出國報告(出國類別：會議)

出席太平洋電信協會(PTC)第27屆年會報告書

服務機關：交通部電信總局
姓名職稱：吳銘仁技正
派赴國家：美國夏威夷
出國期間：94年1月15日至1月21日
報告日期：94年4月11日

摘要

太平洋電信協會(PTC)第27屆年會援例於夏威夷檀香山舉行,今年的主題是“寬頻與內容 － 從有線到無線”（Broadband and Content：From Wires to Wireless),計有來自52個國家地區共917人與會。除年會、專題討論外並同時舉辦電信設備展覽,參展廠商達58家。年會、專題討論等會議之演講者共達160餘人。年會活動包含會員大會、各常設委員會會議及各種研討會等,研討會包括9 場大會/超級論壇（Plenary/ Super Session)、32 個並行論壇（Concurrent Session)、3個場次的講習會(Workshop)及3個場次的圓桌/小型討論會(Round Table /Panel),探討寬頻發展與內容應用、衛星商機、海纜、寬頻行動通信、VoIP 應用、寬頻遠距教學、全球資訊化社會、政策與監理等重要議題,規模盛大。

目錄

附件

出席太平洋電信協會(PTC)第 27 屆年會
報告書

壹、前言

太平洋電信協會(Pacific Telecommunications Council, PTC)爲一國際非官方組織之非營利性會員制機構，1980 年於夏威夷創立。原參加成員多爲太平洋地區之主要電話公司，後經逐年擴大成員範圍至電信設備製造商、電信顧問公司等電信相關廠商及個人，共分營利團體會員、非營利團體會員、個人會員、學生及附屬會員等五大類。電信總局於 1983 年起加入爲營利團體會員，直至 1996 年改制變更會員屬性爲非營利團體會員，同年中華電信公司則以營利團體身份加入。

太平洋電信協會第 27 屆年會（PTC '05）援例於夏威夷檀香山舉行，會議地點在 Hilton Hawaiian Village，今年的主題是“寬頻與內容 — 從有線到無線”（Broadband and Content：From Wires to Wireless），計有來自 51 個國家地區的 917 人與會，同時舉辦電信設備展覽，參展廠商達 58 家，其中各項會議演講者人數總計達 167 人。年會活動包含會員大會、各常設委員會會議及各種研討會等(詳附件一)，研討會包括 9 場大會/超級論壇（Plenary/ Super Session）、32 個並行論壇（Concurrent Session）、3 個場次的講習會（Workshop）及 3 個場次的圓桌/小型討論會（Round Table /Panel），探討寬頻發展與內容應用、衛星商機、海纜、寬頻行動通信、VoIP 應用、寬頻遠距教學、全球資訊化社會、政策與監理等重要議題，規模盛大。我國除本局、中華電信公司及其他廠商皆有派員出席參與外，尚有台北市政府應智慧社區論壇（Intelligent Community Forum, ICF）之邀請，派員在本年會分組討論會議擔任講者介紹臺北市過去一年建設網路新都之成果。

貳、行程安排

1 月 15 日	自台北中正機場啓程
1 月 16 日	參加會員大會及開幕

1 月 17 至 19 日　參加研討會

1 月 20 日　啓程返國

1 月 21 日　返抵國門

參、PTC 2005 年會會議紀要

一、會員大會與管委會會議

管委會（Board of Governors）會議由 PTC 會長及管委會主席 Bruce 主持。管委會會議依更正後之會議議程逐項進行。首先由 Bruce 致歡迎詞，並介紹被執行長選舉委員會提名之 Stephen Tom。經 Stephen 自我介紹其對 PTC 之願景及委員提議覆議後，委員會通過執行長人選之認可。其他主要議題包括：修正秘書長之職掌、PTC'05 會議之檢討、變更管委會運作方式、今年年中(2005/06)重點討論、財務報告等事項，會議紀錄詳附件二。

其中較值得一提的是管委會運作方面。管委會未來半年將於每月的第一週週三舉行管委會電信會議(BG teleconference)，會議紀錄將於一週內發布。若會員未於發布後 2 週內對會議紀錄表示意見，將被視爲認可會議紀錄。會議主要議題需經管委會多數委員(7 人)認可。會員可以以電子郵件方式表示意見。會議紀錄中若有議題採投票表決時，將會以粗體、底線及斜體字體呈現。另外，各委員會新當選之名單請詳附件三。

二、研討會

(一) 研討會包括 9 場大會/超級論壇（Plenary/ Super Session）、32 個並行論壇（Concurrent Session）、3 個場次的講習會（Workshop）及 3 個場次的圓桌/小型討論會（Round Table /Panel），探討寬頻發展與內容應用、衛星商機、海纜、寬頻行動通信、VoIP 應用、寬頻遠距教學、全球資訊化社會、政策與監理等重要議題。

(二) 衛星通信發展

今年大會安排許多場次進行衛星通信發展之探討。

- 在寬頻應用方面(詳附件四)：許多衛星公司分別介紹他們的衛星通信產品。1、Xantix 公司介紹該公司具有以 IP 技術衛星提供用戶 432kbps 速率以上之數據及語音通信服務，並可依需求進行分封交換或電路交換之連接。2、日本 WISHnet 公司則介紹以網際網路衛星提供動態頻寬分配/指配系統。該公司主要是以網際網路衛星提供點對點及 IP Multicast 服務。3、Intelsat 公司於會議中除了介紹該公司衛星系統發展外，並說明其可彈性提供各類業者取求之衛星通信服務。4、波音公司之 Connexion 計畫，則是以衛星技術提供行動資訊服務，使在航空器上、在船舶上或偏遠地區之人員可獲得高速網際網路寬頻接取服務。

- 衛星業務市場趨勢方面：與會討論之專家認同寬頻需求可促進衛星通信市場發展，且以衛星提供廣播、提供跨國企業寬頻網路或提供航空器、船舶上寬頻通信仍較其他類通信工具具優勢。但就應用在陸地上之衛星通信發展則有不一樣的看法。有些專家認爲衛星通信在偏遠地區，仍有相當好的機會提供寬頻通信服務，以補償有線網路及陸地無線網路建設之不足。但另一派專家則認爲衛星通信在偏遠地區提供寬頻通信服務雖具優勢，但偏遠地區同時意味著經濟較弱勢地區，僅有少數民眾或企業得以負擔使用衛星通信設備之成本。

(三) 陸地無線通信發展

今年討論的議題相當廣泛(如探討 WiMAX、下一代無線用戶迴路、行動 IP 的影響及 3G 核心網路 IP 化等議題)。

- 下一代無線用戶迴路方面：會議中有專家提出"北京 2008 年 4G:應用意義(4G Beijing 2008: Application and Implications)"之報告(詳附件五)。該篇文章說明中國大陸、日本及韓國在用戶數、手機製造及創新服務是全球無線通信領導者，預期亞洲未來是 4G 網路最先使用之地區。此外，文中特別將 4G 定義爲"無線對接點對點網路連線(wireless *ad hoc* peer-

to-peer networking)"，介紹一種將用戶無線終端設備視爲無線網路元件之一之架構。文中除了說明此架構可使傳統無線網路約有 80%成本花費在基地臺建置、20%技術之規則，轉變爲 20%建設成本、80%技術。但由於技術成本將會隨時間降低，在不需要大量建置基地臺之情況下，服務提供者可將節省建設成本嘉惠消費者，以加速擴大普及率，儘速達成網路之經濟規模。並從公共安全、交通控制、熱點(Hot Spots)及行動熱點等方面論述其架構優勢。

- 3G 核心網路 IP 化方面：日本 NTT DoCoMo 公司於會中說明該公司針對目前及未來數據通信需求，計畫將 3G 核心網路及接取部分 IP 化的規劃(詳附件六)。文中依據目前行動通信網路接取技術、用戶使用數據成長情況及莫爾定律(Moore's Law)與比爾喬定律(Bill Joy's Law)，預測至 2010 年數據通信需求將是目前的 70 倍，而語音通信需求則僅成長 1.2 倍。該公司針對上述數據需求分析採取中長期策略，一方面擴大用戶數，並在多媒體、普及性及全球化方面開放與其他業者之合作，以使分封服務通信量與營收成正比。另一方面，則應用 IP 技術以實踐高速、高容量及低成本之網路，並計劃將既有服務按部就班移轉至 IP 網路。

(四)寬頻網路發展

- 整體而言，目前已有許多電信業者著手進行核心網路技術的調整，將以分封交換取代電路交換，而中繼傳輸網路未來亦將以 IP 網路爲主。由於各國民眾近年來使用寬頻數據網路已日漸普及。電信業者以往僅在國內長途或國際電路應用 IP 提供較廉價語音通信服務之模式，將會隨著寬頻網路普及逐漸擴大至市話領域。

- VoIP 服務營收在 2004 年已較前年成長 30%，據專家預測至 2008 年之全球市場規模將達 300 億美元。在一般民眾普遍獲得寬頻服務，且各國間網際網路頻寬加大情況下，民眾將可使用寬頻網路之 VoIP 服務達成國內市話、國內長途及國際通信之目的。就國際業者而言，此一趨勢將會造成其直撥業務(International Direct Dial, IDD)營收下降。據專家在會中發表的

論文(Bypass and Transit - Arbitrage Issues in international Interconnection and Revenue Reporting in Developing Countries, 詳附件七)統計已有許多國家的去話分鐘數已掉 25%。同時清算營收(settlement revenue)亦會下降。但與會專家亦認爲各國監理者對其國內 VoIP 服務之監理機制(如號碼、普及服務費等)，亦會左右 VoIP 技術及寬頻網路環境對既有市話、長途及國際營收之影響。

- 美國學界在此次會場中發表一篇「普及服務的結束：網際網路電話之市場效益模型(The End of Universal Service: Modeling the Market Effects of Internet Telephony) 」論文，說明現行普及服務計畫無法滿足美國社會之需要。該篇論文認爲付予 VoIP 業者繳交普及服務費將會使 VoIP 費用增加，並將延後此技術原得以解構傳統電信業者壟斷市場及促使其對消費者提供廉價且有價值服務之益處。若取消普及服務計畫，此 VoIP 技術將可使電話服務之費用降低至人人皆可負擔之水準。但此措施需要修正美國電信法。(詳附件八)。

(五) 監理議題

1、頻譜管理

美國 FCC Jennifer A. Manner 以個人身分演講頻譜衝突(Spectrum Wars) (詳附件九)，廣泛介紹頻譜使用背景、國際與國內頻率管理監理機制、干擾的處理、免執照使用頻率之優缺點及需執照頻率分享的方式等，供與會者參考。

2、國際投資案例

美國 Global Crossing Limited 公司於會議中以該公司爲例，說明美國的法律力量及國家安全顧慮影響全球之投資(詳附件十)。該事件是起因於該公司之前，因網際網路泡沫化及經濟風暴吹襲到電信產業，使該公司面臨相當嚴峻的財務危機，並依破產法向法院聲請破產保護。破產保護期間已洽新加坡的 ST Telemedia 公司及中國香港的 Hutchison Whampoa 公司以總計現金美金 2.5 億換取該公司 61.5%的股權。但美國的外國人投資委員會則以 Hutchison Whampoa 公司屬於中國大陸爲由，拒絕核准此項投資。最後在總統於 2003 年 9 月 19 日未禁

止由 ST Telemedia 公司承擔所有投資資金情況下，由 FCC 於同年 10 月同意此項投資交易，解除該公司之破產保護。此案例突顯美國政府對外國人投資電信之顧慮，值得做爲我國政府在准駁外國業者投資我國第一類電信事業之參考。

肆、感想與建議

一、 感想

(一) PTC 組織藉由年會活動促進各國電信人員交流，並規劃相當空間供電信產業界展示商品之作法，具有豐富年會活動之效果，令人印象深刻。

(二) PTC 組織每年能夠吸引近千位之各界人士參與年會活動，除了活動內容安排妥適外，選擇在擁有完善休閒設施之渡假村舉行，亦是其成功之處。值得我國未來辦理類似之國際會議地點選擇之參考。

(三) 韓國學者在主講各國寬頻發展時，特別舉韓國爲例加以說明其國家推動寬頻網路的策略。韓國早期認爲電力是國家經濟之基礎，積極達成電力建設及普及；在目前知識經濟時代，則認爲寬頻網路是必要的基礎設施。因此，韓國會積極進行寬頻網路建設之推動，以使其成爲寬頻網路最普及之國家，其目前之成就不令人意外。但其「謀定而後動」之執行力，值得我國學習。

(四) PTC 組織在歡迎大會時，要求與會者爲去年 12 月發生南亞大海嘯受難者莫哀。並在結束大會安排探討海嘯下的通信系統，顯見其組織不僅提供各國電信人員交流，同時對電信技術改善人類生活亦相當關注。美國在大會中介紹通信技術得以預警大海嘯發展及廣播疏散之方法；日本業者則說明其對此次大海嘯受難國家進行災後通信設施支援之情況。此等跨國合作之作法，值得我國參與。

二、 建議

(一) 應持續培養電信、廣播、資訊及英文專業人才，積極參與國際組織活動。

爲因應未來 NCC 成立業務職掌範圍擴大與職權位階提升後，將需有更多具英文與專業能力之人員處理境外事務與國際交流。建議本局應擴大編列制度性與比例性出國預算，積極派員參與國際組織及參加國際會議，以達成電信、廣播、

資訊涉外專業人才之培養。

(二) 應持續關注電信、廣播及資訊技術發展，研擬妥適之發展策略，持續維持健全之通信環境。

依 PTC'05 與會專家事後檢視 93 年 12 月 26 日南亞地震引發世紀大海嘯之探討，認爲若當時鄰近國家有較完整通信環境，將有較多時間可以進行人員疏散措施，以降低傷亡人數。若以此檢視我國情況，整體而言，我們的通信設施已相當多元，民眾持有行動手機之普及率亦全球排名前茅。但我國屬多山之海島地型，近年來亦常遇到地震或颱風引發山崩、土石流或水患等情事。因此，建議在推動電信普及服務以達成全民平時皆可獲得適當之基本通信服務外，是否亦可研究如何使民眾將隨手可得之通信工具，於緊急災難發生時，可轉變成通報工具。使行政機關得以有效且低成本的方式，建立災害地區人員疏散之受信及廣播等作業。

(三) 審慎檢視相關法規以因應 VoIP 應用技術之發展

今年與會主講 VoIP 發展者認爲此一應用將會日漸普及，其營收亦會水漲船高。但未來可能會對既有電信網路之計費模式及電信監理機制產生影響。我國雖早於 2001 年 7 月即開放網際網路電話服務。但尚未核配 ITU-T E.164 電信號碼。建議針對該類業者未來是否可以獲配電信號碼，及若業者可擁有電信號碼，則業者間之網路互連、費率攤分及通信監察與普及服務等配套措施可一併研議，以因應新技術對監理機制之影響，確保整體電信經營環境之穩健發展。

伍、結語

總的來看，此次年會各議題探討中，已突顯行政機關之電信政策、法規及行政作爲，具有影響電信業者之競爭秩序。而電信、資訊及廣播技術不斷的創新，則對行政機關既有的監理措施，帶來某種程度之定性衝擊。唯有行政人員不斷提升專業水準，並充分掌握通信技術發展，適時調整監理機制，才能使消費者得以持續且適時獲得廉價、安全及方便之通信工具；也才能促使電信業者不斷提升通信服務品質及及時推出各項創新服務，以達成其企業得以永續經營之發展。

最後，感謝 鈞長給予職出國參與國際會議之機會，會議期間各電信專家、

學者針對各種通信技術發展、電信監理相關議題之論述，對職後續之工作具有莫大幫助。期望能對局方監理措施帶來益處。

附件一：年會議程

PTC'05 PRELIMINARY CONFERENCE PROGRAM

(Subject to Change)

Sunday, 16 January 2005

0800 – 1830
CONFERENCE REGISTRATION

0800 – 1800
EXHIBITOR REGISTRATION / MOVE-IN

0830 – 1545
GVF ASIA-PAC SATCOMS FORUM
Network Deployment and the Asia-Pac Sustainability Imperative:

ICT Applications and 'Best Practice' Satellite Solutions Satellite-based communications provides the only effective breakthrough from the bottleneck that is the under development of telecommunications services throughout much of the Asia-Pacific region.

Yet, from the greatest cities to the smallest villages, access to information and the development of the knowledge society through low cost telecommunications connectivity is an absolute imperative for the continued economic and social development of the nations of the land and ocean masses of Asia and the Pacific.

Recognising this imperative, the GVF Asia-Pac Satcoms Forum will address key issues regarding the world of connectivity solutions from satellite-based and satellite-terrestrial hybrid technologies and will offer examples of 'best practice' in the creation of strategies for satellite terminal deployment, network roll-out and sustainable application development.

0900 – 1130
MORNING WORKSHOPS / ROUND TABLES

WKS 1
BROADBAND AND WIRELESS IN ASIA: TRENDS AND OPPORTUNITIES
Hosted by Paul, Weiss, Rifkind, Wharton & Garrison LLP

Broadband has become the key to development in Asia, and throughout the world. The rapid changes in the broadband sector, and the acceleration in deployment of broadband, are complemented by change in the delivery of, and content provided for, wireless and mobile services. The challenges in these sectors are particular substantial in Asia, where there is a wide disparity among nations, from those with highly advanced broadband and wireless sectors (e.g., Japan and Korea), to those that have only recently begun to see the widespread deployment of broadband and wireless.

This Workshop will examine these challenges — and the associated opportunities — from several perspectives. Three Paul, Weiss lawyers expert in China issues will consider the many facets of the Chinese economy as it modernizes in broadband and wireless. A Paul, Weiss partner based in Tokyo will focus on issues of consolidation and competition in the Japanese economy. And, two Paul, Weiss partners from the United States will discuss two sets of overarching global issues for broadband and wireless: the regulation of voice over Internet Protocol (VoIP) services; and the concerns about national security and global trade in the relevant sectors.

Introduction and Overview
PHILLIP L. SPECTOR, Partner, Paul, Weiss, Rifkind, Wharton & Garrison LLP (PWRW&G), *USA*

CHINA

- ***Investment by Chinese Companies in the Broadband and Wireless Sectors***
  JEANETTE CHAN, Partner, PWRW&G, *Hong Kong SAR, China*
- ***In-bound Investment into China***
  MARCIA ELLIS, Counsel, PWRW&G, *Hong Kong SAR, China*
- ***The Role of Patent and Trademark Protections***
  CORINNA YU, Associate, PWRW&G, *People's Republic of China*

JAPAN

- ***Broadband and Wireless in Japan: Consolidation and Competition***
  LISA YANO, Partner, PWRW&G, *Japan*

GLOBAL ISSUES

- ***Voice over IP (VoIP) and Global Regulation***
  PATRICK CAMPBELL, Partner, PWRW&G, *USA*
- ***National Security and Trade Constraints***
  PHILLIP L. SPECTOR, Partner, PWRW&G, *USA*

WKS 2
PRACTICAL STEPS IN BUILDING A CHANGE MANAGEMENT COMPETENCY

Living in the context of permanent ongoing change means that corporations need to be able to understand, embrace and implement change as a consistent reality, but more importantly they also need to be able to initiate and lead change. The ability to do this will be an important differentiator and a key competitive advantage. This workshop will outline the challenge and the opportunity that confronts us as corporate leaders. It will explore the drastic change required within our companies in order to deal with the dramatic change in the technology and communications industries. This session will explore the challenge of shifting from existing to new ways of thinking about how we structure and run our companies — and particularly on how we lead change within technology companies. It will outline the core principles for success and will provide a practical framework for achieving the sustainable change that is required *within* and amongst our own employees.

The workshop will consider examples and references to best practice/case studies/personal experience in regard to six questions:

- What is the core or essential requirements for the individual telecom/technology company in order for it to deal adequately with the constant external change in the market and industry?
- What are the more common ways in which companies try to prepare and equip themselves to meet these requirements?
- Why is it that some efforts (and some companies) are significantly more successful than others in doing this?
- What do you regard as the critical success factors in enabling telecom/technology organizations to meet the demands of constant change?

