 2 weeks for regional licenses. Two rounds a day allowed participants ample time to analyze the result and make decisions. All the process was completed within a year comparing that every comparative hearing for cellular phone took about two years. Minimum increment played important role to adjust speed of auction; when it was big the auction proceeded fast. It is desirable to have high increment at the beginning and small one at the end of the auction.

III. 3G Licensing Worldwide

Comparative selection and auction are two popular methods for 3G licensing. Finland issued 3G licenses for the first time in the world in March 1999 by comparative selection. Selected carriers have to satisfy customer demand, compete fairly, be technologically advanced, provide high quality services, operate under stable and reliable condition, and set reasonable prices.

Japan issued 3 licenses for national services this year without auction, and the selected carriers will start to provide 3G services in 2001 first in the world.

First auction for 3G took place in UK for 8 weeks from April this year. Licenses are for 20 years and roaming with existing 2G and other 3G operators are required. Government collected US$ 35.4 billion for 5 licenses including the one issued out to the new entry. Radiocommunications Agency designed auction for economic efficiency, transparency and objective selectivity, and wider competition. It has 4 steps; invitation, pre-qualification, auction, and grant. The results have been controversial, and very influential to other European countries whether they consider auction or beauty contest [2].

In Germany, auction only took 14 days with total price of US$ 45.85 billion from 6 operators; T-mobile, Mannesmann Mobilfunk, E-Plus Hutchinson, Viag Interkom, Group 3G and MobilCom. Prior to the auction, qualification of each applicant was evaluated based on reliability, efficiency, special knowledge, ownership interests, and declaration of non-objection from the federal cartel office. In addition, Austria, Italy, and Netherlands decided to go for frequency auction from fall of this year to early next year.

France does not follow UK. Though it decided to use comparative selection with high contribution. Selection criteria are fast network construction for providing services to many people in wide area. Fee for a 15-year license is US$ 4.55 billion [3].

Sweden will issue 4 national licenses at the end of this year. Two out of 4 include the license for GSM network business. Selection will be made by a beauty contest after evaluating the ability for coverage.

IV. Discussion in Korea

Frequency auction was actively discussed last year, and rejuvenated this year while auction was being held in UK. Minister of Information and Communication mentioned that his ministry was reviewing it because there is no arbitrariness involved in the selection process. The government desperately requested for transparency and non-discrimination on frequency management after having hard time caused by PCS licensing under comparative selection.

The controversy over auction versus beauty contest is not unique in Korea. Auction is favored because it can select the most efficient operator and the fund raised from it is usually higher than other methods. It is assumed that the best operator expects the highest profits from the business, therefore it can submit the highest price. It is transparent and objective. There is no controversy on favor for certain applicant. It also can save time and administrative cost for information gathering and analysis and take same amount of time even if the number of applicants are increased.

The strong argument against auction comes from the uncertain business model for 3G services. No one knows how many subscribe 3G services, and which services will be provided for charge. It is hard to assess value of the frequency, therefore selection process via auction can be distorted. It simply can work as an entry barrier for that specific services. We already saw the side effects of auction in the US. The coverage, service quality, and competition are not sufficient. There is no incentives for technological innovation, some of winners were bankrupt like Nextwave [4]. Low growth in market leads to price increase, which prevents expansion of services and market. Agency problem may cause inefficiency in the process. The party who prepared application has an incentive to submit high bid to win. Since winning is more important than profit for them, the value can be assessed higher than it was supposed to be. High price for licence has bad influence on R&D investment and customer welfare. In addition, auction seems to deny public nature of radio frequency by recognizing private ownership for it. It becames a subject to corporate strategy because it depends solely on financial ability under imperfect capital market. Incumbent carriers obtain it in order to block others' entry, and/or foreign capital just hold it for economic gain from resale.

They may not provide any services, then social welfare has decreased.

Even for the British auction, some say that it will take 10 years to recover investment in 3G. When BT and Vodafone submitted the highest bid, their share prices fell down. Government is the only winner in this game if the policy was raising fund. Close Brothers Technology Group reports that it will take 20 years to recover all the investment for 3G. Monthly ARPU has to be US$150-320, four time as much as the current level, to make the recovery period short (within 15 years) [5].

Arguments are made for beauty contest, too. It releases financial burden on operator, and can minimize type 2 error, the error to select a carrier that cannot efficiently provide 3G services. It can evaluate technological and business capability, and various aspects of the applicants such as financial condition, stability, reliability of operation, and quality of services. The disadvantages involved in comparative selection are well known. The process is inefficient and criticized for special privilege. High administrative cost, lack of transparency and objectivity are mentioned. Arbitrariness or improper outside pressure could intervene in the selection process, and it is hard to check compliance to the business plan. Naturally, the incumbent has better chance to get a license than new enterant.

Even though merits and demerits of selection process are well known, controversy had been continued until July this year when the government issued Request for Proposal. Presumably high auction price could

limits the number of bidding which is not good for competition, while fund raised from comparative selection can not compared with that form and information asymmetry between regulator and regulated is prevalent, thus many think that it is desirable to leave on market mechanism. Other part of the government supported for auction with belief that revenue from the auction could improve government finance more than maximum R&D contribution under beauty contest.

In order to take advantages of both methods, the government, however, declares comparative selection for 3G licensing with R&D contribution of 1 to 1.3 trillion Korean won which is around 10 times of it levied on PCS licences.

V. Business Analysis for 3G Services under Different Selection Process

Discussion on licensing methods can be understood conceptually. The validity and appropriateness of either way are not empirically examined, however. Measuring any of significant factors will clarify the focus of arguments. Based on reasonable and simplifying assumption on a few variables, cases will be set up and compared on profitability, firm value, and price for the services. It will provide valuable information to the applicants for assessing the value of 3G license, and some insight for the countries that contemplate where to go for 3G licensing.

Assumption

Base on that 68% penetration is assumed to be a saturation point, annual demand is estimated until 2010 [6]. Since it is known that there will be three licenses, equal market share of 33.3% is assumed. Unequal distribution will make cases worse in terms of profitability unless the company is dominant in the market. Usage is estimated by adjusting actual data gathered from similar services; 2G mobile voice, wireless internet, wireline data, etc. The most difficult part is the estimation of required investment. It is determined by using the unit price obtained from a vendor and the estimated subscription and usage. Network construction will be completed by 2004 to cover 98% of total population. Price is set up to cover incurred costs including cost of capital, which becomes the basis of estimating revenue. Expenses are estimated from investment in fixed assets and 2G operators' experience in recent years. In addition, total capital is assumed to be composed of equal amount of debt and equity, and the services are provided from May 2002 [7]. All these are summarized in Table 1.

		2002	2003	2005	2007	2010	Unit
1. Subscriber		566	1,504	4,673	6,223	6,871	1,000 People
2. Monthly Usage per User	Voice	109	107	105	103	100	Minute
	Video	1	3	8	10	9	Minute
	Data	21	34	60	74	80	Mbyte
3. Cumulated CAPEX		799	1,130	2,161	4,146	8,237	US$ in million
4. Cumulated OPEX		196	603	1,997	4,916	10,157	US$ in million

<Table 1> Assumptions

If there is no additional cost required either as auction price or as R&D contribution, a 3G company may be able to report net income first in 2005, and to reach to break even point in 2006. When a selected operator has to pay maximum R&D contribution and it is amortized for 15 years, life of the license, the company reports smaller net income in 2005, but it will take a year longer to reach break-even point. The cases are summarized in Tables 2 and 3, respectively.