- What do you regard as the core implications for leaders/executives in telecom/technology companies?
- What implications do you think merger/acquisition activity has for how telecom organizations need to deal with managing change?

This interactive and experiential session will enable participants to develop the skills and techniques required to build a core competency within an organization for achieving significant, smooth and sustainable change. Participants will explore a step-by-step approach to change management as a core competency, become familiar with specific tools that can be used to implement this approach and develop potential action plans for implementing the learning within their own organizations.

Presenters:
RIC MATTHEWS, President, Radical Momentum Consulting, *Canada* and RENE ROBERTSON, Psychologist, *USA*

ROUND TABLE 1
STANDARDIZING LAST MILE BROADBAND DEPLOYMENT TECHNOLOGIES USING EXISTING UTILITIES
Hosted by ASTM International

Building optical fiber in dedicated conduits placed in open cut ditches to solve the last mile and the fiber glut problem cannot be done due to excessive delays, lack of permits to open/cut, disruption to traffic in highly populated areas, and the enormous cost of construction. The very governmental, commercial, and residential end users who are craving for true broadband coming into their premises already have power lines, sanitary sewers, storm drains, drinking water pipes, and natural gas lines reaching their premises to meet their needs. They also have roads and electrical conduits reaching them. The fat pipe to carry infinite voice/video/data from multiple providers could be housed in these utilities by forming creative business partnerships among optical fiber owners, service providers, utilities, and vendors. Fiber could also be installed in micro-road cuts and micro-ducts. Municipalities and energy companies could even take the lead in this new paradigm in some situations, given they own and manage most of these underground assets for the public. By them taking the initiatives for building the last mile fiber, they could meet the needs of broadband, renovation of their aging pipeline infrastructure, and improved sensing, surveillance, and security of vital lifelines. Because of this, the telecommunications industry has vigorously promoted alternative methods that circumvent these problems. And, as these alternative installations solutions have emerged, a new group of voluntary standards developed through ASTM International have concurrently evolved through industry cooperation. This round table shall provide an overview of the enormous benefits to the ICTs, Municipalities, Energy Companies, and others, when they seek to complete the last mile.

Opening Remarks:
JEY K. JEYAPALAN, Chair of ASTM International Committee F36: Technologies and Underground Utilities

History and Market Positioning Power of ASTM Standards
DANIEL SCHULTZ, Manager of Standards, ASTM International, *USA*

Deployment of Fiber in Natural Gas Lines Provide a Lucrative Solution to Last Mile Connectivity
SCOTT A. BEALS, Vice President, Technology, Sempra Fiber Links, *USA*

Transforming Sewers into a Last-Mile Access and Revenue Generating Asset
MICHAEL C. WELCH, CEO, BRB Contractors, Inc., *USA*

Effectiveness of Intelligent Drill and Dowel Robots in Getting the Job Done
JACK J. CONIE, III, President & CEO, Ca-Botics Fiber Systems, *USA*

History, Track Record, and Success of Japanese Optical Fiber Installation Robots
TAKEHISA HATTA, Board Member, Nippon Hume Corporation, *Japan*

Would the Sewer Owners Go for This?
BUDDY BARNES, Carter Burgess, *USA*

Broadband Over Power Lines as a Cost Effective Last Mile Solution
JAMES VALLE, Founder and Chief Executive Officer, Fiber Bridge Communications, Inc., *USA*

Partnering with Sewer Owners to Rehabilitate Sewers for Fiber Installation and Provide for Their Long-Term Maintenance
STEVEN HENNING, Consultant, *USA*

Preparing Water Lines for Fiber Installation and Preserving Their Civil Life
MARK P. SMITH, Jacobs Civil, Inc., *USA*

ROUND TABLE 2
E-LEARNING COURSE MANAGEMENT: INTERNATIONAL CASE STUDIES AND EVALUATION OF ALTERNATIVE SYSTEMS

There exist many different e-learning management systems (ELMS). Not all of them fit equally to all environments. Our goal is to discuss various ELMSs and propose their appropriate use in specific environments. Each participant works with one or more ELMS in his/her teaching and learning settings. These settings represent a spectrum of educational and social communities (elementary to life-long learning, local to international, etc.). The ELMSs will be characterized, evaluated and their appropriate application within different educational environments will be proposed.

Participants:

JOHN H. SOUTHWORTH, Educational Associate, Curriculum Research & Development Group, College of Education, University of Hawaii, *USA*

CURTIS HO, Chair, Department of Educational Technology, University of Hawaii, *USA*

JOZEF HVORECKY, Chair, Department of Information Science, Vysoka skola manazmentu, *Bratislava, Slovakia*

SHIBO NARITA, Professor of Education, Hyogo University of Teacher Education, *Japan*

1130 – 1315
MEMBERS' MEETING

1200
LUNCH ON OWN

1315 – 1545
AFTERNOON WORKSHOPS / ROUND TABLES

WKS 3
VOIP REGULATORY ISSUES
Hosted by Coudert Brothers LLP
(PTC's Official Legal Counsel)

ROUND TABLE 3
APPLICATION AND SUBSCRIBER DATA MINING FOR BANDWIDTH MANAGEMENT

ROUND TABLE 4
HAWAII'S ROLE IN PACIFIC ISLAND DISTANCE LEARNING
(Hosted by PTC Hawaii Foundation and PEACESAT)

This round table will bring together a number of Hawaii-based programs and resources which are available to address the educational needs of the Pacific Island region. Participants will gain a clearer understanding of the resources currently in use and which may have the potential for expanded usage in the region. Principals from various programs and projects will be able to discuss at a significant level the prospects of collaboration and cooperation.

1530 – 1600
AFTERNOON BREAK

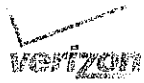
1600 – 1800
OPENING CEREMONY

YOSHIO UTSUMI, Secretary-General, International Telecommunications Union

Opening Plenary Session
JEFF PULVER, President & CEO, Pulver.com, *USA*

Other participants to be advised.

1830 – 2000
OPENING RECEPTION
Sponsored by Verizon



Monday, 17 January 2005

0700 – 1700
CONFERENCE REGISTRATION

0715 – 0800
SPEAKERS' BREAKFAST

0800 – 1030
EXHIBITOR REGISTRATION / MOVE-IN

0830 – 1000
CONCURRENT SESSIONS I

M.1.1
DOES SATELLITE SERVE ASIA ENOUGH? — FUTURE MARKET TREND

Broadband application via satellite has been touted as a killer application to B2B and B2C to enterprise network. This year will be a pivotal year for its application in Asia. The Panel will discuss winning strategies for effective utilization of satellite for broadband service. Many Asian countries are operating DTH platforms successfully on their national satellite. Shortage of local content is a problem in Asian DTH operators. This year marks the first DMB (Digital Multimedia Broadcasting) services in Japan and Korea, first of this kind in the world. DMB service offers digital content directly to handheld wireless terminals, like PDA, mobile telephone and automobile. The expert panel members will discuss business issues, new business development, market strategy and share their views on future prospects of the satellite industry in the Asia-Pacific region.

Chair:
EUI K. KOH, President, APSCC

Panelists:
JOHN KIRCHNER, Vice President Marketing, LoraiSkynet, *USA*
JEAN-YVES LE GALL, President, Arianespace, *France*
SAMUEL KOO, President, Arirang TV, *Republic of Korea*
THOMAS CHOI, Vice Chairman, Speedcast, *Hong Kong SAR, China*
YUTAKA NAGAI, Senior Executive Officer, JSAT, *Japan*

M.1.2
VOIP REGULATORY ISSUES

Chair:
TARA GIUNTA, Partner, Coudert Brothers LLP, *USA*

M.1.2.1
Voice over IP: Telephony or Information Service?
GRANT LUSTY, Business Development Manager, Voice Technologies Group, Cisco Systems Asia Pacific, *Singapore* and K.C. LAM, Senior Business Consulting Manager, Cisco Systems Asia Pacific, *Hong Kong SAR, China*

M.1.2.2
The End of Universal Service: Modeling the Market Effects of Internet Telephony
MARTHA GARCIA-MURILLO, Assistant Professor of Information Studies and LEE W. McKNIGHT, Associate Professor, School of Information Studies, Syracuse University, *USA*

M.1.3
BROADBAND DISTANCE EDUCATION IN 2007: VIEWS FROM THE DEMAND SIDE

Chair:
T. CRAIG MONTGOMERIE, Professor Emeritus, Department of Educational Psychology, University of Alberta, *Canada*

The major objectives of this panel will be to discuss some of the leading edge uses of broadband in education; to forecast how broadband could be used in distance education in the near future; to identify the constraints on these visions; and to identify the kinds of collaborative research that may be required between educators and industry.

Topics include:

Leading edge applications of broadband in (distance) education

Merging of "distance education" and "traditional" education

Evolution of broadband networks in education: private vs. public networks

All IP networks and education

Managed IP services and education

Panelists:

MICHAEL DAVENPORT, Consultant, Davenport and Associates, *Canada*

LOUIS FOX, Vice Provost, Educational Partnerships and Learning Technologies, University of Washington, *USA*

CATHY KING, Director of Member Services, Netera Alliance, *Canada*

HAE OKIMOTO, Director, Distributed Learning and User Services, University of Hawaii, *USA*

OMAR PONCE DE LEON, Professor, Universidad Autonóma del Estado de Morelos, *Mexico*

G.A. REDDING, Adjunct Staff Member, Institute for Defense Analyses, *USA*

M.1.4
Next Generation Wireless Local Loop

Chair:
KEN ZITA, Managing Partner, Network Dynamics Associates, LLC, *USA*

M.1.4.1
4G Beijing 2008: Applications and Implications
ALLEN H. KUPETZ, President, Kpartnerz, Inc., *USA*

M.1.4.2
Constructing Future Proof Access Networks Using Ethernet Wireless Technology
ERIK BOCH, VP of Engineering and CTO, DragonWave Inc., *Canada*

M.1.5
Managed Session on Mobile

1000 – 1030
MORNING BREAK
Sponsored by Rostelecom

ROSTELECOM

1030 – 1200
PLENARY SESSION

WILLIAM KENNARD, Managing Director, Telecommunications and Media, The Carlyle Group, *USA*

Other participants to be advised.

1130 – 1730
EXHIBITS OPEN

PTC '05

1200 – 1330
LUNCHEON

The Growing UHF MILSATCOM Gap and Commercial Gapfiller Solutions"

Sponsored by SIA

SIA SATELLITE INDUSTRY ASSOCIATION

Moderator:

DAVID CAVOSSA, Executive Director, SIA

Other participants to be advised.

1200 – 1330
LUNCH IN EXHIBIT HALL

1330 – 1500
CONCURRENT SESSIONS II

SS

M.2.1
SATELLITE CEO SUPER SESSION TRACKING THE NEW BUSINESS OPPORTUNITIES
Organized by the Satellite Industry Association (SIA) & Access Intelligence, LLC

Chairmen:
DAVID CAVOSSA, Executive Director, Satellite Industry Association (SIA), *USA*

DAVID BROSS, Associate Publisher, Editorial, Access Intelligence, LLC, *USA*

The Asia-Pacific region continues to be the third-largest market for the global communications satellite industry. The region continues to be an area open and ready to consider new satellite applications, services and innovative solutions. Satellite concerns have positioned themselves for sustained profitability and steady revenues. What are the key challenges facing satellite companies in the Asia-Pacific region? What techniques are these CEOs using to overcome those challenges? Will there be more consolidation in this sector? The top CEOs from the global communications satellite industry will gather

at PTC'05 to discuss how this dynamic sector of the communications market is surviving consolidation and facing increased competition and challenges during this conference Super Session.

Panelists:
ROMAIN BAUSCH, President & CEO, SES Global, *Luxembourg*
MARK DANKBERG, CEO, ViaSat Inc., *USA*
TED GAVRILIS, President, Lockheed Martin Commercial Space Systems, *USA*
PETER JACKSON, CEO, Asia Satellite Telecommunications Co. Ltd., *Hong Kong SAR, China*
DUMRUNG KASEMSET, Executive Chairman, Shin Satellite, *Thailand*
CONNY KULLMAN, CEO, Intelsat Ltd., *USA*
JIM MASER, President and General Manager, Sea Launch Company, LLC, *USA*

M.2.2
VOIP APPLICATIONS: HOW CARRIERS ARE MAKING MONEY

Chair:
SCOTT WHARTON, Vice President of Marketing, Broadsoft, Inc., *USA*

The objective of this session will be to educate carriers on the VoIP applications deployed today. Through examples (e.g., IP Centrex, Hosted PBX, VoIP over Mobile/3G/802.11x networks and Residential Broadband offerings) and end-user case studies, the session will demonstrate how carriers are deploying, making money from these new applications, and providing value to the end customer.

This panel will focus on how carriers can offer local VoIP services that are superior and more lucrative than those currently offered on their TDM infrastructures. The topics will include how to select different VoIP applications applicable to residential customers, small- and medium-sized businesses, as well as large enterprise.

Panelists:
JOHN MELICK, Co-President, Primus, *USA*
BRAHAM SINGH, COO, PCCW, *Hong Kong SAR, China*
SCOTT WHARTON, Vice President of Marketing, Broadsoft, Inc., *USA*
RICH GRANGE, President and CEO, New Global Telecom, *USA*

M.2.3
MANAGED ENTERPRISE IP

Chair:
JAGADISH RAO, Consultant, *USA*

M.2.3.1
Exploiting the Potential of IP Networks
MAYUKO NISHIDA, Senior Manager, Global Service Business Division, Global IP Network Group, NTT Communications Corporation, *Japan*

Presenter:
YUKIMASA ITO, Vice President, Global Service Business Division, Global IP Network Group, NTT Communications Corporation, *Japan*

M.2.3.2
Utilizing Converged Networks to Provide Cost-Effective Services Worldwide
PETE BELL, Vice President and General Manager, WilTel Communications, *USA*

M.2.3.3
Interworking IP and MPLS with ATM, Frame Relay, Ethernet, and Other Data Networking Protocols
ANDREW G. MALIS, Chief Technologist, Tellabs, *USA*

M.2.3.4
Learning How to Leverage Your Existing MPLS Network
DAN DEARING, VP of Marketing, NexTone Communications, *USA*

M.2.4
BIO-PREPAREDNESS, E-LEARNING, TELECOMMUNICATIONS AND THE ASIA-PACIFIC REGION

Chair:
LOUIS FOX, Vice Provost, University of Washington, *USA*

The panelists will discuss several innovative projects designed to improve public health bio-preparedness by enhancing communication, coordination, and cooperation among the relevant sectors of the Asia-Pacific nations, e.g. health, agriculture, trade, communications, and first responders, through the collaborative participation in computer-supported bio-preparedness exercises and through various e-learning programs. Adding value to the projects to be discussed is the application of advanced networking communications technologies between economies, facilitated through partnering leading research universities, governments, telecommunications companies, and advanced networking entities within the economies. Projects have some or all of the following goals:

- Improve public health emergency preparedness in and among Asia Pacific nations.
- Reduce economic risk in these economies through enhanced intersectoral preparedness for epidemic disease.
- Use advanced network technologies and applications for secure communication, collaboration and visualization.
- Continue to provide timely disease alerts, and updated distance learning materials as core activities.

By facilitating cooperation between public health sectors of the APEC member economies, and integrating existing systems of computing and communication into this collaboration, the entire Asia Pacific region can reduce the biological and economic threat posed by emerging and re-emerging infections.

M.2.5
MANAGED SESSION ON GENERAL TELECOM LAW IN ASIA-PACIFIC
Hosted by Asia Law and Practice

1500 – 1530
AFTERNOON BREAK

1530 – 1700
CONCURRENT SESSIONS III

M.3.1
DOING WELL BY DOING GOOD: THE NEXT WAVE IN SATELLITE CONTENT DISTRIBUTION?
Presented by World Teleport Association

Chair:
BRUCE ELBERT, President, Application Technology Strategy, Inc., *USA*

This session continues a series of panels among satellite communications services providers, the markets they serve and an entire new cast of potential customers.

The market for broadband transmission services via satellite to, from and throughout Asia is growing fast. Not only telecom carriers, but ISPs, broadcasters, corporations and government agencies continue to use and to grasp the benefits and opportunities afforded by satellite services. While the commercial and military sectors continue to use services, a social phenomenon is taking place: satellites are being used to provide a range of "intelligent" services. These include distance education, telemedicine and, in more and more cases, an entire infrastructure for a city, region or town.

This session will explore what is happening in this area and what the exciting possibilities are for those who embrace the satellite communications. This session will present insights from the people who know and who have installed Internet cafes on Mt. Everest and use satellite to help people cross the "Digital Divide." You will come away with at least one strategic or useful sales insight from this group. You will also get a better understanding of how the satellite industry is truly "bringing the world to the world" in a positive way. These panels are intended to be penetrating and entertaining, and feature the satellite industry's brightest executives who work closely with customers and see the changes that the industry is bringing to the human community first-hand.

Panelists:

MALCOLM WARREN, Managing Director, Business Development, ViaSat, Inc., *USA*

DEEPAK MATHUR, Worldsat, *Singapore*

AMER KHOURI, Vice President – Marketing, Intelsat, *USA*

BO NORTON, Director of Sales, Telenor Satellite Services, *USA*

M.3.2
TRANSITION TO VOIP

Chair:

MICHAEL A. KATZ, Consultant, *USA*

M.3.2.1
Exploiting VoIP Markets – The Art of Balance

GUY McAREE, Head of Marketing, New Global Telecom, *USA*

Presenter:

RICH GRANGE, President and CEO, New Global Telecom, *USA*

M.3.2.2
Migrating to an IP-based Infrastructure: Strategies for Service Providers

GUY CHENARD, Vice President, Marketing and Business Development, Integral Access, *USA*

M.3.2.3
Overcoming the Limitations for Softswitched Architectures

SRIDHAR RAMACHANDRAN, Co-Founder, NexTone Communications, *USA*

M.3.2.4
VoIP Network Security Threats: How to Anticipate and Defend Against Intruders

EJOVI NUWERE, Chief Technology Officer, SecurityLab Technologies, *USA*

M.3.3
STRATEGIES FOR IMPLEMENTING UNIVERSAL ACCESS:TOWARD A GLOBAL INFORMATION SOCIETY – SUPER SESSION

Chair:

ROBERT WALP, Founder and President Emeritus, GCI, *USA*

In recent years, there has been significant progress in extending access to telecommunications throughout the world, largely because of the explosive growth of wireless cellular networks, even in poorer countries. However, access is far from universal, with many rural and impoverished areas still unserved. Access to the Internet is far more limited, with connectivity unavailable in many regions and unaffordable for most people even where it does exist in the developing world.

Throughout the 1990s, a number of new approaches to extending telecom networks to previously unserved areas have been tried, including both market and public sector approaches. Some of these have been highly successful. In addition, in December 2003, The World Summit on the Information Society (WSIS) pledged to turn the digital divide into a digital opportunity for all. One of its proposals for consideration is a Digital Solidarity Fund to help bridge the divide. Studies on the financial requirements and options to secure needed funds are to be completed before the final session of the WSIS in November 2005. Since its founding, PTC has been concerned with improving access to telecommunications in the developing world, particularly in the Asia-Pacific region. Thus PTC is sponsoring this Super Session to address these concerns and provide input to the WSIS process. Further, the Communications Society of the IEEE (Institute of Electrical and Electronic Engineers), through its Subcommittee on Global Access, is supporting this effort as a co-sponsor; Dr. Seo and Mr. Walp are Fellows of the IEEE.

The panel of experts will explore a range of policy solutions for providing affordable universal access for a truly global Information Society. It will critically assess progress toward bridging the "Digital Divide" and various approaches that have been implemented, and are being proposed to help achieve universal access, including both private and public sector initiatives. It will also examine the preparatory work of the UN Task Force on Financial Mechanisms and the viability of a global Digital Solidarity Fund, and its economic, political, and regulatory implications.

Panelists:

WILLIAM H. MELODY, Director, World Dialogue on Regulation and LIRNE.NET, Technical University of Denmark, *Denmark*

ROHAN SAMARAJIVA, Former Head, Telecommunication Regulatory Authority and Former Head, Public Interest Policy Unit, Ministry of Economic Reforms, *Sri Lanka*

JUNG UCK SEO, Chairman, Innoace, Former CEO of SK Telecom, Professor Emeritus, Seoul University and Former Minister of Science and Technology, *Republic of Korea*

RANDY SPENCE, Senior Economist, International Development Research Centre, *Canada*

Discussant:

HEATHER E. HUDSON, Director, Telecommunications Management and Policy Program, University of San Francisco, *USA*

M.3.4
ADVANCED RESEARCH AND EDUCATION NETWORKS: GLOBAL COLLABORATIONS

Chair:

JACQUELINE BROWN, Director, Technology Outreach, Pacific Northwest Gigapop, *USA*

Advanced networks have become one of the cornerstones of collaboration for research and education in the 21st century as the commercial Internet has been unable to support the bandwidth intensive and other advanced needs of those constituencies. In many ways, the technologies developed and deployed in these advanced networks are leading the way to the next generation of the commercial Internet, such as with early deployment of 10Gbps circuits, multicast deployment across autonomous systems and advances in user control of lightpaths. Examples are multiplying of cross-sector and cross-boundary collaborations in the creation of those advanced networks. The challenge will be to insure that these national and multi-national efforts interoperate seamlessly.

Topics:

Driving Bandwidth-hungry Applications: SX-TransPORT — the Infrastructure to Support e-science

Speakers:

GEORGE McLAUGHLIN, Director, International Developments, AARNet, *Australia*

FIONA BECK, CEO, Southern Cross Cable Networks, *New Zealand*

GLORIAD: A Ring Around the Northern Hemisphere for Science and Education Connecting US, Russia, China and Korea with Advanced Network Services

Speakers:

JIM OLSON, Executive Director – Americas Region, Tyco Telecommunications, *USA*

GREG COLE, Director, Center for International Networking Initiatives, Joint Institute for Computational Sciences, University of Tennessee, Oak Ridge National Laboratory, *USA*

NATASHA BULASHOVA, Associate Director, Center for International Networking Initiatives, Joint Institute for Computational Sciences, University of Tennessee, Oak Ridge National Laboratory, *USA*

M.3.5

FOCUS ON CHINA

Chair:

GREGG DAFFNER, President, G³ Global Communications Consulting, *USA*

M.3.5.1

Content Regulation with Chinese Characteristics: Optimizing Content Regulation Without Sacrificing Control

MARCIA ELLIS, Counsel, Paul, Weiss, Rifkind, Wharton and Garrison, *Hong Kong SAR, China*

M.3.5.2

Convergence Between the Cable Network and Telecommunication Network in China

HONG QIANG, PhD Candidate of Mass Media Studies, College of Communications and CHUN LIU, PhD Candidate of Mass Communications, Institute for Information Policy, Pennsylvania State University, *USA*

M.3.5.3

Modeling IT for Growth: How China's Informatization Index System Informs its Development Policy

BIN ZHANG, Professor, School of Economics and Management, Beijing University of Posts and Telecommunications, *People's Republic of China*; RICHARD TAYLOR, Co-Director, Institute for Information Policy and CORINA CONSTANTIN, Graduate Research Fellow, Pennsylvania State University, *USA*

M.3.5.4

Wireless LAN Bi-directional Authentication

XU XIA, Post-doctoral Fellow, Department of Electronic Engineering, The Modern Communication Institute, Shanghai Jiaotong University; JIANHUA LI, Professor; and KAIYUAN ZHEN, Professor, Southeast University, *People's Republic of China*

1630 – 1730

EXHIBIT COCKTAIL RECEPTION

Tuesday, 18 January 2005

0715 – 0800
SPEAKERS' BREAKFAST

0730 – 1630
CONFERENCE REGISTRATION

0830 – 1000
CONCURRENT SESSIONS IV

T.1.1
MANAGED SESSION ON VOIP

T.1.2
THE FIGHT FOR SPECTRUM

Chair:
JENNIFER WARREN, Senior Director for Trade and Regulatory Affairs, Lockheed Martin Corporation, *USA*

Who's fighting and, where and why? Is spectrum really a limited resource? Is "spectrum sharing" a solution or a problem? What does it mean, "spectrum management should be market driven" — simply available to the highest bidder? What spectrum rights should licensed and licensed-exempt services have? What role should consumer expectations play in spectrum management? These are the fundamental questions that our panel of experts will address.

Panelists:
SIDDHARTHA RAJA, PhD Student, Speech Communication, University of Illinois, Urbana Campaign, *USA*
JENNIFER MANNER, Senior Counsel to Commissioner Abernathy, Federal Communications Commission, *USA*
JOHN JANKA, Partner, Latham & Watkins, *USA*

T.1.3
DEVELOPMENT ISSUES

Chair:
EIJI HAYASHI, Chair Emeritus (Individual), Pacific Telecommunications Council

T.1.3.1
The Implementation of Plan Actions of WSIS (World Summit on Information Society) Geneva, Switzerland; Focusing on the Role of CAP (Community Access Point) in Enhancing Online Learning to Close the Digital Divide to Build Civil Society in Indonesia
NASWIL IDRIS, Professor in Communication Studies and Expert Staff of TKTI (Indonesian ICT Coordinating Team), Indonesian Ministry of Communication and Information, *Indonesia*

T.1.3.2
Investing in Infrastructure: Bridging the Broadband Divide in the Developing World
HEATHER E. HUDSON, Director, Telecommunications Program, School of Business and Management, University of San Francisco, *USA*

T.1.3.3
Fiji's Information-economy and the Role of Information and Communication Technology (ICT) Literacy Education in the Age of Broadband
MAKI KATO, Coordinator and Expert of "ICT Capacity Building @ USP" Project, Japan International Cooperation Agency (JICA), *Fiji*

T.1.4
TRACKING BROADBAND ADOPTION

Chair:
ANTHONY C. GARDINER, President, Kensar Telecommunications, Ltd., *Canada*

T.1.4.1
Best Practices in Broadband Development: Lessons from Canada, Japan, Korea and the United States
ROB FRIEDEN, Professor of Telecommunications, Pennsylvania State University, *USA*

T.1.4.2
Profiling Leaders and Laggards in the Global 3G M-Business Applications
NIR KSHETRI, Assistant Professor, Bryan School of Business and Economics and PRABHU SANKARANARAYANAN, MBA Student and Research Assistant, University of North Carolina — Greensboro, *USA*

T.1.4.3
Engaging Customers and Communities in Developing Content for Broadband — a New Zealand Case Study
ERNIE NEWMAN, Chief Executive, TUANZ (Telecommunications Users Association of New Zealand, Inc.) and Chairman of INTUG (International Telecommunications Users Group), *New Zealand*

T.1.5
MOBILE BROADBAND — CHANGING THE WAY WE DO BUSINESS TODAY AND IN THE FUTURE

Mobile broadband has been influential in transforming the trucking industry for a number of years now. Since the inception of placing small antennas on trucks linked via satellite, this technology has become more advanced and has since been adopted by the maritime and airline industries. No longer is this technology being used simply to track the location of a vehicle and its estimated time of arrival using narrowband technology. Now, vast amounts of data are being sent between locations conveying more information than ever, using multiple streams and broadband platforms, all requiring larger amounts of bandwidth.

The panelists, representing the most prominent segments driving mobile broadband applications, will delve into the new technologies that enable this growing medium and its ongoing evolution. They will give insight into the direction they see it moving in and what new applications are expected to be developed over the next few years. In addition to ground equipment becoming more sophisticated, satellites also have been redesigned making them more powerful, reliable and able to transmit larger amounts of data faster over parts of the globe never covered before.

As more data is sent in a wireless world, other challenges become more apparent — one of the first is security and privacy. The panelists will talk about these hurdles and what safeguards they have put in place to ensure that the information being sent and received remains proprietary. They will also address the issues of operating a global network with moving transmit and receive units and the unique operational issues that arise.

Mobile broadband has enabled business travelers to remain in close contact with their home office at all times - from planes, taxis and hotels — creating "virtual" offices anywhere. Now, if a crisis were to arise, travelers can be informed immediately and begin solving the problem with little to no delay. In addition, they can also attend meetings and remain informed of current issues and developments.

Speakers:
KYOUNG-YONG JEE, Team Leader and Principal Researcher, Network Economy Research Team, ETRI (Electronics and Telecommunications Research Institute), *Republic of Korea*

Other participants to be advised.

T.1.6
BROADBAND SATELLITE APPLICATIONS

Chair:
TIMOTHY J. LOGUE, Principal, TJLNova Consulting, *USA*

BGAN: The New Satellite-based Broadband Global Area Network
RUUD ENGELBERTS, Senior Product Manager, Xantic, *The Netherlands*

Dynamic Bandwidth Configuration / Assignment System for Satellite Internet
HARUHITO WATANABE, Board Member and Researcher; HIDETAKA IZUMIYAMA, President, CEO and Researcher; and MASAKATSU SHIBAMOTO, Board Member, WISHnet Inc., *Japan*

Broadband via Satellite's Time has Arrived in the Asia-Pacific
SOUSSAN SAADAT, Director, Broadband and Corporate Networks, Intelsat, *USA*

High Speed Broadband Internet Connectivity for Remote Land, Air, and Water Communities Through Connexion by Boeing
RICHARD R. NORDSTROM, Maritime Marketing and Business Development; WILLIAM R. RICHARD, Associate Chief Engineer; and EDWARD R. LAASE, Director-- Development Activity, Connexion by Boeing, *USA*

1000 – 1030
MORNING BREAK

1030 – 1200
PLENARY SESSION

1130 – 1530
EXHIBITS OPEN

1200 – 1330
LUNCH IN EXHIBIT HALL

1200 – 1330
RESEARCHERS' AND EDUCATORS' LUNCH

1200 – 1330
LAWYERS' LUNCH

1330 – 1700
PTC COMMITTEE MEETINGS
PTC SPECIAL INTEREST GROUP MEETINGS

Wednesday, 19 January 2005

0715 – 0800
SPEAKERS' BREAKFAST

0730 – 1630
CONFERENCE REGISTRATION

0830 – 1000
CONCURRENT SESSIONS V

W.1.1
E-HEALTH AND DISTANCE LEARNING CONTENT, ACCESS AND METHODOLOGIES IN THE PACIFIC ISLANDS

Chair:
IRMA VELAZQUEZ, Information Technology Officer, Essential Health Technologies (EHT), World Health Organization, *Switzerland*

The objectives of the session are to engage participants in a dialog on the successes and challenges of implementing eHealth and distance learning initiatives in the Pacific Islands; discuss needs and possible technical solutions to support eHealth activities in the Pacific Islands. The panel will provide a discussion on successful distance learning and eHealth programs and highlight innovation means of overcoming some of the unique challenges in the Pacific Islands such as isolation, high cost transportation and telecommunication.

Topics:

ACCESS: Public Service Networks, cost-effective use of narrowband connectivity.

CONTENT: Development and implementation of Distance Learning Programs in the Pacific Islands with a focus on eHealth, telemedicine applications, and continuing medical education.

METHODOLOGIES: Theory and Practice; Video Teleconferencing; Integrated On-line Modules, e-Case Studies; trials and tribulations of Partnerships and Collaboration; Issues to be resolved in Distance Learning and Partnerships

Panelists:

USP Distance Learning Programs
TOSHIO KOSUGE, University of Electro-Communications, *Japan*

A Collaboration on Distance Learning Delivery and Content Development in American Samoa
ANDRA SAMOA, Coordinator, Pacific eCommerce Development Corporation, *American Samoa*

Pacific Association for Clinical Training (PACT)
TAI-HO CHEN, Director, Department of Family Practice and Community Health, John A. Burns School of Medicine, University of Hawaii, *USA*

Pacific Open Learning Health Network (POLHN)/ Pacific Resources for Education and Learning (PREL)
STEVE BAXENDALE, Director, PRELStar and JIM BANNAN, Educational Specialist, PREL, *USA*

Ohana Diabetes — Telehealth with the Republic of the Marshall Islands
JOSEPH HUMPHRY, Ohana Diabetes, *USA*

Open Learning and Open Content in eHealth and Distance Learning
BRENDAN BARRETT, Academic Program Officer, United Nations University, *Japan*

W.1.2
SERVICE LEVEL MANAGEMENT

Chair:
ANDREW SIMPSON, Managing Director, Telco One Pty. Ltd., *Australia*

W.1.2.1
Bandwidth Management: Better Service Through Prioritization
KURT DOBBINS, Chief Technical Officer, Ellacoya Networks, *USA*

W.1.2.2
Providing Mobile Applications with Connection Awareness
WILLIAM K. WONG and JIANGXIN HU, Communication Research Centre, *Canada*

W.1.2.3
Ensuring Carrier-class QoS, Reliability, and Stability for Today's Emerging Services
NAN CHEN, Vice President of Marketing, Atrica, *USA*

W.1.3
MANAGED SESSION ON CARRIER BUSINESS STRATEGIES

W.1.4
REGULATORY ISSUES

Chair:
MICHAEL JANIGAN, Executive Director and General Counsel, Public Interest Advocacy Centre, *Canada*

W.1.4.1
Analysis of Taiwan's Telecommunication Regulatory Framework — the Perspective of VoIP
YU-CHI WANG, Assistant Professor, Department of Law, Shih-Hsin University and YA-HUI LIN, Legal Research Fellow, Science and Technology Law Center, Institute of Information Industry, *Chinese Taipei*

W.1.4.2
Bypass and Transit — Arbitrage Issues in International Interconnection and Revenue Reporting in Developing Countries
ROB NICHOLLS, Consultant, Gilbert + Tobin, *Australia*

W.1.4.3
Law Enforcement and National Security Concerns Impacting Investment in Global Networks: Lessons from Global Crossing
TERESA D. BAER, Partner, Latham & Watkins LLP and PAUL KOUROUPAS, Vice President, Regulatory Affairs, Global Crossing Limited, *USA*

W.1.5
MEETING THE CHALLENGE OF OFF-NET PROVISIONING IN A GLOBAL ENVIRONMENT

Chair:
GARY HALE, Vice President of Global Operations, Global Internetworking, *USA*

As the need to rely on off-net provisioning in a global context becomes even more critical and in recognition that no one carrier can do it all, this session will strive to provide an overview of the new innovative approaches and best practices used for off-net provisioning. It will also outline the challenges carriers and service providers face when working to expand the in-country and global reach of their networks.

Topics include:

- Finding Competitive Off-Net Providers in Foreign Markets;
- international Regulatory and Interconnection Issues;
- Cross Border Monitoring & Management of Off-Net Circuits;
- Multi-Carrier Service Level Management; and
- Impact of MPLS, VoIP and Ethernet on Off-Net Provisioning.

Panelists:
ANTHONY BRISCOE, General Manager, Telecom New Zealand, *New Zealand*
DAN DOOLEY, Vice President, Sprint International, *USA*
MARK MENDES, CEO, Wisor Telecom, *USA*

1000 – 1030
MORNING BREAK

1000 – 1430
EXHIBITS OPEN

1030 – 1200
CONCURRENT SESSIONS VI

W.2.1.
FOCUS ON INDIA

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

W.2.1.1
Information and Communication Technologies — Promotion By and Profit for the Educated and Perception by Voter-Masses
T.H. CHOWDARY, Founding Director, Center for Telecom Management and Studies and Chairman, Pragna Bharathi (Intellect India), *India*

W.2.1.2
The Initiatives by Network Operators and Service Providers and Policy Measures in India Towards Broadband Priorities
SOWRI RAJAN KOMANDUR, Head, Telecom, Indian Telecommunications, *India*

W.2.1.3
Inroads of Broadband Access for Enhancing Socio-Economic Development in South Asian Countries
N.K. CHHIBBER, Secretary-General, PTC India Foundation

W.2.1.4
ICT 4 Development: Indian Perspectives
ANIL PRAKASH, President of India Resource Centre, Director of AirPhone Technologies, and Secretary-General of Telecom Users Group of India and ITU-APT Foundation of India, *India*

W.2.2
REVENUE ASSURANCE — PLUGGING LEAKS TO STRENGTHEN THE BOTTOM LINE

Chair:
GARY KIM, Editor-in-Chief, *FAT PIPE, USA*

Changing variables within a carrier's interconnect business model can easily tip profitability into or out of the carrier's favor. Influencers include daily termination rate changes, dial-code changes, minimal capacity on preferred routes, changing routing efficiencies and more. The call termination landscape changes daily, which makes risk management and revenue assurance a tricky business to manage.

Still global carriers expend valuable resources performing low-value data validation instead of executing decisions that create value for the business. While many telcos continue to use spreadsheets and faxes with a team of analysts to review daily changes and input new data to the network, those carriers looking to enjoy a competitive advantage and operate more efficiently have already implemented automated systems to track and manage the barrage of information that affects their businesses.

This panel – focused on revenue assurance – will explore the operational complexities inherent in the global interconnect business. Specifically, panelists will describe:

- Challenges experienced by carriers in evolving deregulated markets;
- The depth and complexity of the interconnect issue;
- The value of immediate access to interconnect revenue, cost and margin data;
- Cost effective and real-time decision making for dial-code management and traffic;
- The need for accurate cost information at all points in the network;
- Optimal routing requirements to fulfill cost, bandwidth, quality of service and business relationship metrics; and
- Increased efficiency from automated interconnect solutions.

Panelists:
AMIR YAZDANPANAH, Chief Executive Officer, Telarix, *USA*
ROBERT K. BAULCH, Principal – Global Business and Telecommunications Consulting, RKB Communications Solutions, *USA*
YASUYUKI KOIDE, General Manager, Network Operations, KDDI CORPORATION, *Japan*

W.2.3
TELECOMMUNICATION POLICY AND DEVELOPMENT IN THE PACIFIC ISLANDS REGION

Chair:
KENJI SAGA, The Japan Institute of International Affairs, *Japan*

In recent years there has been increased awareness of ICT and telecommunication benefits in developing countries and in parallel there have been many efforts to address the need for enabling telecommunication policy and sector reform. Liberalization is a controversial topic in regions such as in the Pacific Island jurisdictions where government owned telecommunication monopolies are the norm: however there are successful examples of how competition has increased value added service at reduced cost. In other regions change and benefits from sector reform has been slow and limited. The objective of this panel discussion is to openly discuss the telecommunication policy reform that has initiated in the Pacific Islands; analyze the progress and challenges and also focus on specific policy areas to be addressed (spectrum frequency regulation for example).

Topics:

Pacific Island State, National and Regional ICT Strategies and Policies

Specific Updates from Fiji, Republic of Palau and the Federated States of Micronesia

Analyzing Environments for Liberalization or Not

Pacific Island Involvement and Contribution to WSIS

Inter-linkages, Collaboration and Cooperation

Panelists:

Enabling Telecommunication Policy, Liberalization and Universal Service for Small Island Economies
NORMAN H. OKAMURA, Telecommunication Specialist, Social Science Research Institute, University of Hawaii, *USA*

Redefining Telecommunication Legislation and Regulatory Environment in Fiji for Improved Economic Growth and Social Development
ESTHER WILLIAMS, Pro Vice Chancellor, University of the South Pacific, *Fiji*

The Pacific Islands and WSIS
STUART MATHISON, Program Manager, Foundation for Development Cooperation, *Australia*

W.2.4
SUBMARINE TELECOM ON TRIAL — SUPER SESSION

The charge has been laid "You destroyed the Submarine Cable business, and worse you did nothing to repair it". In the dock will be the chief offenders: the private submarine cable owner, the financier and the forecaster. Assisting the prosecution will be carrier, supplier and industry experts.