<Table 2> Business Case without R&D Contribution or Frequency Auction

	2002	2003	2005	2007	2010
Sales	88	541	2,312	3,442	3,892
Operating Expenses	463	846	1,892	2,672	2,580
Net Income	-375	-305	420	770	1,313
Accumulated Net Income	-590	-895	-568	851	4,218

	2002	2003	2005	2007	2010
Sales	88	541	2,312	3,442	3,892
Operating Expenses	584	997	2,042	2,572	2,670
Net Income	-496	-456	270	870	1,222
Accumulated Net Income	-745	-1,201	-1,173	230	3,326

<Table 3> Business Case with Maximum R&D Contribution

The case looks worse if we assume frequency auction. In order for estimation, we had to estimate winning price for frequency auction. Some analysts published their estimation of auction price; US$ 3.64 billion by Dongwon, and US$ 3.61 billion by Hundai Securities. Thinking they are too high, we take different approach. The amount collected in the UK US$ 35.4 billion is adjusted with differences in purchasing power and size of potential market in two countries. Under that assumption, each license seems to worth for US$ 2.913 billion [8]. As you may guess, business profile looks even worse. The company is barely able to make ends meet in 2005, and break-even will take place in 2008, which are shown in Table 4.

	2002	2003	2005	2007	2010
Sales	88	541	2,312	3,442	3,892
Operating Expenses	761	1,217	2,256	2,666	2,782
Net Income	-673	-677	56	776	1,111
Accumulated Net Income	-970	-1,647	-2,053	-950	2,090

<Table 4> Business Case with Frequency Auction

The equity prices are estimated on three different cases with 4 different levels of cost of capital. It is assumed that 100 million shares are issued and outstanding. Table 5 wraps up the previous results with equity price estimation.

<Table 5> Comparison of Cases

		BEP	Paid-in Capital (million$)	Equity Value per Share($)			
				WACC 12%	13%	14%	
Comparative Selection	Without R&D Contribution	2006.10	406	58	50	44	
	R&D Contribution of $1.182 billion	2007.8	1,016	22	19	16	
Auction	Auction Price $2.913 billion	2008.11	1,909	11	9	7	

The additional burden of auction price on operators is significant. Users have to pay increased price by 18.7% if the company wants to reach break even in 2006, the year that no additional cost case reaches to break even. Thus far, we fixed price and requested investment for the sake of comparison and simplicity.

The case will be worse if the price increase really happens, which is very likely. Market cannot grow as we estimated, and the actual business profile will look very bad. Even if there was a slight change in demand, the business case does not make much sense. Table 6 summarizes what it looks like if the demand is 10% less than previous assumption. No reasonable operator would be interested in new services.

	2002	2003	2005	2007	2010
Sales	81	495	2,118	3,162	3,574
Operating Expenses	579	971	1,948	2,343	2,499
Net Income	-498	-476	171	819	1,075
Accumulated Net Income	-747	-1,223	-1,341	-109	2,617

<Table 6> Business Case with Maximum R&D Contribution(Worst case, demand decrease by 10%)

Korean government recommends sharing facilities to the candidate operators, and it can save some required investment. But it is not quite clear because technical standards are not determined yet.

VI. Conclusion

For innovative 3G services, various methods of licensing have been actively discussed in Korea. Various parties prefer comparative selection to frequency auction, though. Many worry about to observe winner's curse, and low or no motivation for R&D. In addition to difficulty involved in value assessment, difference in financial ability and technology advancement is mentioned. If the licenses will be issued by frequency auction, candidates could be only conglomerates and/or international enterprises that could raise such a huge fund. Operators that cannot raise such huge amount of money is excluded regardless of expertise and/or advanced technology. Conglomerate with widely diversified lines of business can peruse profits as a group by submitting high auction price for frequency. For example, though 3G services are not able to generate enough revenue to cover costs, equipment and advertisement could do well enough to cover losses in 3G services. In a word, cross subsidy among companies in a group can be taking place. Some are even afraid of influx of foreign capital, since it could be threat to domestic vendors. Active merger and acquisition is expected because financial burden for the auction may be too big for a single company to bear. Too much spending on auction leaves not enough room for investment in infrastructure. Moreover, we did not have enough time for designing frequency auction and public nature of radio frequency was emphasized. In fact, 70% of 3,067 participants were against the auction in the Internet survey done by National Assembly.

Quantitative analysis for the business cases brings in similar conclusion. The auction put a great burden on operators and increases price for new services very likely. Rather than introducing frequency auction, we had better think about complementary measures to cure problems in comparative selection. Conditional licenses for limited time period and/or reasonable level of R&D contribution are implemented. Such an adjustment is better for customers as well as operators as seen in section V. Conditions could be different case by case, but the logic underlined licensing mechanism is common to other countries.

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附件五

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INTERCONNECT IN THE ASIA PACIFIC - MILLENIAL TRENDS

Jim Holmes

Abstract

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Interconnection - what is it?

Interconnection is the interworking of networks so that services connected to one network may call and be called by services connected to another. Interconnection, by other names, occurred traditionally in the international telecommunications arena, when national operators passed traffic between themselves, and terminated traffic addressed to services connected to their own networks. Interconnection as such is therefore not a new concept.

Why interconnect is important

In the world of national telecommunications monopolies the importance of interconnection was limited to ensuring that international traffic was terminated, and that limited private network operations that might be permitted had suitable operating interface arrangements with the public network.

The current importance of interconnection is dramatically different. In a liberalised, multi-operator environment, interconnection becomes critical. Without the ability to guarantee that its service subscribers can call and be called by all existing and future subscribers in the country, new entrants would attract no customers. Competition would be stillborn under these conditions.

Without suitable, workable arrangements for effective interconnection, network service competition cannot be sustained.

Sustainable interconnection

Without a suitable pro-competitive regulatory environment interconnection is not feasible or sustainable. This is only to say, in another way, that without a suitable regulatory framework, telecommunications competition will not be sustainable.

What therefore are the minimum conditions for sustainable and effective interconnection?

There have been two key influences shaping the answers to this question within national environments in the Asia Pacific, namely the WTO (World Trade Organisation) and APEC (Asia Pacific Economic Cooperation organisation).

In February, 1997, within the WTO negotiation framework, 68 countries concluded the Basic Telecommunications Agreement (BTA). The Agreement provides for the interconnection of foreign service suppliers with the PSTN in a timely manner, under non-discriminatory terms and conditions, at any technically feasible point, and at charges that are cost-oriented, transparent, reasonable, and unbundled to the extent that interconnecting parties will not be required to pay for network service elements, components and facilities that they do not require. The Agreement also requires public availability of the procedures for interconnection negotiations, and of the procedures applicable to major suppliers. Transparency considerations require that major suppliers will make available either its interconnection agreements or a reference interconnection offer. Dispute settlement procedures are also required based on the determination of independent arbitral bodies. These, therefore, are the minimum conditions for an effective interconnection framework as far as the framers of the Agreement is concerned.

The impact of the Agreement, supported by major trading nations in the region, such as the United States, cannot be under-estimated. The terms establish an important template for the development or re-alignment of national policies on interconnection.