No part of the telecom industry suffered more in the multi-billion dollar telecom meltdown than the submarine telecom sector. In the collapse that followed, investors lost money, companies lost business, and employees lost jobs. But who was to blame? Foolish investors, wrong-headed entrepreneurs, suppliers who rushed to endorse every project, or fundamentally, an outdated way of building connectivity in the industry? Conveniently, the evidence, such as it is, remains out of sight, at the bottom of the ocean.

This "trial" will interrogate representatives and expert witnesses of all the groups involved, and seek to pass judgement. In a stimulating analysis of what went wrong, the industry — now passing into a period of recovery — might just avoid repeating the same mistakes all over again some time in the future.

The Presiding Judge:
JOHN HIBBARD, CEO, Hibbard Consulting Pty Ltd, *Australia*

The Chief Prosecutor:
STEVE MCCLELLAND, Editorial Director, Telecommunications, *UK*

Participants to be advised

W.2.5
SERVICE PROVIDER STRATEGIES FOR VOIP

Chair:
STEVE SMITH, Chief Information Technology Officer, University of Alaska, *USA*

W.2.5.1
Bundling Service with Wireless over Packet Cable
HENRI SETIAWAN W and GUNADI DWI HANTORO, Wireless Access Laboratory, TELKOMRisTI – PT Telkom Indonesia, *Indonesia*

W.2.5.2
VoIP: What Have Carriers Learnt So Far?
JEAN-FRANCOIS THOMAS, Vice President – Asia, Carriers and IT, France Telecom Networks, *Hong Kong SAR, China*

W.2.5.3
IP Services (IPVPN, VoIP, IP Transit, IP Video) — Growing, Gaining Speed, Jump On or Move Over
ANTHONY D. CHRISTIE, Chief Marketing Officer and Executive Vice President, Global Crossing, *USA*

W.2.5.4
Exchange and Settlement of Peer to Peer IP Services
JIM DALTON, Founder and CEO, TransNexus, Inc., *USA*

1200 – 1330
LUNCH IN EXHIBIT HALL

1330 – 1500
CONCURRENT SESSIONS VII

W.3.1
SMART CITIES
Hosted by World Teleport Association (WTA)

W.3.2
MANAGED SESSION ON INVESTMENT STRATEGIES

W.3.3
FIBER OPTICS — SUBMARINE CABLES

Chair:
To be advised

W.3.3.1
Serving Thin Routes: The Economics of Migrating from Satellite to Fiber Optic Connectivity
NIKOS NIKOLOPOULOS, Director of Business Development, Tyco Telecommunications, *USA*

W.3.3.2
How Short Haul Cost Optimized Systems Could Pave the Way for Inception of Regional Systems
MARC FULLENBAUM, Product Marketing Manager, Alcatel Submarine Networks, *France*

W.3.3.3
The State of the Global Submarine Cable Market in 2005
MICHAEL RUDDY, Managing Director, Terabit Consulting, *USA*

W.3.3.4
Virtual Consolidation of Overlapping Submarine Cables to Increase Availability, Improve Protection Capacity Efficiency and Lower Ownership Costs
ADAM HOTCHKISS, Nortel Networks, *USA*; RICHARD ROMAGNINO and ISSAM FADLALLAH, Nortel Networks, *Canada*

W.3.4
IMPACT OF IP ON MOBILE

Chair:
SEIICHI TSUGAWA, Director, Geneva Liaison Office, KDDI CORPORATION, *Japan*

W.3.4.1
SMS to MMS Conversion Platform in Wireless Telephony Network
HEEJIN CHUN, Assistant Researcher; BONGSU UM; DONGWON NA; and WONHEE SULL, Director, Platform R&D Center, SK Telecom, *Republic of Korea*

W.3.4.2
Real Case of Harmonized Terminal with CDMA and WLAN: KT's NESPOT SWING Phones
JUNGJOON KIM, Director, Convergence Project Team, Service Development Laboratory, KT, *Republic of Korea*

W.3.4.3
Growth Dynamics in Mobile Data Markets
JEREMY GODFREY, Member of PA's Management Group and JACKSON KAM, Principal Consultant, PA Consulting Group, *Hong Kong SAR, China*

W.3.4.4
Introduction of IP-based Core Network in 3rd Generation Mobile System and Future Trends
TOSHINORI MIYAZAWA, Engineer; MITSUAKI HANAOKA, Director; and YOSHINORI MAEDA, Manager of IP Network, Core Network Engineering Department, NTT DoCoMo, Inc., *Japan*

W.3.5
DELIVERING NEW SERVICES TO THE HOME

Chair:
JEFFREY SOONG, CEO, Broadband Network Systems Ltd., *Hong Kong SAR, China*

Several operators in worldwide have rolled out new value-added services such as IPTV, VOD, and interactive services to varying degrees of success. What are the key success factors for rapid service uptake, marketing strategies and bundling techniques? What types of programs are most popular among Asia Pacific viewers? What are the challenges in technical consideration over platform, equipment and standards? This panel aims at bringing together Triple Play operators and vendors around the world to share their experiences

Panelists:

MINZHEONG SONG, Director, Department of Corporate Strategy, Management Research Lab., KT, *Republic of Korea*

JASON DURANT, Director of Content and Alliances, SaskTel Canada, *Canada*

Other participants to be advised

W.3.6
Pacific Island Telecommunications Association (PITA)

1430 – 1700
EXHIBITOR MOVE-OUT

1500 – 1530
AFTERNOON BREAK

1530 – 1730
CLOSING PLENARY SESSION AND CLOSING CEREMONY

附件二：管委會會議紀錄

PTC
Board of Governors Meeting
January 20, 2005

Location: Hilton Hawaiian Village

Participants: Rick Cho, Thomas Cooper, Bruce Drake, Anthony Gardiner, David Lassner ,William Lin, Richard Nicholson, Kenji Saga, Tim Shea, Seiichi Tsugawa, Robert Walp, Ken Zita.

Guests: Gregg Daffner,(Vice Chair/AC), Jay Guillete (Chair /AC) Steve Rich (Coudert Bros.), Stephen Tom (Executive Director, PTC), Klaus Gueldenpfennig (President, REDCOM), PTC member and exhibitor, Heather Hudson, Chair (Research Committee), Linda Ristow, Bob Bissell (Industry Canada)

Meeting Commenced at 9:20 AM

Item:	Action By:
1. Welcome by Bruce Drake **1.1** Bruce welcomed all to the meeting and introduced Stephen Tom. Stephen was nominated by the Executive Director Selection Committee for the of Executive Director, PTC. **1.2** Stephen addressed the BG. indicating his appreciation for being selected and his willingness to begin to work immediately with and for the BG. He indicated that he considered himself **also** as the chief marketing officer for and as such he would seek new partners and opportunities and strengthen existing relationships. Some BG members provided indicators of where some of these opportunities might lie. He indicated his belief that the PTC can do more humanitarian work. He provided his email address: stephen@ptc.org. **MOVED BY DAVID LASSNER THAT THE BOARD OF GOVERNERS RATIFY THE SELECTION OF STEPHEN TOM FOR THE POSITION OF EXECUTIVE DIRECTOR, PTC UNDER THE TERMS AND CONDITIONS AS RECOMMENDED BY THE EXECUTIVE DIRECTOR SELECTION COMMITTEE. TONY GARDINER SECONDED. CARRIED**	

PTC
Board of Governors Meeting
January 20, 2005

2. Approval of Agenda: **2.1** Bruce indicated there are some changes to the agenda 2.1.1 Heather Hudson will address the BG in her capacity as the Chair of the Research Committee at approximately 10:30 AM 2.1.2 Peter Schall of the Hilton Hawaiian will address the BG 2.1.3 Item 5.4 is dropped as it is a duplicate of item 6.1 2.1.4 Item 6.8 is retitled "China Chapter" and item "6.9 Other" added. 2.1.5 Item "8.2 Pay-out of Pension Plan" is added.	
2. Ratification of Decisions from Saturday January 15, 2005 BG Meeting: **3.1** Bruce noted that the BG Secretary position is not designated as Vice–President as are other similar BG executive officer positions. **MOVED BY ROBERT WALP THAT THE PTC BG POSITION OF SECRETARY BE RETITLED TO BE "SECRETARY AND VICE PRESIDENT." SECONDED BY KEN ZITA. CARRIED**	
4. Report on PT'05 (David Lassner): **4.1** David indicated that overall the feedback he had received was positive. Bruce also indicated that he did not receive one negative comment. Seiichi also indicated he heard favorable comments. **4.2** David indicated that participation was somewhere on the order of 920 to 930 and that this did not include the day passes. **4.3** In respect to the exhibits, David understood exhibitors thought that the logistics were good but some indicated the hours of operation were too short. He suggested there was room to improve. Speaking as an exhibitor, Klaus Gueldenpfennig, representing the exhibitors, observed that the exhibit hall was closed too soon and there needs to be	

	an increase in the exhibit hours that do not overlap session times. He observed that there was not much hardware on display at some of the exhibitors. He also indicated that the support of the hotel was excellent.	
	KLAUS AND STEPHEN AGREED TO TALK FURTHER ABOUT THE IMPROVEMENTS REQUIRED FOR THE EXHIBITS AND EXHIBITORS	**Klaus, Stephen**
4.4	Peter Schall, Senior VP and Marketing Director for the Hilton Hawaiian Village addressed the group citing a number of improvements that have been undertaken and will be taken by Hilton. He expressed appreciation to the PTC for being a loyal customer and commended the great working relationship between the Hilton and PTC staff.	
5. Modus Operandi for the BG:		
5.1	Executive Committee and BG Calls Monthly: Bruce indicated that monthly BG teleconferences are preferred. This once a month schedule will be applied for at least the first four months of 05/06. The teleconference will normally be held on the first Wednesday of each month at 10 AM Honolulu standard time and meeting minutes will be circulated within a week. If a member provides no response within 2 weeks of the issuance of the minutes, the member will have been considered to have approved the minutes. Major issues must be ratified by a majority of the BG members (7). An electronic indication (email) is acceptable. If a decision requiring a vote is in the minutes, it will be highlighted (***bold, underlined, italicized***).	
5.2	Working Groups: As this was not essential to the current meeting, this item was deferred to a later call.	
5.3	Mid-Year: A number of possible options were discussed including timing of the event. Further discussion is planned for the next call.	

PTC
Board of Governors Meeting
January 20, 2005

6. Priorities for 2005/06:	
6.1 Executive Director Engagement Support and Evaluation: Bruce indicated that there is a need for a sub-committee to support and evaluate the Executive Director.	
THE BG MEMBERS AGREED TO FORM A SUB-COMMITTEE FOR THE PURPOSE OF EXECUTIVE DIRECTOR ENGAGEMENT, SUPPORT AND EVALAUTAION; THE SUB-COMMITTEE MEMBERSHIP WILL BE BRUCE, ROBERT WALP, RICHARD AND RICK CHO.	**Bruce Robert Richard Rick**
6.2 Proposed Revision of Membership Fees and Categories: See items 7.1 and 7.2	
6.3 Mission Vision Purpose: See item 7.2.	
6.4 Mid-Year: See item 5.3 above.	
6.5 Potential SIG on Global Access: Robert discussed the formation of a SIG to address the digital divide. While obviously tied to developing countries it is also linked to WSIS. Seiichi indicated that he could assist. The BG recommends that PTC members help to identify obstacles and solutions.	
MOVED BY ROBERT WALP THAT THE BG ENDORSES THE CREATION OF A GLOBAL ACCESS SPECIAL INTEREST GROUP (SIG) AND ENCOURAGES PTC MEMBERS TO COME FORWARD WITH IDEAS ON HOW TO DEVELOP AND IMPLEMENT THIS INITIATIVE. SECONDED BY KEN ZITA. CARRIED.	
6.6 Potential SIG on Disaster Communications: Tony Gardiner discussed the Disaster Recovery session held on Tuesday, January 18, 2005 and specifically the opportunities available to the PTC to facilitate telecommunications recovery when a disaster occurs. He suggested that one service the PTC could offer is a shopping list of PTC member capabilities. He indicated the PTC must define	

what the it can do to help with in an event such as the recent tsuami. Included in the discussion was whether or not SIGs were recognized in the bylaws as well as the difference between a SIG and a committee.	
THE BG REQUESTED THE EXECUTIVE DIRECTOR TO IDENTIFY WHAT THE PTC COULD DO INCREASE AWARENESS OF THE NEED FOR TELECOMMUNICATIONS SERVICES FOLLOWING A DISASTER, HOW TO COORDINATE A PTC RESPONSE TO DISASTER RECOVERY WITH MEMBERS, AND A PROCESS FOR DELIVERY OF MEMBER SERVICES AND CAPACITY IN A DISASTER SITUATION.	**Stephen**
6.7 IEEE Relationship: The PTC BG recognizes the essential contributions made by the IEEE to ensure the formation of PTC and values and wants to continue to maintain and develop the longstanding relationship with the IEEE.	
6.8 China Chapter: William Lin reported that he has presented the China Chapter Affiliation Agreement and License Agreement to the BG for processing and signature by the appropriate PTC executive(s).	
7. AC Engagement (Potential priorities)	
7.1 Sustainability: The BG discussed membership fees and the sensitivity of this issue. It was noted that sustainability goes beyond membership fees. If fees would be revised, in time for a new fiscal year, all members must be notified by November of the current year. It was suggested that it would be timely to discuss this item at the Mid-year conference. To give the issue due consideration at the Mid-year, BG members must have the necessary information 30 to 45 days prior to the meeting. The AC was seen as the appropriate PTC body to review the issue of sustainability as it has members from all sectors/geographic and areas .	
THE BG REQUESTED THAT THE AC EXAMINE THE ISSUES AND OPPORTUNITIES RELATED TO INCREASING PTC FUNDING SUPPORT AND SUSTAINABILITY INCLUDING THE FINANCIAL	**Jay Gillette (AC)**

IMPACT OF SUCH ACTIVITIES AND REPORT BACK TO THE BG SO THAT THE BG CAN BY JUNE 2005 DRAW CONCLUSIONS ON THIS ISSUE AND SET OUT A PLAN FOR THE NEW FISCAL YEAR.	
7.2 MVP: The BG considers the MVP issue to be complex. Seiichi reminded everyone that for some members it is tied into the membership fees. The BG felt that as the AC was comprised of members from all sectors the AC would be best suited to assist with this issue.	
MOVED BY SEIICHI THAT AS THE PTC BG HAS DETERMINED THAT A REVIEW OF THE MISSION, VISION AND PURPOSE OF THE PTC IS A PRIORITY, THAT A JOINT COMMITTEE OF THE BG AND THE AC BE FORMED WITH THE OBJECTIVE TO CONDUCT A THOROUGH AND ROBUST REVIEW OF THE MVP IN ORDER THAT THE BG CAN MAKE APPROPRIATE RECOMMENDATIONS, IF ANY IN RESPECT THE MVP BY JUNE OF 2005. SEIICHI FURTHER MOVED THAT THE BG REPRESENTATIVES ON THE JOINT COMMITTEE ARE TO BE TONY GARDINER AND ROBERT WALP WITH AC REPRESENTATION LEAD BY AC CHAIR JAY GILLETTE. SECONDED BY ROBERT WALP. CARRIED.	**Tony Robert Jay Gillette (AC)**
It was recommended that a representative of the PTC-Japan Chapter be invited to participate. Refer to item 7.1 above	
7.3 Membership Growth: See 7.1 and 7.2 above.	
7.4 Revisit the Bylaws:	
THE BG ENCOURAGED THE AC TO REVIEW AND OFFER IF THE AC SEES FIT REVISIONS TO THE PTC CURRENT BYLAWS.	**AC**
7.5 Increasing the Value of the PTC for members:	
THE BG ASKED THE AC FOR A LIST OF 5 TO 10 INITIATIVES THAT COULD BE UNDERTAKEN BY THE PTC TO INCREASE THE VALUE OF THE ORGANIZATION TO ITS MEMBERS.	**AC**

7.6 AC Chair Jay Gillete indicated that the AC was looking forward to closely working with t he BG. He suggested that perhaps the BG could look on the AC as councilors. **THE BG ASKED THAT THE AC PROVIDE THE BG WITH A RESOURCE MAP OF THE AC MEMBERS INCLUDING INFORMATION ON THE MEMBERS BACKGROUND AND INTERESTS AND CAPABILITIES.**	**AC**
8. <u>Secretariat:</u> **8.1** <u>Financial Briefing:</u> Tony reported that the most recent documents were circulated at the Saturday, January 15, 2005 joint BG meeting. He indicated that the current fees for the auditor were considered high and that approval was being sought to look for an alternative auditor. **MOVED BY TONY THAT THE BG DIRECTS THE EXECUTIVE DIRECTOR TO SOLICIT ALTERNATIVE PROPOSALS FROM LOCAL FINANCIAL AUDIT FIRMS WHO HAVE INTERNATIONAL EXPERIENCE FOR THE PURPOSE OF CINDUCTING THE YEARLY AUDIT AND THAT THESE PROPOSALS WOULD BE EXAMINED BY A SUB-COMMITTEE COMPRISED OF JOHN SPENCE, RICH CHO AND TIM SHEA WHO WOULD IN TURN MAKE APPROPRIATE RECOMMENDATIONS TO THE BG. SECONDED BY DAVID LASSNER. CARRIED.** **8.2** Payout of Pension Plan: Linda Ristow provided the background and an update on the payout of the PTC pension plan. It was indicated that there were delays incurred due to the IRS processing however the issue is approaching conclusion. There will be complete liquidation of the funds but only when final approval from the IRS is received.	**Stephen John Spence Rick Tim**

PTC
Board of Governors Meeting
January 20, 2005

9. Other: **9.1** Research and Education Committee: Heather Hudson, Chair of the Research Committee reported on the activities of the committee. She indicated that the committee is looking at a number of possible research topics. She also expressed appreciation that the BG had reinstated the committee as it is seen to add value to the PTC as a whole. The committee's report as filed by Heather is attached. **9.2** **MOVED BY SEIICHI THAT THE BG RECOGNIZES THE SIGNIFICANT CONTRIBUTION PROVIDED TO THE BG AND THE PTC BY MARK HUKILL. SECONDED BY DAVID LASSNER. CARRIED.**	
10. Next Meeting: **10.1** Next Meeting of the BG is scheduled for February 9, 2005 at 10 Am Honolulu Standard Time.	
The meeting closed at 1:30 PM Honolulu Standard Time.	

PTC
Board of Governors Meeting
January 20, 2005

Research Committee Meeting Report **January 18, 2005**

Participation:

Some 47 researchers and educators came to the Research and Educators lunch. Attending were PTC Board members Tom Cooper, Richard Nickelson, and Kenji Saga, as well as several Advisory Council members.

Participants were from universities, training institutes, consulting firms, government agencies, iinternational organizations, and nongovernmental organizations (NGOs). Countries represented were the U.S., Canada, Japan, Indonesia, Fiji, Guam, South Korea, China, and Australia.

A list of email contacts was compiled and will be sent to all for continued networking.

Fourteen people attended the Research Committee Meeting. Those present felt that Tuesday was preferable to Thursday for the meeting. However, some others interested later reported that they had conflicts with the Advisory Council meeting and with the session on Disaster Communications.

Research Essay Prize:

A prize was not awarded this year because funding was not secured until part way through the year, and there was not sufficient time or administrative support to publicize the opportunity.

$1500 was raised by Tom Cooper who obtained the donation from Robert Gardiner.

The Committee felt it could proceed with reinstating the Research Essay Prize this year. There would be only one winner. With the limited funding, there would be no cash prize, but the winner would be provided with free travel, hotel and registration as well as an opportunity to participate. While $1500 should be enough to cover airfare and hotel from large countries, the Committee would like to request an additional $500 from PTC to ensure that there is sufficient funding for airfare if the winner is from a smaller or more distant country with higher travel costs.