The second important influence within our region has been the work of the APEC Telecommunications Group, (APEC Tel). In 1997 APEC Tel retained Ovum to survey interconnection arrangements in the

member economies of APEC and to comment on emerging trends. At that stage the development of liberalisation in the region, and of the scope and depth of interconnection arrangements, were extremely diverse, ranging from the bilateral arrangements of carriers to intrusive national regulatory agency activity for the setting of terms and conditions. Carrier rights of interconnection were established clearly in most, but not all, member economies.

The APEC Ministerial Meeting in Singapore in June, 1998, adopted an important statement on interconnection as part of the Singapore Ministerial Declaration from that meeting (Paragraph 37), namely the recognition "that it is crucial to establish fair and transparent interconnection and access arrangements to support competitive service provision". The Ministers endorsed APEC Tel's efforts to develop interconnection guidelines (consistent with the WTO Agreement principles) and the creation of a flexible, non-prescriptive framework containing necessary principles to formulate interconnection arrangements to promote fair and effective competition in the market. The Ministers endorsed action to identify best practices for interconnection arrangements, including price benchmarks and time frames for negotiation.

The Ministers have therefore endorsed the WTO Agreement principles, but have required some degree of flexibility to enable interconnection to be effective in the different and various environments of APEC member economies.

Traditional interconnection emphases

The traditional emphasis of policy makers and regulators has been to establish frameworks or conditions for the interconnection of narrowband (telephony) services connected to the PSTN (Public Switched Telephone Network). There were a number of important reasons for this:

- Market power of incumbent carriers was associated with fixed network access to customers at the local network level.
- The mass of customers connected to telecommunications networks were connected via narrowband telephony access lines. Few business and other customers had broadband access in the mid-1990s or before.
- New services such as cellular mobile were not the subject of long-standing monopoly provision, and in most countries digital mobile services were being introduced on a competitive basis. Such services needed to have interconnection with fixed networks, but the high initial prices of mobile service tended to ensure that commercial sharing of revenues was readily achieved. Interconnection was an issue, but not one of great immediacy.
- Carrier networks were essentially circuit-switched and designed for voice. The issues associated with mass take up and use of the Internet did not commence until 1996, and the move to IP based next generation network design did not commence until at least 1997 in most countries. The issues of interconnection in a broadband environment were potential and not immediate in the thinking of most regulators and industry participants.

Emerging trends

Within the Asia Pacific region there has been movement towards the interconnection environment envisaged in the WTO Agreement, but that movement has been almost entirely in terms of narrowband fixed telephony interconnection. The movement has not been consistent across the economies in the Region.

The basis for interconnection charge determination, for example, varies greatly from commercial negotiation supported by regulatory arbitration in Australia, to charge setting by the regulator in the United States.

The basis on which new entrants might access terms and conditions for interconnect also varies greatly. In countries where the rates and conditions are set by the regulator, the issue virtually does not arise. In countries where reference offers are required or where agreements are made public, such as New Zealand, transparency is less acute. In Australia, where an undertaking or reference offer is voluntary, access to information across the industry and to guidelines on current trends in charge negotiation is still in the hands of major incumbent operators. There is an information asymmetry which gives incumbents and

others who have negotiated a large number of 'serious' interconnect agreements a decided advantage.

Notwithstanding the above, the emerging trend noticeable through Ovum's work on interconnection in the region (and globally) has the following features:

- Commitment to a cost-related charging structure, with long run incremental cost standards emerging as the most preferred.
- Commitment to the principle that interconnection should not require new entrants to pay for the inefficiencies of incumbent operators and that the rates should provide incentives for efficiency. Interconnection rates are therefore typically based on the costs that would be incurred by an efficient operator.
- Growing interest in benchmarking to ensure that national interconnection rates and conditions are aligned to world's best and better practices.
- Limitation on the timescales available for negotiation between carriers before one or both may seek the intervention of the regulator or arbitration. Governments and regulators are becoming less prepared to allow incumbents to delay interconnection outcomes and to retard the entry of new carriers.

In addition, the regulators and participants in most countries are commencing to recognise the important issues associated with mobile and broadband interconnect, and to take initial action in recognition that the telecommunications world will be changed forever by developments in these areas. These changes will occur over a relatively short period, and be effectively in situ by 2007.

Mobile interconnection

Mobile service penetration is proceeding at a high rate. Typical penetration rates in the developed economies of the region are in or above 35 per 100 population. In Hong Kong the penetration is 55 per 100 population, and exceeds the fixed service penetration level (53 per 100).

Mobile penetration is driven by:

- price and feature competition
- technology
- increasing convenience
- increased coverage
- lifestyle changes.

While mobile service prices were relatively high, revenue-sharing arrangements for interconnection were convenient and easy to negotiate. Increased competition, contracting margins and lower base annual revenues per user (ARPU) have changed the cosy basis for such arrangements.

Regional regulators have tended to require fixed network operators to set the same cost-based interconnect prices for terminating calls from mobile networks as they charge for calls from other fixed networks. This approach is non-contentious and generally supported by mobile operators.

Increasingly, however, regulators are requiring mobile operators to charge for terminating calls on their network at cost-based prices. This is more controversial, and, if implemented would reduce fixed-to-mobile and mobile-to-mobile terminating charges by over 75% in many countries.

Our work suggests that the **cost** of terminating a call on a mobile network is around 5-6 times that of fixed network terminations, whereas the rates charged are typically 10-15 times. These figures are averaged and

offered as 'rules of thumb' for current practice. In Australia for example, the regulator (ACCC) has recently suggested a fixed termination rate of 1.5 (A) cents per minute (averaged). Some current commercial agreements exceed that by 10 times for mobile terminating access.

A range of indicative mobile terminating rates is illustrated in Table 1 below:

Table 1: Examples of Fixed to Mobile Interconnect Rates in the Region

Country	Net fixed terminating access charge	Party responsible for call charges	Mobile terminating access charge	Mobile : Fixed charges
Australia	0.8	Calling party	13.2	16.7 times
Hong Kong	0.4	Called Party	1.0	2.1 times
Japan	4.3	Calling party	43.5	10.2 times
New Zealand	1.0	Calling party	14.5	14.0 times

Source: Ovum, 2000 (Charges in US cents per minute)

Note that the Hong Kong example is not comparable with the others because a called party pays arrangement is still in place in Hong Kong

Regulators are starting to recognise that fixed to mobile retail prices are being kept artificially high by excessive interconnect charges, and are reviewing the situation. Competition alone (usually very strong in urban mobile markets) is insufficient to impact what is a local access bottleneck. This situation is not affected by the fact that a mobile operator may be generally non-dominant in the market. It still has substantial power in relation to access to its own customers. These customers are not directly affected, and may be neither aware nor concerned, by the costs imposed on callers to them.

Broadband interconnection

All new entrant and incumbent carriers are now implementing plans for operating Internet Protocol (IP) based or next generation networks. If they do not move in this direction they will soon be out of business.

IP networks are based on Internet Protocol and carry all traffic as packets on an IP backbone. The platforms are based on open technology with separation of switching and transport functions from services and applications. Most importantly they are integrated. Network operators need no longer operate separate voice and data networks, or overlay networks, or maintain separate narrowband and broadband platforms. The move to IP next generation networks is being driven by:

- service competition, and the need to design and deliver customised services of a kind that are only cost-effective in a ubiquitous IP environment
- the data wave, resulting from mass take up and use of the Internet in business and by residential customers
- cost savings resulting from massively reduced unit costs of traffic conveyance and management. Suppliers such as Lucent, Ericsson and Nortel report typical 50-80% cost improvement for new networks, and operators are claiming around 30% cost improvements for incumbent upgrades.

Regulation of broadband is yet to converge. Regulators have yet to come to grips with the essential requirements of competition in a broadband environment and how that might relate to existing predominantly narrowband regulation. There has been some window dressing with new agencies in some countries. They have been renamed to provide a convergent flavour - but the reality (the black letter of policy and law) remains un-converged.

Regulatory paradigms are hard to shift. Telecommunications regulators have developed their approaches heavily based on narrowband telephony models. This applies also to their interconnect models.

As we know, legal structures become capitalised, and for that reason contain their own inertia. It is not just the regulators who need to reconsider the fundamentals of interconnection in the new broadband environment. It is also the industry. Indeed, many ISPs are keen to exploit the intersection of narrowband interconnection pricing with always-on broadband and Internet access arrangements. They need local interconnection that reflects the retail structure of free or untimed local calls.

Internet access and IP networking brings into stark relief the fact that circuit switched is based on

- channels that are permanently connected
- retail charges based on distance and minutes;

whereas IP is packet based, involving

- no permanent connections
- charges based on data volumes transferred.

The inevitable conclusion is that a new model for interconnection is needed.

There are a number of fundamental choices in how this might be achieved, including

- Peering agreements, as in the case of the Internet. (Note however that these arrangements are now heavily in dispute, particularly following the apparently successful action of the major Internet backbone operators in 1997 to convert their erstwhile peers into customers.)
- Revenue sharing (which does not necessarily promote the overall public interest in transparent and cost-based interconnection charging).
- Flat rate access charges (which may not appropriately reflect direct transaction-driven costs, except on a very averaged basis).
- Volume based charges, (as is typically the case with current narrowband interconnection).

The purpose of this paper is to raise the issues confronting regulators, industry participants and users, rather than to suggest the desirability of specific interconnection approaches.

It is important to note that some regulators, such as OFTA and the ACCC, have commenced the process of discussion of the wider issues, and also whether transition to a new order will require modification of current narrowband arrangements. For example, what guarantees are appropriate to be given to the incumbent fixed operator regarding the recovery of the costs of newly ordered circuit switches for interconnect gateway exchanges from interconnect revenues? This is especially important, given the asset lives used for interconnect purposes average 10-15 years, and given that the move to broadband access and voice over IP is likely to be substantially completed by 2007. The issues, therefore, go beyond determination of the most suitable arrangements for a broadband future. They include the transition process, and how that might affect a narrowband model that many in the industry consider to be a final result requiring no further adjustment.

A major concern at this stage is that there is no obvious leadership in the management of the discussion and the debate on broadband interconnect issues. Regulators are essentially concerned about the implementation of current policies. Industry is divided by conflicting agendas. Governments are hampered by the fact that Internet related issues are global, and solutions typically transcend national borders. It is not clear how issues associated with IP and broadband interconnect will be raised and resolved. There is no clear template of the kind offered in the 1990s for narrowband interconnect by the WTO or APEC Tel.

Conclusions

Our major conclusions about the trends in interconnection in the Asia Pacific region at the beginning of the new millennium are:

- There are emerging commonalities and consistencies in the national implementation of narrowband interconnection on the telephony model.
- Emerging consensus in this area has been materially assisted by the WTO Agreement and the activities of regional forums such as APEC.
- Consistency and commonality should not be confused with uniformity. There still exist substantial differences within the region on matters such as the precise pricing principles to apply to interconnect rates, and the role of the industry participants and regulators (price setters or arbitrators). Transparency measures also vary widely.
- Most countries review their interconnection frameworks from time to time.
- In the mobile interconnect area there are substantial moves (but in some regional countries only) to examine whether mobile service competition is sufficient to ensure efficient and public interest interconnection outcomes.
- Much more attention can be expected to be given to mobile interconnection in the next 5 years.
- In the meantime, mobile terminating access rates remain well above the levels that incremental long term cost (LRIC) standards would suggest.
- Concern about the implications of the broadband and IP revolution for interconnect is increasing. It is not at all clear how the issues will be raised, discussed and resolved in most countries in the region. Some, such as Hong Kong, have initiated preliminary consideration.
- Leadership is wanting in the identification and resolution of broadband interconnection issues and the development of sustainable models.
- Transition issues are especially difficult for broadband interconnect, given the obligations that are usually placed on all carriers to continue to invest in technologies that will ensure continued narrow band interconnection on the traditional model.
- We have only a small time window in which to address and resolve the related issues. Realistically that window is 2 years only - or even less.

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附件六

開發中世界邁向數位利得--
電信政策及施行上的課題

Toward Digital Dividends in the Developing World: Lessons in Telecommunications Policy and Practice

Heather E. Hudson

1. Introduction

The transition to a digital economy requires affordable access to reliable communications, along with other facilities such as computers and intelligent terminals, and the ability to put these tools to productive use. While there are gaps in both access to ICTs (information and communication technologies) and the skills to use them associated with income, ethnicity and/or rurality in industrialized countries, this so-called "digital divide" is much more pronounced in developing countries, where access to information and communications technologies (ICTs) remains much more limited.

Table 1: Internet Access by Region [1]

	People Connected (millions)	Global Percentage of People Connected	Percentage of Global Population
Canada and U.S.	97.0	56.6%	5.1%
Europe	40.1	23.4	13.7
Asia/Pacific	27.0	15.8	56.2
Latin America	5.3	3.1	8.4
Africa	1.1	0.6	12.9
Middle East	0.9	0.5	3.6

Table 1 shows the gap in Internet access between the industrialized and developing worlds. More than 85 percent of the world's Internet users are in developed countries, which account for only about 22 percent of the world's population [2]. Of course, Internet access requires both communications links and information technologies, particularly personal computers or networked computer terminals. While there is still much less access to telecommunications in developing countries than in industrialized countries, at present, the gap in access to computers is much greater than the gap in access to telephone lines or telephones. High income countries had 22 times as many telephone lines per 100 population as low income countries, but 96 times as many computers. However, as prices for computers continue to decline, access may become more related to perceived value than to price. See Table 2.

Typically, a high percentage of developing country residents live in rural areas (as much as 80 percent of the population in the least developed countries), where access to communication networks is much more limited than in urban areas. See Table 3. It should be noted that this table overestimates rural access because the "rest of country" includes everything except the largest city. Also, facilities are not likely to be evenly distributed throughout the country, so that in poorer nations there may be many rural settlements without any communications infrastructure.

Table 3: Access to Telecommunications [3]

Country Classification	Teledensity (Tel Lines/100)		
	National	Urban	Rest of Country
High Income	46.0	52.9	43.8
Upper Middle	13.7	25.7	11.5
Lower Middle	9.7	22.1	7.2
Low Income	2.5	6.5	2.3

Table 2: Access Indicators [4]

Country Classification	Tel Lines /100	PCs /100	Internet Hosts/10,000	Internet Users/10,000
High Income	54.1	22.3	28.1	92.0
Upper Middle	13.4	2.9	8.4	55.9
Lower Middle	9.7	1.3	1.9	19.0
Low Income	2.5	0.2	0.1	0.9

2. Telecommunications and Development

2.1. Information is critical to development.

The theoretical underpinning of research on the impact of information and communications technologies in general is that information is critical to the social and economic activities that comprise the development process. Information is obviously central to activities that have come to be known as the "information sector" including education and research, media and publishing, information equipment and software, and information-intensive services such as financial services, consulting, and trade. But information is also critical to other economic activities ranging from manufacturing to agriculture and resource extraction, for management, logistics, marketing, and other functions. Information is also important to the delivery of health care and public services. If information is critical to development, then information and communications technologies, as means of accessing, processing, and sharing information, are links in the chain of the development process itself [5].