The committee discussed the possibility of awarding Honorable Mentions to a second and third winner if papers were strong enough. The award could consist of a registration fee waiver. Several felt this would allow winners to obtain travel funds from universities, etc.

The Committee plans to put out a Research Essay Prize announcement by March 1. Submissions would be due by mid June; winner would be announced by Sept 1.

PTC
Board of Governors Meeting
January 20, 2005

There was considerable discussion of other potential sources of funding. Suggestions and contacts were requested to be emailed from participants. Suggestions from Board and Advisory Council members are also requested.

Administrative Support for Committee:

The chair thanked Richard Nickelson for his previous administrative support while at PTC, and noted that such administrative support – to help with the call for papers, receiving submissions, tabulating results of paper reviews, etc. – is critical to the functioning of the Committee. The Committee would like to request that PTC provide such support again in the form of access to a staff member who could help with these functions.

Research in PTC:

Several attendees noted that they felt researchers make an important contribution to the quality of the conference sessions, and that the sessions are the heart of the PTC conference.

Peer review was introduced a few years ago to provide more incentive for junior faculty to submit papers and obtain funding to attend. The Committee would like to know how many submitted papers this year requested peer review.

The role of research supported by or involving PTC was also discussed. Members would like to revive such research. The possibility of a submission to the World Summit on the Information Society (WSIS) was raised. Research on issues relevant to the Pacific Islands was also proposed.

Publications:

When feasible, the Committee would like to see the relaunch of PTR (*Pacific Telecommunications Review*). Several felt that it could be done as an online publication to eliminate printing and distribution costs.

There was discussion of publishing top conference papers in another journal such as *Telecommunications Policy* to get more visibility than available solely through proceedings for attendees.

Committee Officers:

The Chair will send a notice to all who attended the lunch (and others interested) requesting nominations for officers for the Committee, including chair, vice chair, and secretary.

Heather E. Hudson
Chair

附件三：各委員會新當選名單

PTC Organization Leadership

PTC BOARD OF GOVERNORS

Board of Governors Executive Officers:	
President and BG Chair Vice President and BG Vice Chair Vice President and Secretary Vice President and Treasurer Vice President and PTC'06 Conference Chair	**Bruce Drake** (bdrake@rogers.blackberry.net) **Robert Walp** (rmwalp@earthlink.net) **Seiichi Tsugawa** (se-tsugawa@kddi.ch) **Anthony Gardiner** (acg@ieee.org) **Ken Zita** (kzita@ndaventures.com)
Board of Governors:	Rick Cho (Rcho@pacificap.net) Thomas Cooper (twcooper@comcast.net) David Lassner (david@hawaii.edu) William Lin (ceo@dragontele.com.cn) Robert Mao (robmao@nortelnetworks.com) Richard Nickelson (richard.nickelson@itu.int) Kenji Saga (saga@nict.go.jp) Tim Shea (tshea@loralskynet.com)
Legal Counsel:	Tara Giunta, Coudert Brothers LLP (giuntat@coudert.com)

PTC ADVISORY COUNCIL

(Term commenced on January 20, 2005)

Officers Chairman Vice Chairman	 Jay Gillette (jaygillette@bsu.edu) Gregg Daffner (daffner@earthlink.net)
Oceania	Maui Sanford (maui.Sanford@opt.pf) Chris Vonwiller (cvonwiller@appen.com.au)
Hawaii	Category unfilled
Central & South America	Category unfilled
South & Southeast Asia	Donald Felbaum (don@optel.org)
Non-Profit East Asia	Norio Nemoto (n-nemoto@itg.hitachi.co.jp) Ichiro Shoji (shoji@rite-i.or.jp)
Non-Profit North America	John Janowiak (abennett@iec.org) Louis Fox (lfox@u.washington.edu) Morley Winograd (winograd@marshall.usc.edu)
For-Profit East Asia	Wha Joon Cho (whajoon@kt.co.kr) Shizuo Endo (shizuo.endo@hq.melco.co.jp) Yoshikazu Kobayashi (kobay@jp.ibm.com) Katsuhiro Onoda (k-onoda@ct.jp.nec.com) Noboru Ubayama (noboru.ubayama@reach.com) Anjian Zhao (zhaoaj@china-netcom.com) Makoto Yamazaki (makoto.yamazaki@ntt.com)
For-Profit North America	Sallye Clark (sclark@panamsat.com) Jey K. Jeyapalan (jkjeyapalan@earthlink.net) N. Mark Lopianowski (mlopian@attglobal.net) Timothy Logue (tloque@cox.net) Ellen Day Hoff (e.hoff@wlpco.com)

Individual	Gregg Daffner (daffner@earthlink.net) Robert Frieden (rmf5@psu.edu) Jay Gillette (jaygillette@bsu.edu) Eiji Hayashi (eijihaya@mtj.biglobe.ne.jp) Mark Hukill (hukill@hawaii.edu) Jagadish Rao (rao5@optonline.net) KaiYuan Zhen (ky-zhen@seu.edu.cn)
Other	Yves Gassot (y.gassot@idate.fr)
Board Of Governors Appointments (5 of 12 seats appointed to-date)	Kosuke Dobashi (kdobashi@jp.fujitsu.com) John Hibbard (jhibbard@bigpond.com) Shuji Kusuda (s.kusuda@j-wave.co.jp) John Pricken (john.d.pricken@verizon.com) John Spence (john.a.Spence@au.pwc.com)

PTC CHAPTERS

PTC Japan Committee	Shuji Kusuda (s.kusuda@j-wave.co.jp)
PTC Hawaii Foundation	Dick Barber (rjbarber@aloha.net)
PTC India Foundation	N.K. Chhibber (chhibber1@vsnl.com)
PTC Korea Chapter	Nam Jin Cho (chonj@castel.co.kr)

附件四：衛星通信簡報

BGAN

The new Satellite based Broadband Global Area Network

Kees Hol
18 January 2005

Objectives of this presentation

xantic

1. Explanation of the new service
2. Impact on the carrier infrastructure
3. The content possibilites of this service
4. Vertical target markets
5. Explanation of the major differences between the current Inmarsat services and BGAN.

Introduction (1)

xantic

Xantic has a 100 years of experience in communication

1904 Scheveningen Radio

1973 Official opening of Burum Land Earth Station; first antenna Burum 1 (AOR)

1982 Introduction Inmarsat-A

1995 First global provider all Inmarsat Services with one access code: 012

2000 Merger Telstra Global Satellite/ Acquisition SpecTec

2001 New name Xantic owned by KPN (65%) and Telstra (35%)

Introduction (2)

xantic

- Xantic's Head Office in The Hague with over 400 employees worldwide
- US$ 250 million annual revenue
- World market leader in mobile satellite services
- AMOS solutions standard in the maritime industry
- One global, seamless operation via LES Burum and Perth

Trends & Developments (1)

xantic

- Continuous consolidation of parties; at all levels in the value chain.
- GSM and terrestrial networks expanding geographical coverage. Cable companies roll out cost efficient & high quality services.
- Growth of alternatives system like Iridium, Globalstar and Thuraya for voice and VSAT for data.

Trends & Developments (2)

xantic

- Move towards converged IP solutions is seen in the whole telecommunications market (VoIP, IP VPN, etc.).
- As well as in Inmarsat service development; bulk of the services will be IP based, except BGAN voice (circuit switched).
- Internet and Intranet access are becoming more important, however, voice remains important (commodity).

BGAN Interconnect for Circuit Switched traffic System Architecture

xantic

BGAN based on UMTS architecture;

PSTN, ISDN and IP Based services;

BGAN is one network, switches/ gateways at Burum & Fucino;

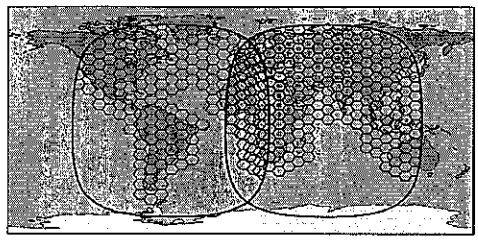
Launch Q1/2 – 2005.

Inmarsat BGAN Coverage

xantic

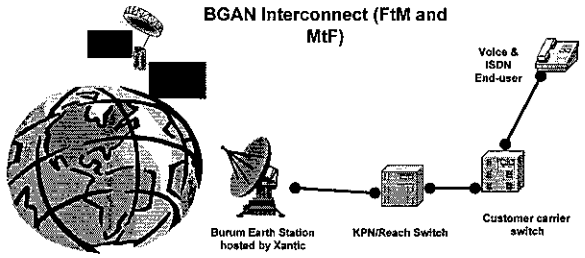
Covering 81% of estimated world traffic

144/432 kbit/s high speed data and voice services



Circuit Switched Solution

xantic



Numbering plan: 870-77 & 870-78

xantic

Inmarsat is Global satellite based – means country code and not network code within a country;

Currently Inmarsat uses international codes 870-4;

All services have to migrate to 870 by 2009 (ITU);

BGAN terminal id (MSISDN) format is 870 77 21 xx xxx;

B-GAN access code for FtM is 870-77.

IP Solutions

xantic

Services	End-User services supported
Private IP	Email, Web browsing
Public IP	Email, Web browsing VPN, hosted connections
End-to-end QoS	e.g broadcast quality streaming
Direct Customer Connection	Email, Web browsing, VPN ; With secure access & greater throughput

Vertical Target Markets

xantic

Proven Markets:	New Markets:
Military Govt	
UN & Aid agencies	
Broadcast Media	
Oil and gas / mining	

Conclusion

xantic

This new service opens the possibility to have Broadband access anywhere on earth on sea and in the air.

It will grow volumes for the terrestrial network providers.

Dynamic Bandwidth Configuration / Assignment System for Satellite Internet

WATANABE Haruhito
WISHnet Inc.

WISHnet

About our company

- Name: WISHnet Inc.
- Started from May 13, 2002
- Capitalization:□JPY 20,000,000
- Board members:
  - CEO SHIBAMOTO Masakatsu
  - Director IZUMIYAMA Hidetaka
  - Director WATANABE Haruhito
  - Auditor SHIBAMOTO Tomoko
  - Advisor MURAI Jun
- Headquarter: Tokyo, Japan

WISHnet

Our businesses

- Internet access service
  - Point-to-Point Access using satellite internet
  - IP Multicast using satellite internet
- Network operation and management
- R&D about internet technologies
  - Satellite internet
  - IPv6
- International standardize activity about Internet technologies

WISHnet

R&D on Asia Broadband Satellite Key Technologies

- R&D project for IPv6 satellite internet technology development
  - Datalink layer protocol for IPv6 satellite internet
  - Large-scale multicast technology for IPv6 satellite internet
  - Dynamic bandwidth allocation and management technology for IPv6 satellite internet
- Not only for technology development, also for standardization
- Funded by Japanese government (Ministry of Internal Affairs and Communications)
  - From August 2003 to March 2006
  - Operate by WISHnet
  - http://www.asia-bb.net/en/project005.html

WISHnet

Objectives

- On the satellite internet...
- To assign a frequency bandwidth to each channels dynamically
  - To improve the usage of all channels
  - Dynamic bandwidth assignment based on the real traffic

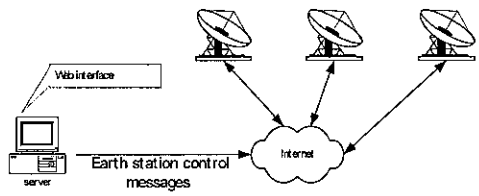
WISHnet

Overview of the system

- Use this system for internet backbone
  - built by multiple point-to-point satellite link
  - FDMA
- Monitors the traffic on each point-to-point link
- Assign a bandwidth for each link based on the traffic information
  - Network operator (human) decides the allocation policy

WISHnet

Overview of the system



Elemental technologies for dynamic bandwidth assignment

- Signaling
  - The function which controls earth stations from remote places
  - This system uses internet (IPv4/v6) for signaling, instead of dedicated line
- fail-safe
  - To prevent unexpected transmission
  - This system has interlock function, and spectrum watching function
- Useful user-interface
  - To prevent miss-operation by human error
  - Satellite operator should be able to know bandwidth allocation information when he want
  - This system has web-based interface

Signaling

- This system uses internet (IPv4/v6) for signaling, instead of dedicated line
  - We do not need to buy any bandwidth only for signaling
  - We can establish several signaling route by internet routing
    - We can use other backup link for signaling when we get accidents on main link
    - High reliability

Fail-safe

- This system controls earth stations from remote place using internet
- We need the following functions for fail-safe
  - Interlock
  - Spectrum watching

fail-safe - Interlock

- If the connection between client and server, the client automatically stop the transmission
  - "connection" = internet packet reachability
  - Not carrier receiving status from HUB station

fail-safe – spectrum watching

- This system has at least one "monitor station" in the network
  - This station has spectrum analyzer
  - This station watches the spectrum
  - This station send the information to the server via internet
- If some earth station transmits strange carrier
  - it is detected by monitor station
  - Notify to the server
  - The server send "stop transmission" signal to the client
- Monitor station is watching the following items
  - C/N of each carrier
  - Frequency and bandwidth of each carrier

Useful user-interface

- This system can be controlled by web-based interface from remote place
- This user-interface is not only for network operator, but also for satellite operator
  - Also satellite operator can access to the system using web-based interface via internet
  - He can check the bandwidth allocation
  - In case of emergency satellite operator can stop the transmission

WISHnet

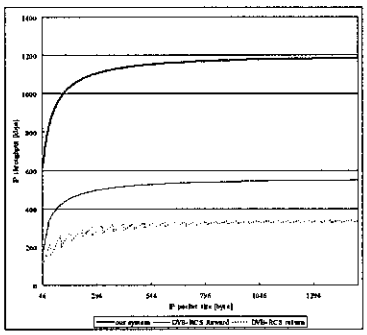
cost advantage

- Compare with DVB-RCS
- This system can carries more data in same bandwidth
  - We can use any modulation type.
    We can use high-efficiency type such as 8PSK.
  - We can use any datalink format.
    We can use high-efficiency type such as HDLC.
- We do not need to buy a bandwidth for signaling
- We can reduce the total cost. We can carry more traffic by same price.

WISHnet

IP throughput (bandwidth=936kHz)

- Our system is using 8PSK FEC=2/3 with Reed-Solomon, HDLC datalink protocol.
- The DVB-RCS forward link is using QPSK FEC=3/4 with Reed-Solomon, DVB MPE datalink protocol.
- The DVB-RCS return link is using QPSK FEC=1/2 with Reed-Solomon, ATM ALL5 datalink protocol.



WISHnet

advantages

- This system can establish several links for signaling easily
  - Using internet routing function
  - We can use other links as backup signaling link when main link has a trouble
  - High reliability
- We can establish satellite internet by any vendors' equipment
  - This system is not designed for specific vendor

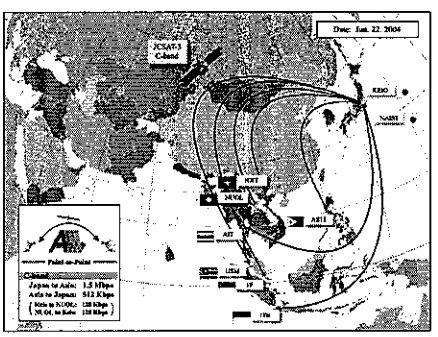
WISHnet

operative example

- We got an approval from JSAT corp.
  - We can use this system for JCSAT satellites
- We are operating international internet backbone using satellite internet
  - AI3 Project Network
    the internet backbone connects between Japan and south east Asian countries
  - Using JCSAT-3 C-band

WISHnet

AI^3 Network Topology



WISHnet

Contact information

- WISHnet Inc.
  - 5-15-5-001 Shirokanedai, Minato-ku,
    TOKYO 108-0071 JAPAN

    TEL: 03-5447-7130
    FAX: 03-5447-7131
    E-mail: info@wishnet.co.jp

WISHnet

Intelsat

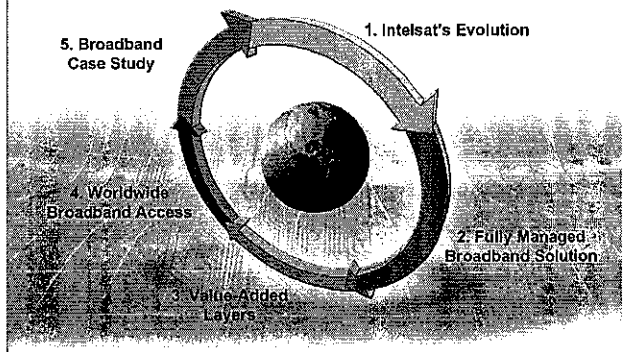
Broadband via Satellite's Time has Arrived in the Asia-Pacific

Intelsat Broadband Services

Susan Saadat
Director Broadband & Corporate Networks
January 2005

Intelsat

Agenda



Intelsat

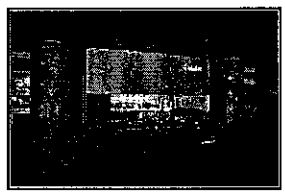
Intelsat's Evolution

	 1960s	 1970s	 1980s	 1990s	 2000s
Service	Global television coverage of Apollo lunar landing	First international digital voice service	Enabling satellite news gathering for broadcasters	Satellites used in Internet applications	End-to-end services, GXS, broadband
Customers	Signatories	World's incumbent telecom companies	Global media and news companies	Tier I Internet service providers	Competitive and wireless carriers
Network	Launch of 'Early Bird'	Establishes global fleet	V and VI series satellites launched	VII and VIII series satellites launched	Hybrid network systems, IX series satellites launched
Competition	Early development of competition in carrier telephony		Fiber build-out begins to threaten point-to-point markets Global and regional operators emerge and evolve toward niche services		Privatization allows Intelsat to expand service offerings and customer base

Intelsat

Intelsat's Background

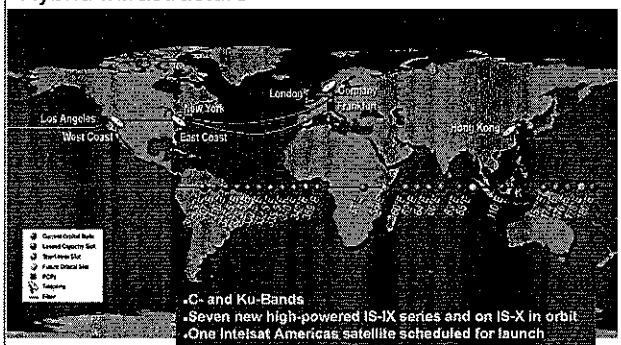
- Global Internet, broadcast, telephony and corporate network solutions provider
- Capacity on 29 satellites + Teleports + Fiber-Optic Cables + Infrastructure
  - $1B purchase of Loral North American assets
  - customers in 200 countries and territories
- Established in 1964
- Average reliability of 99.997% since 1985
- Unmatched quality of service, global reach and reliability



Broadband Services is a Strategic Growth Area

Intelsat

Hybrid Infrastructure

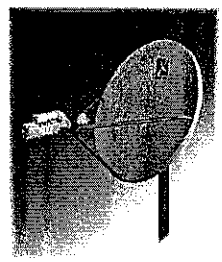


- C- and Ku-Bands
- Seven new high-powered IS-IX series and on IS-X in orbit
- One Intelsat Americas satellite scheduled for launch
- Will work to repoint beams if possible

Intelsat

What is Broadband Access ?

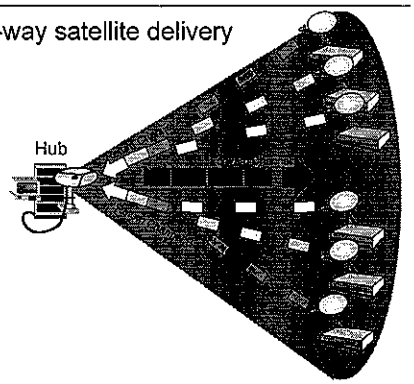
- "Last-mile" Internet access to a variety of customers
  - Businesses (SOHOs, SMEs)
  - Residential users
  - Government offices and schools
  - Corporate networks (VPNs)
- Low cost, low risk for Service Provider – infrastructure owned and managed by Intelsat
- Low cost for end user - small user premises equipment



Intelsat

Asymmetric two-way satellite delivery

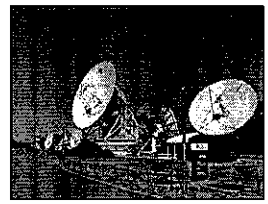
- The Forward Link is a continuous broadcast channel
  - point-to-multipoint
  - terminals share bandwidth
- The Return Link consists of a number of carriers
  - each carrier carries the bursts from one or more terminals
- The Hub dynamically controls the allocation of bandwidth to the terminals - "on demand"



Intelsat

Key Message : Flexibility !

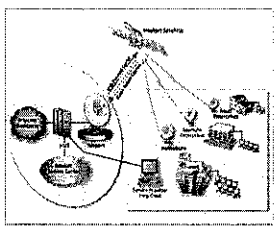
- In Terms of Ground Platforms
  - Gilat Skystar 360E
  - Viasat Linkstar
  - Viasat Surfbeam
  - I-Direct
- In terms of Customer Commitment
  - Any combination of uplink and downlink data rates is possible
- In terms of QOS and Service Classes
  - These are entirely defined by the Service Provider
- In terms of Geographic coverage
  - Strategically placed teleports around the world



Perth, Australia

Intelsat

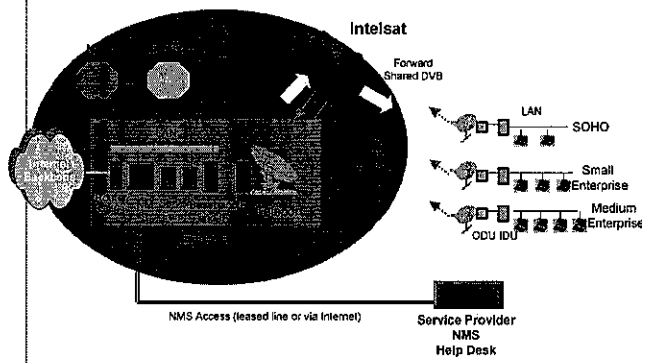
Intelsat offers a fully managed solution



- Which Includes:
  - Aggregate satellite capacity
  - Teleport uplink services
  - Hub management
  - IP backbone connectivity
  - Network operations center (NOC)
- Utilizing Intelsat's shared hubs
- Results in cost-effective solution for service providers
- Service class management allows Service Provider differentiation vis a vis the competition

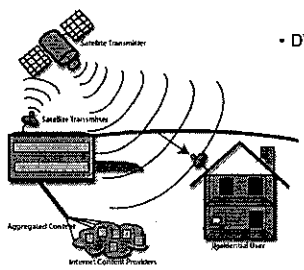
Intelsat

For a variety of user applications



Intelsat

Content can be adapted to variety of end users within the same network



- DVB/IP technology allows inclusion of
  - Web pages
  - Corporate files
  - Voice
  - Video-conferencing
  - E-mail

  into a single IP stream carried over the Internet

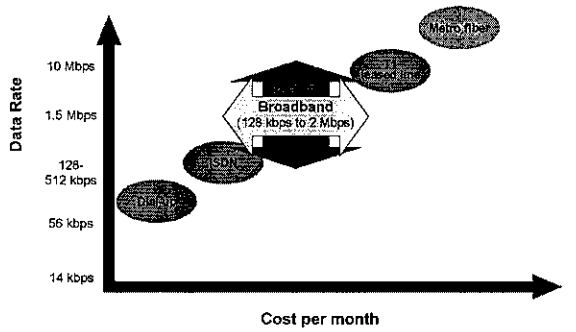
Intelsat

Responsive to Service Provider's requirements

Typical SP Requirement	Intelsat's Solution
•Always on Internet access •Turnkey satellite solution •Integrated, pre-engineered infrastructure •Pre-negotiated terminal prices •Ability to define and modify QOS according to market requirements •Low risk, affordable and scalable proposition •Rapid provisioning and speed to market •Association with a world name •High reliability and built-in redundancy	• Two-way, direct DSL-like access • Integrated, pre-engineered solutions • Fully-managed to space-only options • Custom-tailored network size and service classes • Value-added services • Shared hubs/Intelsat investments • Buy only the capacity you need • Existing networks ("up in hours") • "Instant infrastructure" • Intelsat's reliability and global experience

Intelsat

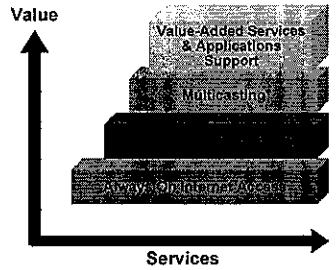
We provide DSL-Like Service…



Intelsat

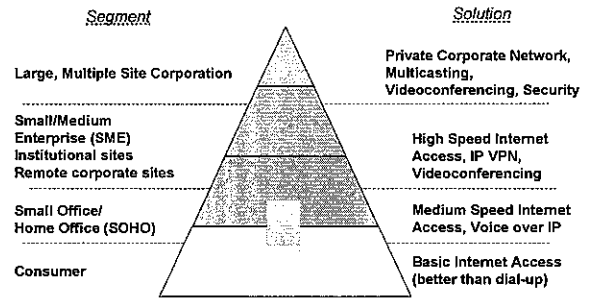
… With Value-Added "Layers"

- Internet Access as the foundation layer
- To which Value-added applications can be added :
  - Virtual Private Networks
  - Multicasting
  - Video conferencing
  - Voice over IP



Intelsat

Addressable Market Segments



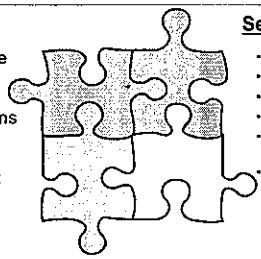
Intelsat

With a Low-Risk Business Model

Reduces Service Provider Capex and Opex
Reduces time to market
Ensures local service

Intelsat

- Wholesale satellite capacity
- Hub investment
- Gateway operations
- Network management
- CPT arrangement
- Level 2 and 3 support

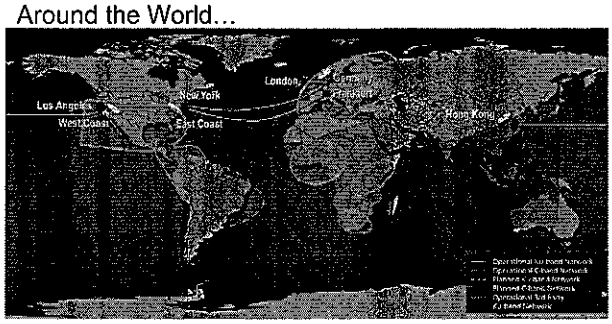


Service Provider

- Local licenses
- Marketing and Sales
- Retail service
- Billing and collection
- Customer care (Level 1 support)
- CPT procurement, installation and maintenance

Intelsat

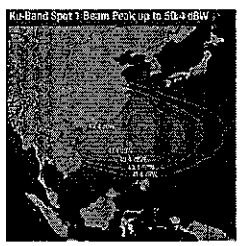
Intelsat's Global Infrastructure Offers Broadband Around the World…



Intelsat

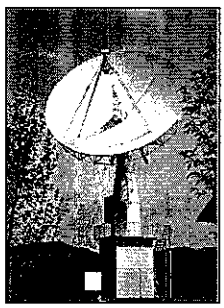
… and into Asia

- South East Asia
  - IS-709 @ 85°E
  - Ku-band, Spot 3 beam
- China
  - IS-709 @ 85°E
  - Ku-band, Spot 1 beam
- India, Bangladesh, Sri Lanka
  - IS-906@ 64 °E
  - Ku-band, Spot 2 beam



Intelsat

Teleports and POPs in Asia-Pacific



- Fuchsstadt (Germany)
  - Gilat 360E hub
  - Viasat Linkstar hub
- Perth (Australia)
  - Viasat Surfbeam
- Hong Kong

Intelsat

Ground Platform Options

- Viasat Surfbeam
  - Based on DOCSIS standard
  - Increased Capacity per transponder
    - Dynamic rain fade mitigation
    - Advanced modulation and coding techniques
- Viasat Linkstar
  - Based on DVB-RCS
- Gilat 360E
  - DVB-S in forward direction
  - Proprietary return technology (FM-TDMA)
- I-Direct
  - MT-TDMA
  - Virtual Network Operator (VNO) Support
  - Supports multiple outbound carriers

Intelsat

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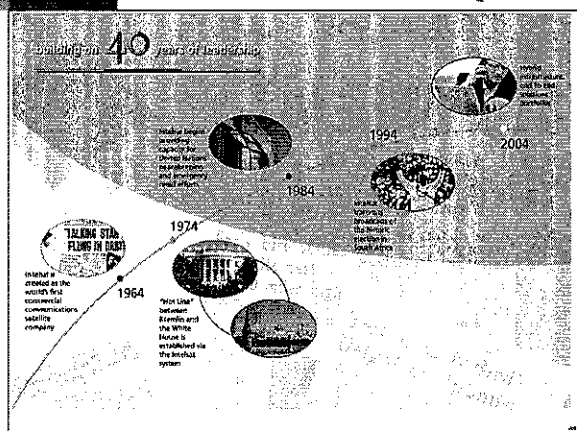


附件五

4G Beijing 2008:
Application and Implications

4G Beijing 2008: Applications and Implications

Allen H. Kupetz
Kpartnerz, Inc.
USA

Abstract

The ancient city of Beijing has the opportunity to host the most modern, high-tech Olympic Games ever in 2008. Beijing also has the good fortune of being able to learn from previous generations of wireless networks as it prepares for 2008. The critical factors used to judge the success of the deployment will be how it meets the needs of public safety officials, helps manage Beijing's notorious traffic, creates ubiquitous Internet access to visitors and visiting media, and what it means for the citizens of Beijing after the Games are over. To accomplish all this, wireless ad hoc peer-to-peer networking must be implemented.

4G Beijing

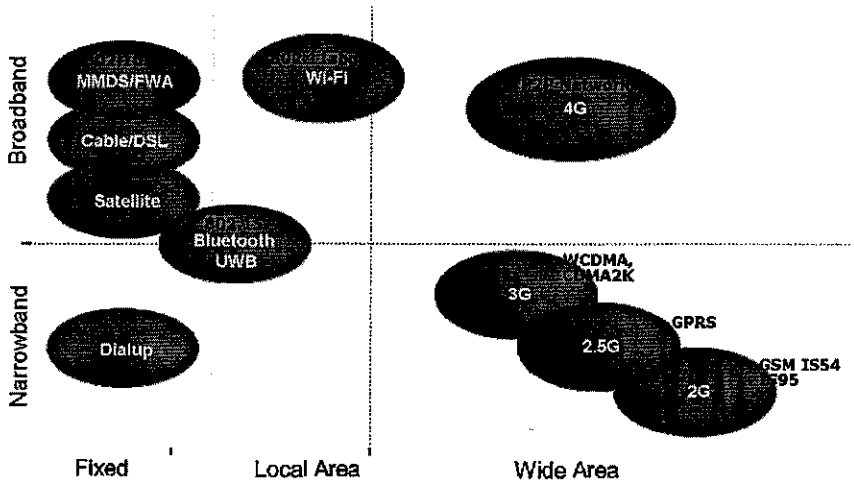
"By three methods may we learn wisdom: first, by reflection, which is noblest; second, by imitation, which is easiest; and third, by experience, which is bitterest."
- Confucius

Asia, particularly China, Japan and South Korea, are world leaders in wireless telecommunications by virtue of the number of subscribers, financially successful carriers, dominant handset manufacturers, pro-growth regulatory structures, innovative software, creative applications, and populaces eager for the next big thing. Third-generation (3G) networks may be deployed and operational in all three countries before the United States has allocated the frequency and sold licenses to the carriers. Just as the West is falling further and further behind in terms 3G wireless, so too will fourth-generation (4G) networks be launched first in Asia.

Beijing has the good fortune of being able to learn from previous generations of wireless networks as it prepares for 2008. First generation (1G) wireless telecommunications – the brick-like analog phones that are now collector's items - introduced the voice-centric cellular architecture that is still being offered by most wireless companies today. Second generation (2G) wireless supported more users within a cell by using digital technology, which allowed many callers to use the same multiplexed channel. But 2G was still primarily meant for voice communications, not data, except some very low data-rate features, like short messaging service (SMS). So-called 2.5G allowed carriers to increase data rates with a software upgrade at the base transceivers station (BTS), as long as consumers purchased new phones too. 3G wireless offers the promise of greater bandwidth, basically bigger data pipes to users, which will allow them to send and receive more information. Despite this 3G hype, such networks are still in essence simply a higher capacity voice system.

All of these architectures, however, are still cellular. Cellular architecture is sometimes referred to as a "star architecture" or "star topology" or "spoke and hub," because users within that cell access a common, centralized BTS. The advantage is that given enough time and money, carriers can build nationwide networks, which most of the big carriers have done. Some of the disadvantages include a singular point of failure, no load balancing, and spectral inefficiencies. The single biggest disadvantage to cellular networks going forward is that as data rates increase, output power will have to increase - or the size of the cells will have to decrease - to support those higher data rates. Since significant increases in output power scare both consumers and regulators, it is far more likely that we will see significantly smaller cells. This will further reduce the return on investment in already fragile 3G business plans.

4G wireless was originally conceived by the Defense Advanced Research Projects Agency (DARPA), the same organization that developed the wired Internet. It is not surprising, then, that DARPA chose the same distributed architecture for the wireless Internet that had proven so successful in the wired Internet. Although experts and policymakers have yet to agree on all the aspects of 4G wireless, two characteristics have emerged as all but certain components of 4G: end-to-end Internet Protocol (IP), and peer-to-peer networking. An all-IP network makes sense because consumers will want to use the same data applications they are used to in wired networks. Peer-to-peer networks, where every device is both a transceiver and a router/repeater for other devices in the network, eliminates the spoke-and-hub weakness of cellular architectures because the elimination of a single node does not disable the network. The final definition of "4G" will have to include something as simple as this: if a consumer can do it at home or in the office while wired to the Internet, that consumer (or public safety official) must be able to do it wirelessly in a fully mobile environment.



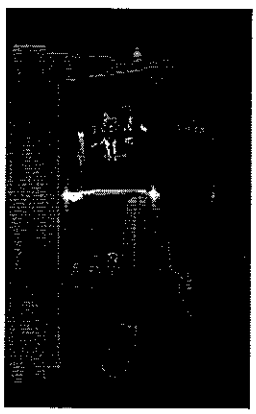
For the purpose of this paper, "4G" will be defined as "wireless *ad hoc* peer-to-peer networking." 4G technology is significant because users joining the network add mobile routers to the network infrastructure. Because users carry much of the network with them, network capacity and coverage is dynamically shifted to accommodate changing

user patterns. As people congregate and create pockets of high demand, they also create additional routes for each other, thus enabling additional access to network capacity. Users will automatically hop away from congested routes to less congested routes. This permits the network to dynamically and automatically self-balance capacity, and increase network utilization. What may not be obvious is that when user devices act as routers, these devices are actually part of the network infrastructure. So instead of carriers subsidizing the cost of user devices (e.g., handsets, PDAs, or laptop computers), consumers actually subsidize and help deploy the network for the carrier.

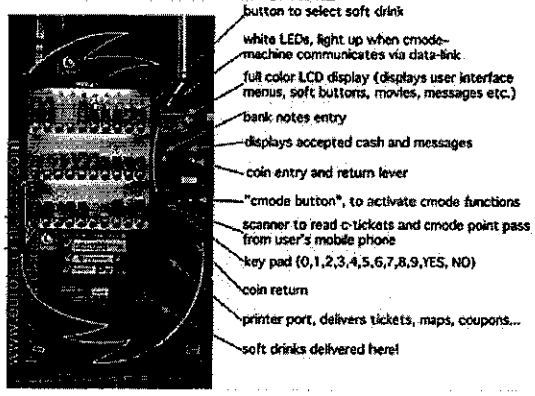
Furthering the economic argument is the 80/20 rule. With traditional wireless networks, about 80% of the cost is for site acquisition and installation, and just 20% is for the technology. Rising land and labor costs means installation costs tend to rise over time, subjecting the service providers' business models to some challenging issues in the out years. With wireless peer-to-peer networking, however, about 80% of the cost is the technology and only 20% is the installation. Because technology costs tend to decline over time, a current viable business model should only become more profitable over time. The devices will get cheaper, and service providers will reach economies of scale sooner because they will be able to pass on the infrastructure savings to the customers, which will further increase the rate of penetration.

There is a statistic (without any known attribution) that estimates that the first phone call made by a majority of Chinese alive today was with a cell phone. This would mean that most Chinese skipped a whole generation of telephony (copper twisted pair) and jumped into the world of wireless telephony. So too might the Chinese skip a generation of wireless and deploy a 4G network before 2008.

The large population of Beijing, temporarily swollen larger still by the influx of athletes, media and tourists for a two-three week period in 2008, will provide ample coverage for a peer-to-peer 4G network. Bringing capacity to these subscribers, however, will still require a physical connection to the wired Internet. This can be done with dual-mode kiosks[1] or even vending machines.[2]



THE CMODE VENDING MACHINE



The kiosks can be used to provide wired telephony to those without mobile phones, sell tickets, display maps, etc. while at the same time serving as access points for wireless users. Each kiosk could be backhauled using existing fiber in Beijing.

Tokyo is famous, among other things, for ubiquitous vending machines. Unlike many Western cities, these machines are almost always outside and accessible 24x7, most likely due to a greatly diminished threat of vandalism or theft. In 2001, Coca-Cola, the Japanese wireless operating giant NTT DoCoMo, and Itochu Corporation launched "Cmode" – information terminal vending machines in Japan.[3] There is no reason a similar strategy could not be deployed in Beijing by 2008, with the added functionality of having the machines serve as access points in a 4G network.

Applications

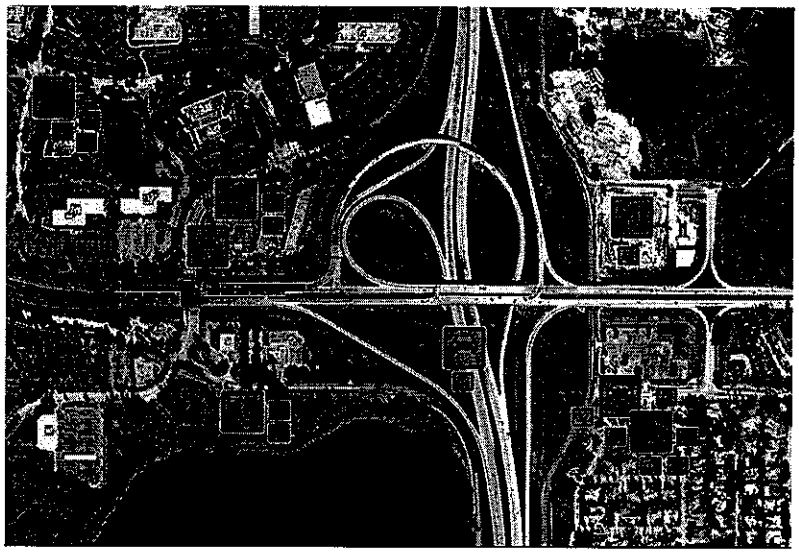
"The only way of discovering the limits of the possible is to venture a little way past them into the impossible."
- Arthur C. Clarke

Public Safety

For the parents of baby boomers, December 7, 1941 was the day that would live in infamy. September 11, 2001 merits the same sad distinction for the children of baby boomers. As witnessed in the preparations for Salt Lake City 2002 and the Athens 2004 Games, no major international sporting event will ever again ignore the terrorist threat.