In general, the ability to access and share information can contribute to the development process by improving:

- *efficiency,* or the ratio of output to cost (for example, through use of just-in-time manufacturing and inventory systems, through use of information on weather and soil content to improve agricultural yields);
- *effectiveness,* or the quality of products and services (such as improving health care through telemedicine);
- *reach*, or the ability to contact new customers or clients (for example, craftspeople reaching global markets on the Internet; educators reaching students at work or at home);
- *equity,* or the distribution of development benefits throughout the society (such as to rural and remote areas, to minorities and disabled populations). [6]

2.2. Telecommunications is necessary but not sufficient for development.

The results of numerous studies have shown that telecommunications is *necessary but not sufficient* for development. The reality is that there are many other factors that contribute to economic development, including:

- other infrastructure: particularly electrification and transport
- a skilled workforce
- cost of operations including facilities and labor.

Regions with all of these advantages may well be able to attract new jobs by encouraging investment in modern and competitively priced telecommunications. Nebraska in the U.S. and New Brunswick in Canada have attracted a thriving call center industry because of their combination of a reliable and relatively low cost workforce and high quality telecommunications. Western Ireland has become the "back office" for many U.S. companies, building on its assets of a well educated and comparatively low cost labor and high quality infrastructure, including telecommunications. Indian software developers have sold their services overseas by contracting to write computer code which is transmitted to overseas high tech companies, typically via dedicated satellite networks.[7]

2.3. The larger the network, the greater its value.

A basic rule of connectivity known as Metcalfe's Law is that the number of connections and thus the potential value of the network increases almost as the square of its users. Theodore Vail, the early visionary president of AT&T, understood this principle, that expanding the network would generate more value for customers and more revenue for AT&T. (In contrast, many PTTs have grown slowly, keeping rates relatively high. They offered a service elites could afford, but did not provide the greater access that could have contributed to national economic growth as well as revenue for the PTT.)

Metcalfe's Law has relevance for policy as well, because it, in conjunction with the evidence of the role of telecommunications in socio-economic development, suggests that the policy makers' top priority should be ensuring availability and affordability of networks so that anyone who wants to use them can do so. Strategies designed to increase access rather than to protect incumbent operators are likely to contribute more to economic growth.

3. Planning and Policy

3.1. Telecommunications planning should not be done in isolation.

Telecommunications planning should be done in conjunction with ministries responsible for other sectors and in consultation with relevant agencies at the state and local level to establish priorities. For example, an east African country had a policy of rolling out public call offices (PCOs) according to the government's administrative hierarchy, from province to region to district to village. On paper in the capital this plan seemed rational, but in practice it missed what should have been higher priorities. For example, there was no access to telecommunications at an intersection of two major national highways, which was the most the most important transport junction in the country. A neighboring country had no provision in its national plan to extend telecommunications services to game lodges, although tourism had become the top foreign exchange earner for the country.

It would appear that transition to a market-driven telecommunications sector would solve such problems in that facilities would be installed where there was predicted to be significant revenue, such as truck stops, guest houses and other businesses. Yet, operators themselves may assume that too little revenue is at stake in rural and impoverished areas to make it worth consulting locally about demand and placement of facilities (see below). If service is poor or access too limited (for example, few outlets selling prepaid phone cards), the result will be not only lack of as much access as the licence requirement was designed to provide, but a self fulfilling prophecy of low revenue.

3.2. The goals should be separated from the means.

Policy makers and regulators have a tendency to confuse the goals with the means. The role of the government should be to set goals and not to determine how they should be achieved. For example, in the U.S., the FCC initially tried to dictate the size and technology to be used in two-way VSATs, in order to minimize interference. Innovative engineers were able to convince the FCC to set the technical specifications and let the industry determine how to meet them. The result was smaller and cheaper terminals than would otherwise have been developed.

An example in India would be the requirement to upgrade village PCOs for data communications. Perhaps the goal should be stated as providing access to e-mail and the Internet in every village. The means may range from upgrading PCOs for data communications, to establishing public access in schools or community buildings, or in privately run business centers or tea shops. The government's role would be to ensure that reliable and affordable networks are available to each community.

3.3. Start with thirsty horses.

National information infrastructure plans typically call for availability of Internet access in every community. However, not all communities may have identified needs for these services. Given limited resources, it may be best to start with pilot projects that would test out both the technologies and techniques for putting them to use. Communities that have requested access, and can demonstrate their commitment, for example, by donating space for the equipment or nominating candidates to be trained as outreach staff, should receive priority. This approach of identifying potential innovators and early adopters may be called "looking for thirsty horses" (as in "You can lead a horse to water, but you can't make it drink).

4. Regulation

4.1. Assuring independence of the regulator may be difficult.

The common wisdom is that regulators must be independent both of the industry and of the political process. In countries that began with the PTT model, the concern is to make the regulator independent from the PTT to avoid conflict of interest between operator and regulator, a necessity in a competitive environment where equitable rules must be set and enforced for all operators. However, a problem with this approach is that typically employees who once worked for the PTT now work for the regulator, making it inherently difficult to avoid bias in assumptions or decisions.

It may be possible to guard against explicit bias favoring the former PTT, but perhaps a more significant danger is that regulatory employees will start with assumptions of what is feasible and practicable based on their PTT experience. Strategies that could address this problem would be to include professional staff such as economists from other ministries, use external consultants without ties to the former PTT, and request public filings and comments so that all relevant views may be considered.

4.2. If the government is slow to act, regulation becomes policy.

A distinction is often made between policy making, typically carried out through a government ministry or department with responsibilities for telecommunications, and regulation, to be carried out by an "independent" body, i.e. that is not related to the operator nor directly responsible to a minister. However, in telecommunications, the distinction between regulation and policy quickly becomes blurred, because of the pace of technological change and market pressures in the communications industry. Some countries [8] have made a functional distinction in placing much more limited responsibility in the regulator as an adjudicator and arbitrator, while retaining responsibility for licensing as well as policy making within the ministry. Although perhaps attractive conceptually, a danger of this approach is that the government will not respond in a timely manner, so that the Indian telecommunications industry will lag foreign industries or lose opportunities to enter new markets. One strategy to avoid this problem is to set firm enforceable deadlines for decisions on license applications and other time-sensitive matters. This approach was used in the US 1996 Telecommunications Act which set specific deadlines for the FCC to complete various rulemakings and directives required to implement the Act.

4.3. Effective regulation requires participation.

It is often thought that the issues in telecommunications policy and regulation are so technical and often arcane that most people would have nothing useful to contribute to the decision-making process, and that public participation would add little of value. However, all regulatory agencies are overworked and understaffed, and cannot find or analyze all the data that would useful to guide decision making. Major users are likely to have well thought out views on the impact of proposed regulations or the need for reforms that would enable the telecommunications sector to better serve their industries. The ability of small users and consumers to contribute may seem less likely; it may take some time for their representatives to get up to speed on telecommunications technology and economics. However, the contribution of such groups may also provide perspectives that might otherwise be overlooked.

A problem for consumer groups is the cost of tracking the issues and preparing testimony or other interventions. In order to ensure that such consumer perspectives are represented, in some countries [9] the regulator pays the costs of participation in hearings by consumer organizations that contribute evidence which would not otherwise be available.

4.4. Old distinctions may no longer be relevant.

Classifications and distinctions which once were useful may no longer be relevant. For example, telecommunications services have been classified by the ITU and its members into fixed, mobile and broadcasting. Regulators typically issue separate licenses and approve separate tariff structures for fixed and mobile services, yet these distinctions have become blurred. Mobile telephone service was designed for communication while in vehicles; however, modern cellular and PCS systems are used for personal communications, and can often be considered a substitute for fixed network connections. In many developing countries, wireless has become the first and only service for many customers who never before had access to a telephone.

4.5. Long term periods of exclusivity do not serve the public interest.

In a liberalized environment, the length and terms of operator licenses can impact the pace of growth of networks and services. Regulators typically face choices concerning how long to protect incumbents to enable them to prepare for competition, and how long to grant periods of exclusivity or other concessions to new operators to minimize investment risk. Yet exclusivity and long time periods may be the wrong variables to focus on if the goal is to increase availability and affordability of telecommunications services. Instead, a transparent regulatory environment with a "level playing field" for all competitors and enforcement of the rules is cited by investors as key to their assessment of risk.

A few countries have granted licenses with as much as 25 years of exclusivity, although 10 years or less seems more common. Even 5 to 10 years seems like a lifetime given the rapid pace of technological change, with Internet time measured in dog years (seven to a calendar year). Some jurisdictions [10] have negotiated terminations of exclusivity periods with monopoly operators in order to enable their economies to benefit from competition in the telecommunications sector.

4.6. Users will find a way...

Protecting dominant carriers that continue to charge prices far above those for comparable services in other countries not only penalizes users, as noted above, but drives the more agile to find alternatives. The users' response to unaffordable prices is increasingly to bypass the network. People with telephones in most developing countries can access callback services to make international calls at a fraction of the price charged by their own international operators.

Many monopoly operators claim that callback is siphoning off revenues that they need to expand their networks, which would also probably create more jobs. However, the relationship is not so simple. For example, an Internet service provider (ISP) from a small west African country pointed out that without callback, he would not be in business. He needs a relatively inexpensive international connection to the Internet in order to provide affordable Internet access for his customers. By using bypass, he is creating new jobs in value-added services as an Internet provider, as well as providing an important information resource for economic development of the country. OFTA, the Hong Kong regulator, negotiated an early termination to Hong Kong Telecom's monopoly on international services, which was to last until 2006. Before the termination of the monopoly, [11] OFTA effectively introduced international competition by licensing competitive local companies which offered callback access.

4.7. Oversight with enforcement will be needed.

The marketplace is generally the best mechanism for bringing innovative and affordable services to most users, including the majority in rural areas (see below). However, there will be an ongoing need for oversight to monitor progress toward meeting targets, to enforce compliance with performance standards, and to review and revise benchmarks. For example, there will be a need for monitoring to determine whether there are disparities in access, quality of services, or pricing that need to be addressed. Otherwise, operators may not meet targets that are conditions of their licenses in areas that they think will not be profitable, or install facilities but not maintain them adequately if they assume the revenue generating potential is low. Operators must also be held to their license conditions if licensing is to be an effective means of extending access. [12]

5. Extending Access

5.1. Fixed lines close large gaps too slowly.

In developing countries without sufficient wireline infrastructure, wireless personal networks can be used for primary service. In China, there are more than 10 million wireless customers. In Uganda, within one year of licensing a second cellular operator, attractive pricing and aggressive marketing of prepaid service using rechargeable phone cards have resulted in there now being more cellular customers than fixed lines in the country. For most of the new subscribers, their cellphone is their first and only telephone [13]. Other developing countries where wireless is used as a primary service include Colombia, Lebanon, Malaysia, the Philippines, South Africa, Sri Lanka, Thailand, and Venezuela [14]. Table 4 below shows Asian developing countries where wireless mobile lines contribute significantly to teledensity, providing 25 percent or more of all subscriber connections.

Cellular operators in South Africa were required to install 30,000 wireless payphones within five years as a condition of their license [15]. This policy, plus rollout requirements placed on Telkom, the monopoly fixed operator, contributed to a significant improvement in access to telephone service. By 1998, 85 percent of South Africans, including 75 percent of those living in rural areas, said that they had access to a telephone. In townships and rural areas, access typically meant an available payphone within a short walk.

Table 4: Mobile as Percentage of all Telephone Lines: [16]

5.2. Resale is an effective means to increase access.

Authorization of resale of local as well as long distance and other services can create incentives to meet pent-up demand even if network competition has not yet been introduced. Franchised payphones have been introduced in Indonesia, India, Bangladesh, and other countries. in order to involve entrepreneurs where the operator has not yet been privatized and/or liberalized. Indonesia's franchised call offices known as Wartels (Warung Telekomunikasi), operated by small entrepreneurs, generate more than $9,000 per line, about 10 times more than Telkom's average revenue per line [17]. Franchised telephone booths operate in several francophone African countries; in Senegal, private phone shops average four times the revenue of those operated by the national carrier [18]. In Bangladesh, Grameen Phone has rented cellphones to rural women who provide portable payphone service on foot or bicycle to their communities.

Resale of network services can also reduce prices to customers. Most interexchange carriers in the US are actually resellers that lease capacity in bulk from facilities-based providers and repackage for individual and business customers, offering discounts based on calling volume, communities of interest, time of day and other calling variables.

5.3. Universal access goals must be moving targets.

Universality has been defined in various countries in terms of population density, distance and time. Some countries set targets of public telephones within a radius of a few kilometers in rural areas; others aim to serve every community or settlement. China, India, Mexico, Nepal, and Thailand, for example, aim for at least one telephone per village or settlement [19]. The ITU's Maitland Commission called for a telephone "within an hour's walk" throughout the developing world.

The concept of universal access continues to evolve, both in terms of services that should be universally included and in our understanding of access, which includes *availability, affordability,* and *reliability.* Universal access should therefore be considered a dynamic concept with a set of moving targets. Rapid technological change dictates that the definitions of basic and "advanced" or "enhanced" services will change over time, while the unit of analysis for accessibility may be the household, the village, municipality, or even institutions such as schools and health centers. Thus, for example a multi-tiered definition of access could be proposed, identifying requirements within households, within communities and for education and social service providers. For example:

- **Level One**: community access (for example, through kiosks, libraries, post offices, community centers, telecenters)
- **Level Two**: institutional access (schools, hospitals, clinics)
- **Level Three**: household access.

In industrialized countries, the goal has been to provide basic telephone service to every household, with the assumption that businesses and organizations could all afford access to at least this grade of service. However, for Internet access, the U.S. is applying community and institutional access models. The U.S. Telecommunications Act of 1996 specifies that "advanced services" should be provided at a discount to schools, libraries, and rural health centers [20]. "Advanced services" are currently interpreted as Internet access. In the future, it is likely that "advanced services" will be redefined, perhaps to include access to new generations of services available through the Internet or its successors.