There are clear and unique advantages to public safety professionals using 4G networks. Putting a nuclear-biological-chemical (NBC) warning sensor on every government-owned vehicle, for example, instantly creates a mobile fleet that is the equivalent of an army of highly trained dogs. As these vehicles go about their daily duties of law enforcement, garbage collection, sewage and water maintenance, Beijing would get the added benefit of early detection of NBC agents. The sensors on the vehicles can talk to fixed devices mounted on the kiosks or Coke machines, so positive detection can be reported in real time.

If every emergency response vehicle in Beijing were equipped with a 4G transceiver, the command center then know where all potential first responders are during an emergency, as would the individual officers. 4G networks would allow public safety professionals to see where their colleagues are, even when they have had to leave their vehicles.[4]



Beijing, like virtually all major cities in the world, has deployed cameras at intersections to send those images back to a central command center. This is generally done using fiber, which limits where the cameras can be hung (i.e., no fiber, no camera). 802.11 wireless networking is quickly becoming a good alternative to fiber, since cities can use this proven technology to deploy cameras without a wired backhaul. But fixed wireless – like 802.11 – means all the information from all those cameras is not available to mobile public safety officials. 4G networks allow any authorized user in the network to view real-time streaming video from any camera in the nettwork. 4G also allows streaming video to be set up immediately in an emergency. A helicopter flying over an incident, for example, could stream video to public safety officials on the ground. 802.11 cannot support streaming video in highly-mobile environments like helicopter-to-ground. And there is tremendous cost savings with 4G too. Using a 4G network, Beijing could backhaul every third or fifth or tenth camera (using the other cameras as router/repeaters), instead of having to backhaul every camera. These cameras can also serve as fixed infrastructure devices (along with the kiosks and Coke machines) to support the NBC mobile sensor application described above.

Traffic Control

Beijing is a challenging city for drivers, with or without an Olympics going on. The growing middle class, and their new-found ability to purchase automobiles, is increasing the number of passenger vehicles on the road at a staggering annual rate of 30%.[5] 4G networks can connect traffic control boxes to intelligent transportation management systems wirelessly. This would create a traffic grid that could change light cycle times on demand (e.g., keeping some lights green longer temporarily to improve traffic flow). It also could make vehicle-based on-demand "all green" routes for emergency vehicles responding to traffic accidents, reducing the likelihood that those vehicles will themselves be involved in an accident en route.

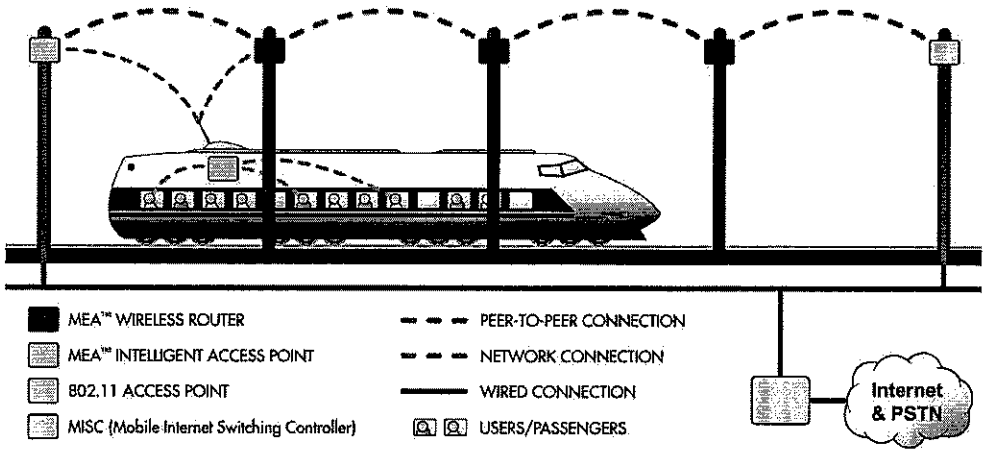
Traffic is also a public safety issue, if emergency vehicles cannot get to an incident. Since a 4G network allows images from traffic cameras to be sent not only to command centers, but also to public safety vehicles on the streets, ambulances and fire trucks facing congestion can query various cameras to choose an alternate route. Police, stuck in traffic on major thoroughfares, can look ahead and make a decision as to whether it would be faster to stay on the main roads or exit to the side roads.

Hot Spots

Once Beijing has transformed information kiosks and/or Coke machines into access points, visitors to the Olympics will be able to get real-time information on results, venue updates, and traffic conditions. These same kiosks and Coke machines could also be home to 802.11 access points, providing free information to anyone with an 802.11 card. And with 4G's peer-to-peer capabilities, the city could deploy access points even where there is no fiber by having those "remote" access points hop to and through backhauled access points.

Mobile Hot Spots

To exploit the real power of 4G, Beijing could create mobile hot spots. This would allow users in the subways, trains, and buses to connect to the Internet via standard 802.11 cards talking to standard 802.11 access points. But since those access points obviously cannot be wired to the network, they are connected via 4G wireless networks.[6]



Implications

"Only the supremely wise and the abysmally ignorant do not change."
- Confucius

Hosting an Olympic Games is, well, an Olympian task. Modern China is more than up to the challenge and it is safe to predict that Beijing 2008 will be one of the most

impressive Games of all times. But one other way to measure the success of the Games is the impact it has on the host city after the torch is extinguished. By deploying a 4G mobile broadband network for the Games, Beijing will ensure that its residents will enjoy profound and lasting benefits in terms of enhanced public safety, better traffic control and management, and more ubiquitous Internet access.

There is, of course, the potential for negative implications to deploying a 4G network in a country like China and a city like Beijing. Since 4G networks become more robust as the number of subscribers increases, one could envision a China where every movement of every person was monitored in real-time by the authorities. While it is likely that in Beijing today, citizens there have little expectation of what the West calls personal privacy, 4G networking is an affordable way for the State to further erode what privacy does exist.

Conclusion

"If you don't change the path you are on, you are likely to end up where you are headed."
- Zen proverb

China is an awesome place in so many ways – its size, its population, the length of its recorded history, and the size of its economy. With technology available today, and a vision for what Beijing could be in 2008, there is an opportunity for the hosts to make the city's telecommunications infrastructure awesome too. Or, in the words of the Olympic motto, Beijing's network could be "swifter, higher, stronger."[7]

Endnotes

[1] Picture taken by author in April 2004 at Capinfo (http://www.capinfo.com.cn/) headquarters in Beijing.

[2] Retrieved from http://www.eurotechnology.com/store/cmode/ on 22 September 2004.

[3] "The Unwired Coke Machine," *America's Network*, 15 September 2001. Retrieved from http://www.americasnetwork.com/americasnetwork/article/articleDetail.jsp?id=176 on 22 September 2004.

[4] Graphic courtesy of MeshNetworks (www.meshnetworks.com). Created by Eric Love (elove@meshnetworks.com).

[5] Wang, Fei-Yue et al. "Toward Intelligent Transportation Systems for the 2008 Olympics," IEEE Intelligent Systems, Volume 18, Number 6, November/December 2003. Retrieved 22 September 2004 from http://csdl.computer.org/comp/mags/ex/2003/06/x6008abs.htm

[6] Graphic courtesy of MeshNetworks (www.meshnetworks.com). Created by Eric Love (elove@meshnetworks.com).

[7] "Swifter, higher, stronger" is the Olympic motto.
Retrieved 22 September 2004 from http://multimedia.olympic.org/pdf/en_report_672.pdf

附件六

Introduction of IP-based core network in 3rd generation mobile system and future trends

Introduction of IP-based core network in 3rd generation mobile system and future trends

Toshinori Miyazawa, Mitsuaki Hanaoka, Yoshinori Maeda

NTT DoCoMo, Inc.

Japan

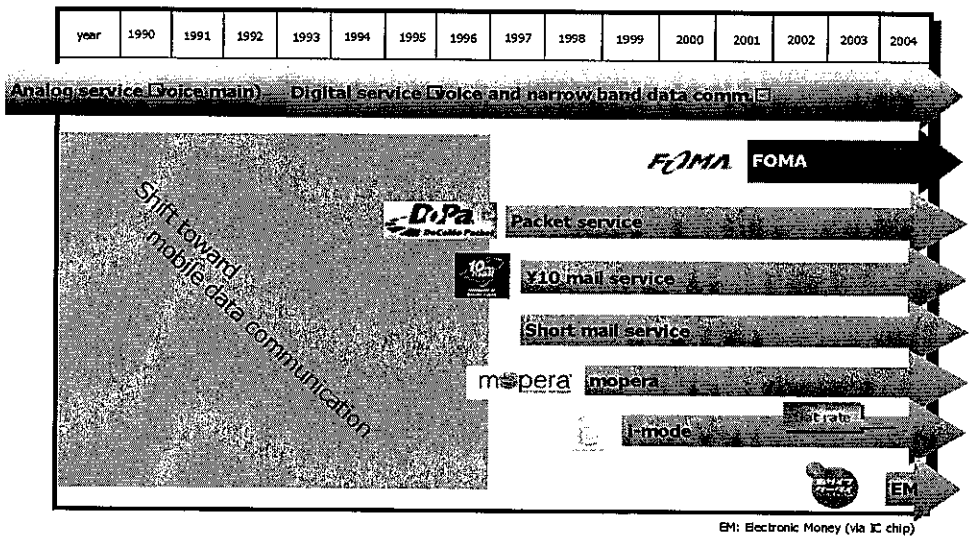
Abstract

This paper describes NTT DoCoMo's plan to incorporate IP technology in mobile networks. NTT DoCoMo's position is based on current demand and future forecasts for growth in data traffic.

Based on core strategies including multimedia, ubiquity and globalization, data traffic demand is expected to by 2010 grow to about 70 times current levels. For that reason, through adoption of IP technology for the core network and access segments as early as possible, realization of a high speed, reduced cost network is attempted.

1. Introduction

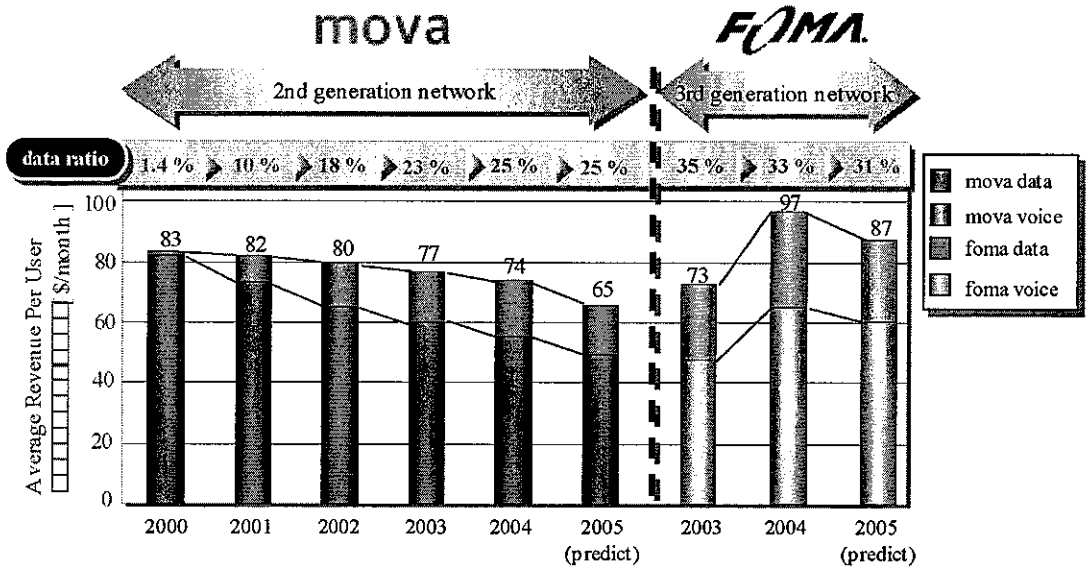
In the early 1990s, NTT DoCoMo migrated analog-based networks to digital-based networks. This enabled the company to provide major new services that shifted the emphasis from voice to data communications. Offerings include packet data, short mail and ISP services (mopera) provided via mobile networks (see Figure 1).



[FIGURE 1. CHRONOLOGICAL TABLE FOR SERVICES INTRODUCED BY NTT DOCOMO]

Following its introduction in 1999, NTT DoCoMo's i-mode service spread widely and dramatically across Japan. Subscriber levels reached 36 million users in just four years, a rarity in an industry in which other services took considerably longer to reach that level of penetration. Around the same time, in an attempt to shift its primary revenue stream from voice communication to data communications NTT DoCoMo began introducing FOMA (Freedom Of Mobile multimedia Access) services in the Japanese market. In addition, as part of its effort to develop new mobile phone services that serve as life infrastructure components, NTT DoCoMo is in 2004 introducing the "Mobile Wallet" service (an electronic money service on mobile terminals that include an IC chip).

The success of this effort is validated by the ARPU (Average Revenue Per User) indicator. In terms of the ratio of data communications in 2nd generation mobile communications traffic, revenue climbed from 1.4% at the end of 1999 to 25% by 2004. In contrast, the FOMA data traffic ratio has changed as much as 30% of 3rd generation mobile communications revenue since the service started (see Figure 2).



[FIGURE 2. CHANGE IN ARPU OF 2ND/3RD GENERATION MOBILE PHONES]

An analysis of the relevant factors finds that the reasons for the change in ARPU include (1) data communication is getting close to around 30% of revenue, (2) it is strategically essential to migrate to the 3rd generation mobile phones because ARPU of 3rd generation phones is larger than 2nd generation phones, and (3) if migration to 3rd generation is achieved, increased data communication traffic will result. The increased data communication traffic in item (3) is analyzed in detail in the next section.

2. Evolution of data communication

2.1 General principles

Two general principles underpin the rapid growth in networking technology:

1) Moore's Law, and
2) Bill Joy's Law.

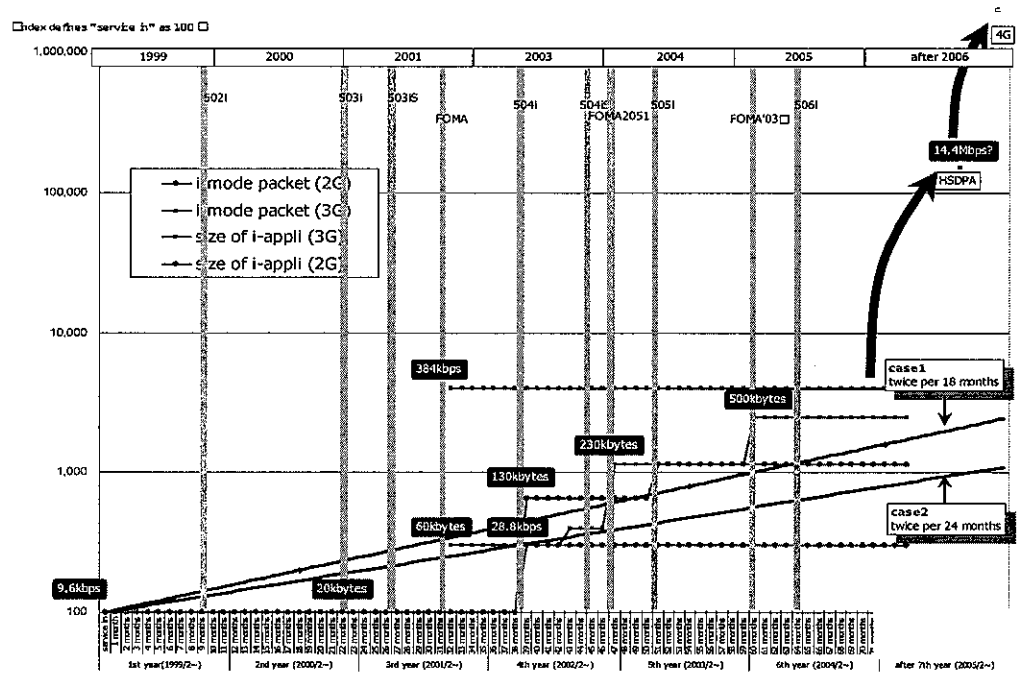
The first principle was articulated in 1965 by Intel founder Gordon Moore, who famously said that the number of transistors in a specified area on a chip would double every 18 to 24 months. The latter principle was the brainchild of Sun Microsystems founder Bill Joy, who posited that network performance will increase 1000 times over 10 years.

2.2 Adaptation of the principles to mobile communication

Based on these predictions, when we analyze innovation in services provided by NTT DoCoMo to date, it is apparent that two key issues must be addressed as follows.

2.2.1 Size of content

The size of content transferred via i-mode has been evolving in accordance with Moore's Law (see Figure 3)



[FIGURE 3. MOORE'S LAW OF APPLICATION SIZE ON MOBILE COMMUNICATION]

Figure 3 shows the relationship between the application size of i-appli (content, games, interactive web content coded in Java), which are the main components of i-mode traffic, and the i-mode bit rate (the bit rate and application size at the time of the introduction of i-mode service are defined as 100 and serve as a baseline). With

regard to the mobile communication field, since the application size and processor performance of terminals are almost proportional, this section verifies that Moore's Law applies, rather than application size.

First of all, in the 2nd generation mobile communications network, the application size increased from 20 kbytes when service was first offered to 130 kbytes in 2002 and a further 230 kbytes in the same year. This increase can be determined to be almost similar to a linear function (the straight lines labeled as "Case 1" and "Case 2" in Figure 3). The increase in content size is established based on the precondition that the provided bit rate increased from 9.6 kbps to 28.8 kbps in 2002.

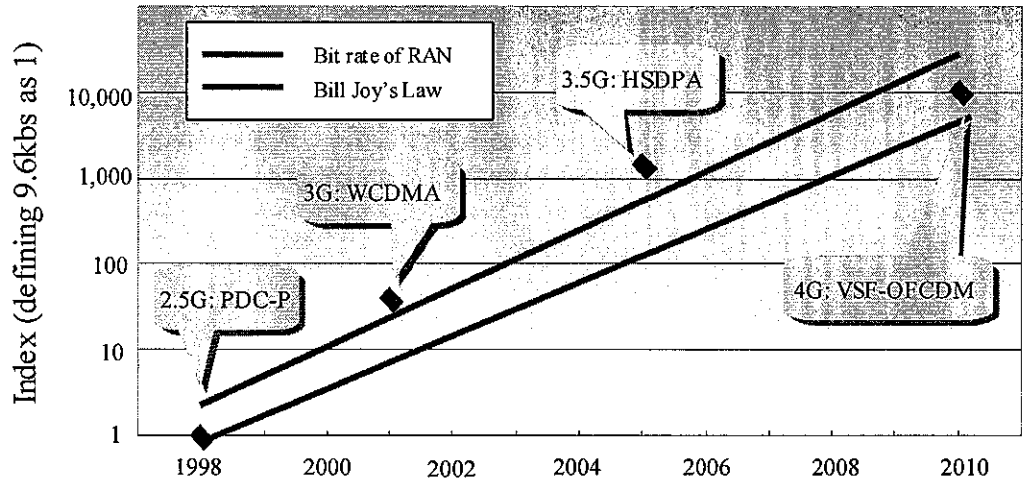
On the other hand, in the 3rd generation mobile communications network, the application size of 60 kbytes when service first began to be offered increased to 230 kbytes at the beginning of 2003 and a further 500 kbytes in 2004. The increase appears larger than Moore's Law predicts but it can still be said that it is approximately within the predicted range.

Second, let's examine the relationship between the content size and communication speed. In the current 2nd generation mobile communications, the maximum application size of 230 kbytes is compared to a maximum communication speed of 28.8 kbps. The application size is about 64 times the communication speed but the user's feeling is that it has almost reached the limit. In 3rd generation mobile communications, while the current maximum application size is 500 kbytes, the maximum communication speed is 384 kbps. Since the application ratio is about 10 times the communication speed, if we assume the ratio is equivalent to 2nd generation mobile communication, it is supposed that up to about 3 Mbytes content can be used. This means that if the terminal processor performance is further advanced in future, as the application size increases, the trend toward additional traffic increase will accelerate.