In developing regions, the need for services besides basic voice is now spreading beyond urban areas, businesses and organizations, to small entrepreneurs, NGOs (nongovernmental organizations) and students, driven by demand for access to e-mail and the Internet. E-mail is growing in popularity because it is much faster than the postal service and cheaper than facsimile transmission or telephone calls. For example, a message of 2,000 words takes 10 minutes to read over a telephone, two minutes to send by fax, and about 4 seconds to transmit via 28.8 kbps modem [21]. Such services can be valuable even for illiterates. A Member of Parliament from Uganda stated that his father sent many telegrams during his lifetime, but could neither read nor write. Local scribes wrote down his messages and read them to him. Similarly, "information brokers" ranging from librarians to telecenter staff can help people with limited education to send and access electronic information.

Telecenters equipped with personal computers linked to the Internet enable artisans, farmers and other small entrepreneurs to set up shop in the global marketplace [22]. South Africa is funding the installation of telecenters equipped with phone lines, facsimile, and computers with Internet access through a Universal Service Fund; South Africa now plans to provide Internet access to government information and electronic commerce services through post offices. Many other countries are extending public access to the Internet through telecenters, libraries, post offices, and kiosks.

5.4. If subsidies are needed, they must be targeted.

The traditional means of ensuring provision of service to unprofitable areas or customers has been through cross subsidies, such as from international or interexchange to local services. However, technological changes and the liberalization of the telecommunications sector now make it impracticable to rely on internal cross subsidies. As noted above, customers may bypass high priced services using callback services or Internet telephony.

In a competitive environment, new entrants cannot survive if their competitors are subsidized. Therefore, if subsidies are required, they must be made explicit and targeted at specific classes of customers or locations such as:

- **High cost areas:** Carriers may be subsidized to serve locations that are isolated and/or have very low population density so that they are significantly more expensive to serve than other locations. This approach is used in the U.S. and has recently been mandated in Canada.
- **Disadvantaged customers:** Subsidies may target economically disadvantaged groups that could not afford typical prices for installation and usage. Some operators may offer interest free loans or extended payment periods to assist new subscribers to connect to the network. In the U.S., the Lifeline program subsidizes basic monthly services charges for low income subscribers. The subsidy funds come from a combination of carrier contributions and surcharges on subscriber bills. Some 4.4 million households receive Lifeline assistance. Also in the U.S., the Linkup program subsidizes connection to the network for low income households.

Funds for subsidies may be generated from several sources such as contributions required from all carriers: for example, a percentage of revenues, a tax on revenues or a surcharge on customer bills. Subsidies may also come from general tax revenues or other government sources. Some countries with many carriers rely on settlement and repayment pooling schemes among operators to transfer payments to carriers with high operating costs. For example, the U.S. Universal Service Fund is mandated by the Federal Communications Commission (FCC) but administered by the carriers through the National Exchange Carriers Association (NECA), and transfers funds to subsidize access lines to carriers whose costs are above 115 percent of the national average [23].

In Poland, over 7,885 localities were connected between 1992 and 1996 with funding of US $20 million from the state budget [24]. In 1994, Peru established a rural telecommunications investment fund, FITEL (Fondo de Inversion de Telecomunicaciones), which is financed by a one percent tax on revenues of all

telecommunications providers, ranging from the country's newly privatized monopoly operator, Telefonica/ENTEL to cable TV operators. Since established, it has generated an average of US$450,000 per month; growing by US$12 million annually.[25] Private sector operators may apply to FITEL for financing.[26]

6. Rural Issues

6.1. Rural demand may be much greater than assumed.

In designing networks and projecting revenues, planners often assume that there is little demand for telecommunications in rural areas. Similarly, telecommunications service providers may be reluctant to extend services to poorer populations who are assumed to have insufficient demand to cover the cost of providing the facilities and services. Their forecasts are typically based solely on the lower population densities than are found in urban areas, coupled with a "one size fits all" fallacy that assumes all rural residents are likely to have lower incomes and therefore lower demand for telecommunications than urban residents. However, some rural residents may need telecommunications to order parts and supplies, check on international prices, and arrange transport of their produce to foreign markets. There may be significant demand from government agencies and NGOs operating in rural areas to administer health care services, schools, other social services, and development projects.

A study for the World Bank estimates that rural users in developing countries are able collectively to pay 1 to 1.5 percent of their gross *community* income for telecommunications services [27]. The ITU uses an estimate of 5 percent of *household* income as an affordability threshold [28]. Using a conservative estimate, 20 percent of households in low income countries such as India could afford a telephone.[29]

Just as income may not fully explain demand for information technologies and services, lack of access to telephone service cannot necessarily be attributed to lack of demand or purchasing power. For example, in many developing countries, television sets are much more prevalent than telephones. In industrialized countries, both TV sets and telephone lines are almost universally available. However, in middle income countries there are twice as many TV sets as telephone lines, while in low income countries, there are more than 5 times as many TV sets as telephone lines (see Table 2). In India there were about 3.3 times as many TV sets as telephone lines in 1999.

It appears that where television is available, a significant percentage of families will find the money to buy TV sets. Thus, even in the poorest countries, there may be much more disposable income available than per capita GDP data would indicate, and there may be significant demand for other information services.

Table 5: Access to Telephone Lines and Television Sets

Country Classification	Tel Lines /100	TV Sets /100	Ratio TV Sets/Tel lines
High Income	54.1	61.9	1.1
Upper Middle Income	13.4	26.3	2.0
Lower Middle Income	9.7	22.7	2.3
Low Income	2.5	13.1	5.2

Derived from: ITU, *World Telecommunications Development Report*, 1998.

Other approaches may also be used to gauge demand for information services. For example, the presence of video shops indicates significant disposable income available for television sets, video cassette players, and cassette rentals. Telephone service resellers (such as in Indonesia, Senegal and Bangladesh), local cable television operators (common in India) and small satellite dishes on rural homesteads and urban apartments (common in Eastern Europe and many Asian countries) also signal demand and ability to pay for information services.

Revenues from rural telephones may also be greater than expected, especially if incoming as well as outgoing traffic is included. For example, it is important to anticipate the influence of family ties on calling patterns. Communities where many people have left to seek work in the city or overseas may have high volumes of incoming traffic. For example, Filipina domestic workers call home from Hong Kong, Singapore

and Malaysia; Indians and Pakistanis call home from the Middle East, and miners in South Africa call their families in other parts of South Africa or neighboring countries such as Mozambique and Zimbabwe. There may also be extensive calling among family members scattered in villages throughout a rural region. The significance of rural toll traffic seems particularly important in estimating rural revenues in India, where revenues from village phones with STD are apparently nearly 50 times as high as revenues from VPTs without STD. [30]

6.2. Rural areas may not be as expensive to serve as is often assumed.

It is typically assumed by both operators and regulators that the costs of providing telecommunications in rural areas are unavoidably high, and, coupled with low demand, render rural services necessarily unprofitable. While costs per line are bound to be higher than in urban areas, creative strategies for design and implementation may reduce costs.

Topography and climate are important considerations in system design. A microwave network may be an appropriate solution for plains and valleys, but satellite service is likely to be more suitable for mountainous areas. Designing for available transportation facilities and labor can also reduce costs. For example, the Alaskan carrier GCI specified that VSATs built for operation in Alaska villages must be designed to be flown into villages in Cessna Caravan aircraft, as there are no roads to most villages. Maintenance and troubleshooting are to be done by bush pilots who regularly fly into the villages. Bell Canada trains local technicians to do basic telephone installation and troubleshooting in northern Canadian communities. Other strategies such as the use of prepaid stored-value telephone cards can save time and money by eliminating the need to collect coins from pay phones (while also preventing pilferage).

Modular design that allows for adding capacity when required will also reduce costs of upgrading service. Demand may increase not only with population growth, but also if there are changes in the economy or demands for new service, such as Internet access. A digital microwave system installed in the Australian Outback reached capacity much earlier than expected not only because of its design (which required remote switching for village-to-village traffic) but also because of unanticipated demand for fax and then Internet access. Upgrading the network required a complete overbuild. In the Marquesas in the South Pacific, satellite earth stations have been installed for telephone service and TV reception, but circuit capacity is very limited. When asked whether additional capacity could be added if demand increased (for example, for Internet access for schools), a site engineer said "There will never be more demand here." [31] Never assume never.

6.3. Rural benchmarks need not be set lower than urban benchmarks.

A persistent assumption is that "something is better than nothing"is the only policy that is technically feasible or economically justifiable for rural areas. However, a corollary of the lessons above, that revenues in rural areas may often be higher and costs lower than assumed, is that is no longer technically or economically justifiable to set rural benchmarks lower than urban benchmarks for access - both to basic telecommunications and to the Internet.

For example, the U.S. Telecommunications Act of 1996 sets a standard of reasonable comparability: rural services and prices are to be *reasonably comparable* to those in urban areas. While the US and other industrialized countries must upgrade outdated wireline networks and analog exchanges in rural areas, developing countries can leapfrog old technologies and install fully digital wireless networks. Thus developing country regulators can also adopt rural comparability standards to avoid penalizing rural services and businesses in access to information services. For example, in the Philippines, after extensive discussion, both government and industry representatives agreed on rural benchmarks including digital switching, single party service, and line quality sufficient for facsimile and data communications. The industry representatives stated that the new digital networks they were installing in rural areas met those specifications, and that older networks should be brought up to those standards. [32]

6.4. Some rural areas may be viable for commercial franchises.

Some countries grant monopoly franchises to rural operators. For example, Bangladesh has licensed two rural monopoly operators; they are allowed to prioritize the most financially attractive customers and charge an substantial up-front subscriber connection fee. The Bangladesh Rural Telecommunications Authority (BRTA) is profitable, even though it has to provide at least one public call office (PCO) in each village that requests one. [33]

Although in most countries a single carrier provides both local and long distance services, it is also possible

to delineate territories that can be served by local entities. In the U.S., the model of rural cooperatives fostered through the Rural Utilities Service (formerly Rural Electrification Administration) has been used to bring telephone service to areas ignored by the large carriers. As noted above, wireless technologies could change the economics of providing rural services, making rural franchises much more attractive to investors. As a result of availability of funds from the RUS for upgrading networks, rural cooperatives in the US typically provide more modern facilities and better Internet access than provided by large telephone companies serving rural areas.

Other countries are opening up rural areas to competition as part of national liberalization policies. Argentina allows rural operators to compete with the two privatized monopolies, Telecom and Telefonica. Some 135 rural cooperatives have been formed to provide telecommunications services in communities with fewer than 300 people. [34] Finland's association of telephone companies has created several jointly-owned entities that provide a range of rural, local and long distance services in their concession areas, in competition with the national operator [35]. In Alaska, a second carrier, GCI, competes with AT&T Alascom to provide long distance services in rural and remote areas. This competition has benefitted Alaskan schools in gaining access to the Internet. GCI has assisted school districts in applying for E-rate subsidies for Internet access, apparently viewing this initiative as a win-win opportunity for both schools and the telephone company.

7. Implementing the Vision

The above analysis assumes a broadening of information infrastructure issues to include rural as well as urban access, a range of levels and targets for services, and pricing to ensure affordability of access to a range of telecommunications services including access to the Internet. It involves an analysis of the potential benefits of access to education and social services, the impact of geographical as well as income-related disparities, and the potential benefits of affordable access to information for social and economic development. A conclusion that can be drawn from the above analysis is that changing the policy environment to create incentives to serve previously ignored populations may significantly increase access among these groups.

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Rural Utilities Service: www.rus.usda.gov
Sustainable Development Networking Programme: www.undp.org
Vitacom, Inc.:

Footnotes

[1] Derived from Henry et al., The Emerging Digital Economy

[2] It should be noted that Japan and Australia are included in the Asia/Pacific in this chart; the estimate in the text includes them with industrialized countries of Europe and North America.

[3] Derived from International Telecommunication Union. *World Telecommunication Development Report 1998.* Geneva: ITU, 1998.

[4] Derived from International Telecommunication Union. *World Telecommunication Development Report 1998.* Geneva: ITU, 1998.

[5] See Hudson, Heather E. *When Telephones Reach the Village.* Norwood, NJ: Ablex, 1984; Hudson, Heather E..*Economic and Social Benefits of Rural Telecommunications: A Report to the World Bank.* Washington, DC: World Bank, 1995; Saunders, Robert, Jeremy Warford, and Bjorn Wellenius. *Telecommunications and Economic Development*, 2nd edition. Baltimore: Johns Hopkins University Press, 1994.

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[8] For example, India has placed licensing responsibility with the Division of Telecommunications Services in the Department of Telecommunications rather than with the Telecommunications Regulatory Authority of India (TRAI).

[9] For example, the Canadian Radio-Television and Telecommunications Commission (CRTC) in Canada, and the California Public Utilities Commission in the United States.

[10] For example, Hong Kong and Singapore.

[11] Personal communication, July 1997.

[12] It appears that this has not been the case for village phones required to be installed by new fixed service providers (FSPs) in India. TRAI notes that only 12 village public telephones (VPTs) had been installed by three FSPs in the first 24 months, while a total of 42,841 VPTs were required under the terms of the licenses.

[13] Personal interview, Uganda Communications Commission, Kampala, November 1999.

[14] ITU, 1998, p.49.

[15] ITU, 1998, p. 50.

[16] Source: ITU, World Telecommunications Development Report, 2000.

[17] ITU, 1998, p. 77.

[18] ITU, 1998, pp.77-8.

[19] ITU, 1998, p. 69.

[20] Telecommunications Act of 1996.United States Congress. Public Law 104-104, February 8, 1996.

[21] Hegener, M. quoted in ITU, *World Telecommunication Development Report,* 1998, p. 80.

[22] Petzinger, Jr., Thomas. "Monique Maddy uses Wireless Pay Phones to Battle Poverty." *Wall Street Journal,* September 25, 1998, p. B1.

[23] See www.neca.org, and information on the Universal Service Fund on the FCC's website, www.fcc.gov.

[24] ITU, 1998, p. 78.

[25] ITU, 1998, p. 79.

[26] Kayani, Rogati and Andrew Dymond. *Options for Rural Telecommunications Development.* Washington, DC: World Bank, 1997, pp. 63-4.

[27] Kayani and Dymond, p. xviii.

[28] ITU, 1998, p. 35.

[29] ITU, 1998, p. 37. It should be noted that this calculation appears to assume even distribution of income throughout the society at higher income levels, which is not necessarily true.

[30] TRAI, p. 49.

[31] Personal interview, December 1996.

[32] Meeting at Department of Transport and Communications attended by the author, Manila, January 1998.

[33] Kayani and Dymond, p. 18.

[34] Kayani and Dymond, p. 18.

[35] Kayani and Dymond, p. 19.

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