2.2.2 Communication speed

Communication speed between radio access networks (RAN) has been evolving in accordance with Bill Joy's Law as mobile networks shift from PDC to W-CDMA, and then to HSDPA (High Speed Downlink Packet Access). (See Figure 4)

Figure 4 shows the relationship between the communication method in the Radio Access Network segments currently deployed or planned by NTT DoCoMo and the associated communication speed. The communication speed of the 2.5G communication method (PDC-P) deployed in 1998 is 9.6 kbps, the 3G communication method (W-CDMA) started in 2001 is 384 kbps, the 3.5G communication method (HSDPA) that is to be introduced in 2005 is 14.4 Mbps and the 4th generation communication method (VSF-OFCDM) targeted for introduction in 2010 is 100 Mbps (downstream).
Figure 4 is a 2D plotted image of those methods and is found that it is resembles Bill Joy's Law.



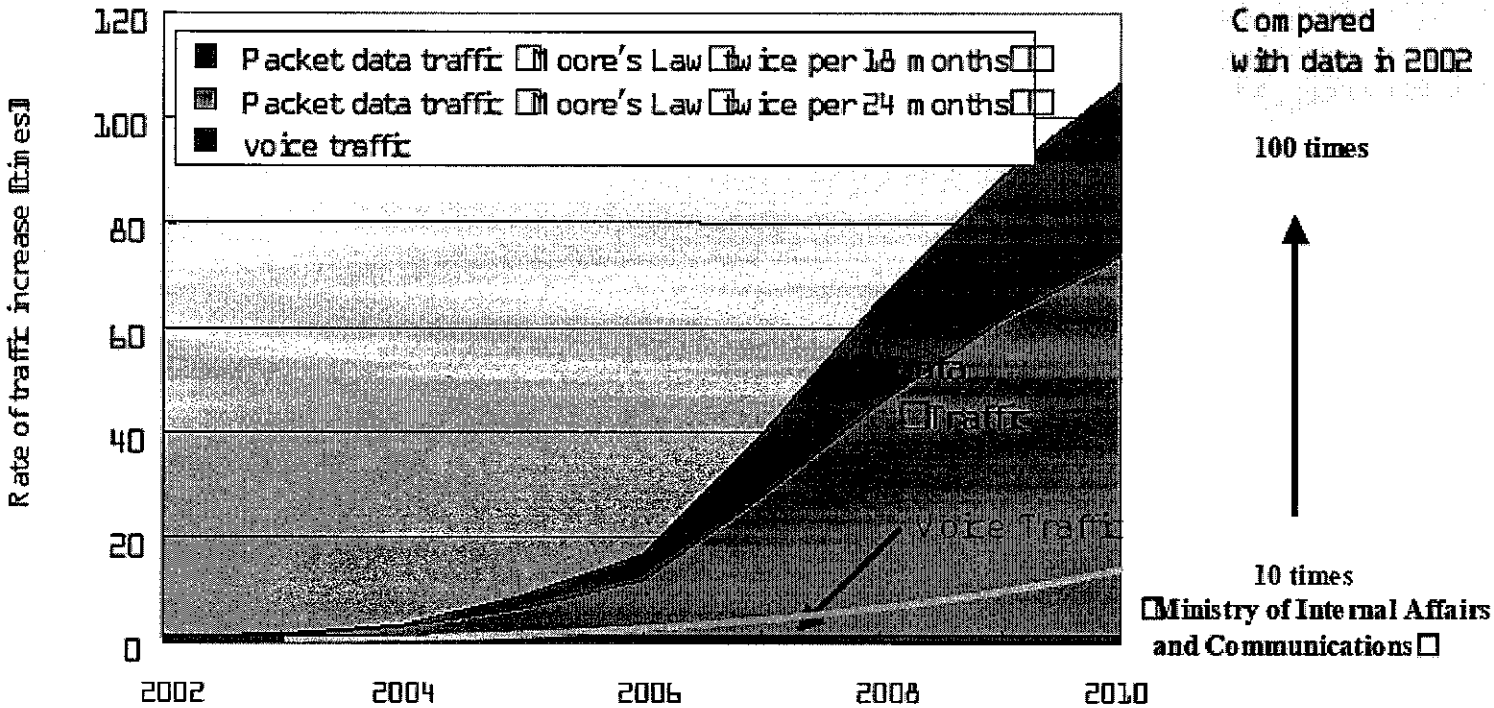
[FIGURE 4. BILL JOY'S LAW IN INTER-RAN COMMUNICATION SPEED]

2.2.3 Prediction of traffic increase

According to the result of the verification of Moore's Law and Bill Joy's Law, during the eight years from 2002 to 2010 it is predicted that data traffic growth will expand 70-105 times while voice traffic will only grow about 120%. (See Figure 5)

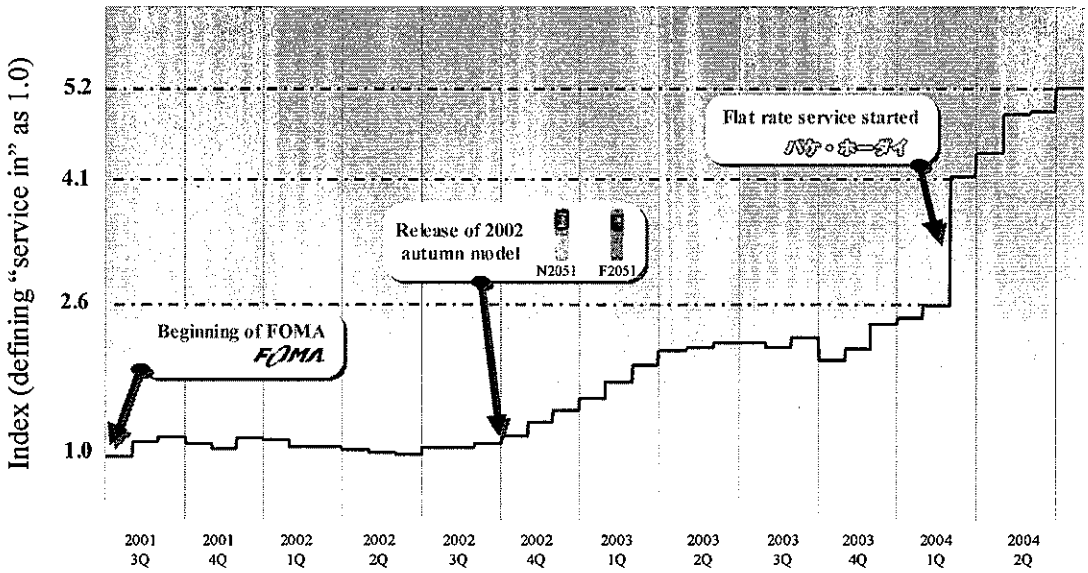
Figure 5 indicates the rate of traffic increase when the total amount of traffic (data/voice) in 2002 is 1. The Telecommunications Technology Council of the Ministry of Internal Affairs and Communications predicts the general traffic growth (mostly wired networks) to be about 10 times between 2002 and 2010. NTT DoCoMo, on the other hand, predicts that traffic running over the mobile communications network will grow between 70 and 100 times between 2002 and 2010.

The grounds for this is that the communication speed of the network is evolving according to Bill Joy's Law (1000 times in 10 years). In addition, after each method is introduced, the content size increases according to Moore's Law (100 times in 10 years). The number of packets used by a subscriber/day was 100 packets/subscriber-day when i-mode service was launched; when W-CDMA was introduced it increased to 700 packets/subscriber-day. It is predicted to reach 10,000 packets/subscriber-day and 230,000 packets/subscriber-day, respectively when 3.5G and 4G are introduced. 230,000 packets/subscriber-day is equivalent to about 30 Mbytes and in near future, we will see a situation in which users use data equivalent to about 10 MP3 music files per day. 30 Mbytes data capacity is the value calculated based on Bill Joy's Law and as terminals advance, it is imagined that data capacity will increase even more.



[FIGURE 5. PREDICTION OF THE CHANGE IN THE PACKET TOTAL DATA AMOUNT]

For the further convenience of the communication environment, in accordance with its belief that household revenue growth may begin to flatten out, on June 1, 2004 NTT DoCoMo began offering a flat-rate FOMA i-mode packet service (Pake-Houdai). The company believes this move will accelerate the migration from voice



[FIGURE 6. GROWTH IN THE NUMBER OF PACKETS BY ONE SUBSCRIBER/DAY IN THE 3RD GENERATION MOBILE COMMUNICATIONS]

Figure 6 shows the change in the number of packets used by subscribers per day in the 3rd generation mobile communications before and after the launch of pake-hodai. The FOMA service was launched on October 2001, the first time it was available anywhere in the world, but immediately after the launch of the service the number of subscribers and traffic did not grow much due to certain bottlenecks, including (i) service area and (ii) battery capacity. However, the terminal introduced in fall 2002 almost overcame the battery bottleneck and around the same time service area coverage achieved 90% of the population. Together these factors became the basis for the gradual spread of FOMA use. With regard to the launch of "pake-hodai" in June 2004, within three months after service began, the number of packets per user per day approximately doubled.

The number of packets used as of October 2004 was about half packets/subscriber-day that were assumed at the time of launching of 3.5G, meaning that traffic numbers are growing rapidly. In future, it is necessary to carefully analyze pake-hodai trends and determine whether it is necessary to raise forecasts for growth in traffic capacity expected when 3.5G and 4G are introduced.

3. NTT DoCoMo Strategy

3.1 Medium-and Long-Term Management Strategies

NTT DoCoMo has to date derived its rapid growth in the mobile communications market primarily from increases in its subscriber base. In 2004, however, growth in the subscriber base and the market itself began to flag. Furthermore, since the flat-

rate packet service was introduced, it became apparent that it would be necessary to depart from a traffic volume-dependent revenue profile. To address these issues, NTT DoCoMo proposes three basic strategies to open new mobile frontiers, including:

(1) Multimedia
Aiming at the propagation and expansion of "FOMA" service that enables "i-mode" services and high-speed, large capacity data communications, NTT DoCoMo intends to rev up the product lineup with improved terminal functions and also develop and provide advanced and diversified services such as visual communication and video/text distribution services, etc. Also, aiming at even more advanced "FOMA" services, DoCoMo is working on the development of a High Speed Downlink Packet Access (HSDPA) system, which is a high-speed packet communication technology. Further, DoCoMo aims to promote mobile multimedia by starting outdoor experiments in May 2003 related to the creation of wireless access system that allows high-speed packet communication required to implement a 4th generation mobile communication system.

(2) Ubiquity
In addition to expansion of usage by promoting remote control of information appliances and information distribution (telematics) for vehicles, which NTT DoCoMo has been tackling for some time, by utilizing interface functions that use infrared communication, "QR code" and non-contact IC chips, etc. built into mobile phones, together with other corporations NTT DoCoMo is also promoting "real linkage" that links mobile multimedia services and other various commercial transactions. Through these kinds of activities, NTT DoCoMo intends to be an innovator in the mobile phone field and oversee the adoption of mobile phones as a "life infrastructure" tool that are used in all manner of business and also hopes to create business opportunities using added value services that do not depend on a framework of conventional metered communication fee revenue.

(3) Globalization
Collaborating with overseas operators in which NTT DoCoMo has invested or with whom NTT has technical tie-ups, NTT DoCoMo is promoting the steady development of a 3rd generation mobile communication system and mobile multimedia service overseas. By creating new revenue opportunities, NTT DoCoMo is continuously promoting business development overseas and intends to expand international roaming service to realize "global mobility support", by which people can communicate "anytime, anywhere and with anyone" on a global scale.

3.2 Requirements of Network

To smoothly implement the above strategies, NTT DoCoMo place importance on the following requirements for NTT DoCoMo's network:

(1) Increase the speed of communication via the network
(2) Increase capacity
(3) Configure new service platforms, and
(4) Use standard or defacto standard technologies.

The reason for this is because even as data traffic increases due to the release of more sophisticated content, there are limits on expenditures by general customers, thus service fees need to be kept at an affordable level and network cost reduction cannot be avoided. For that reason, NTT DoCoMo is introducing IP-based standard technologies for the purpose of reducing costs.

The approach is to (i) actively adopt general technology centered on IP, (ii) expand the application scope of general devices such as routers and server as early as possible, and (iii) work to reduce the price of devices through global economies of scale. Especially, by adopting standard defacto technologies, to reduce the total cost of the network NTT DoCoMo is trying to break away from conventional proprietary technology, specifications and unique devices like conventional switching. The network revolution characterized by the move to a larger capacity network and reduction in cost is explained in the following section.

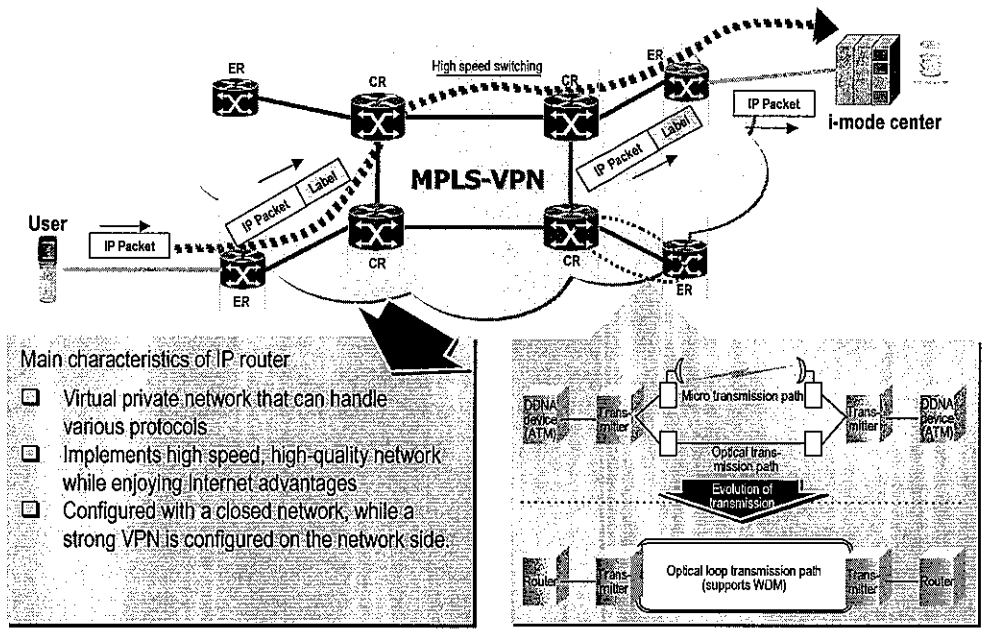
4. Introduction of IP-based network

NTT DoCoMo is implementing or studying use of the following three areas using IP standard technologies that help to realize high speed, high capacity, low cost networks and that also serve as stepping stones for migration to IP-based networks.

4.1 Configure nationwide IP router networks

In March 2004, NTT DoCoMo realized a nationwide IP router network, which implements MPLS on a large capacity optical transmission infrastructure and uses IP technologies for the core network (Figure 7).

The main features of an IP router network include that it (1) is a virtual private network that can contain various protocols, (2) implements high-speed and high-quality network while enjoying Internet advantages, and (3) is configured with a closed network, while a strong VPN is configured on the network side.



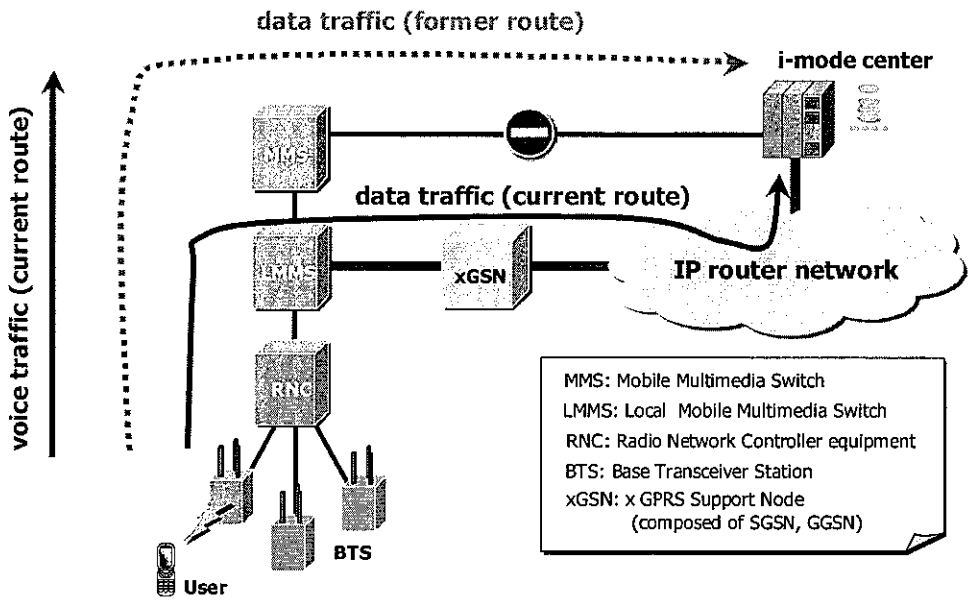
[FIGURE 7. CHARACTERISTICS OF IP ROUTER NETWORK]

Based on the End-End principle for various systems, using technologies such as VWLS (Martini) and BGP/MPLS-VPN (RFC2547bis) to provide Layer2 and Layer3 VPN, respectively, it has become possible to contain various protocols in the same network without heavily modifying protocols. Further, with regard to the delivery of a high-speed and high-quality network, large capacity transmission interfaces (OC-3, OC-12, OC-48 and OC-192) and high-speed label switching using MPLS technology are preconditions. Network reliability and security are ensured through system-based segregation via VPN, filtering and access control management. This protects the network from attacks with malicious intent.

Introduction of the above IP router network brings about the completion of a large capacity data communication infrastructure network and also achieves significant network cost reductions.

4.2 Separate packet calls from the line/packet integrated network

DoCoMo's switching in the IMT network handles both line traffic and packet traffic in ATM. However, since the demand for non-voice communication is expected to increase in future, DoCoMo is currently working on separating packet traffic from the IMT network and using an IP router network to move packet traffic. (Figure 8)



[FIGURE 8. SEPARATION OF IMT PACKET CALL]

To separate IMT packet calls from the ATM network, NTT DoCoMo introduced equipment called xGPRS Support Node (xGSN). xGSN is a general server that consists of a Serving GPRS Support Node (SGSN), which has functions to provide Internet-related services such as i-mode, and a Gateway GPRS Support Node (GGSN), which has functions to perform packet integration processing between servers for i-mode, etc. (the "x" in xGSN denotes equipment that integrates SGSN and GGSN).

xGSN is connected to subscriber switching by LMMS and traffic is sent to the IP router network via xGSN. Since packet traffic goes through the IP router network, it becomes possible to reduce the load on IMT transit switching even though traffic increases and could significantly reduce network-related costs.

Other functions of xGSN include address management for data communication assigned to mobile terminals, billing control, and originating/terminating control functions.

4.3 Increase wireless access network speed

Targeting 2005, NTT DoCoMo will introduce HSDPA (High Speed Downlink Packet Access) technology to increase the bit rate between RANs and is aim at a peak rate of 14 Mbps (an average speed of 2 Mbps).

Conventional W-CDMA provides the same transmission speed to all users. HSDPA, On the other hand, dynamically manages the user signal environment in a fixed interval of 2 mmSec and adjusted modulation is under study that dynamically

assigns a high-speed modulation method (16 QAM) for users in an environment with good signal conditions and low-speed modulation method (QPSK) for users who are operating in signal environments that are less than optimum. Further, with a technology called Node-B Scheduling, high quality communication can continuously be maintained by controlling on a preferential basis the transmission of data in 2 mmSec units for users whose signal condition is recovering.

In summary, the use of HSDPA allows us to use wireless channels according to fluctuations in the wireless environment and also allows to handle large capacity data communication from the service point of view.

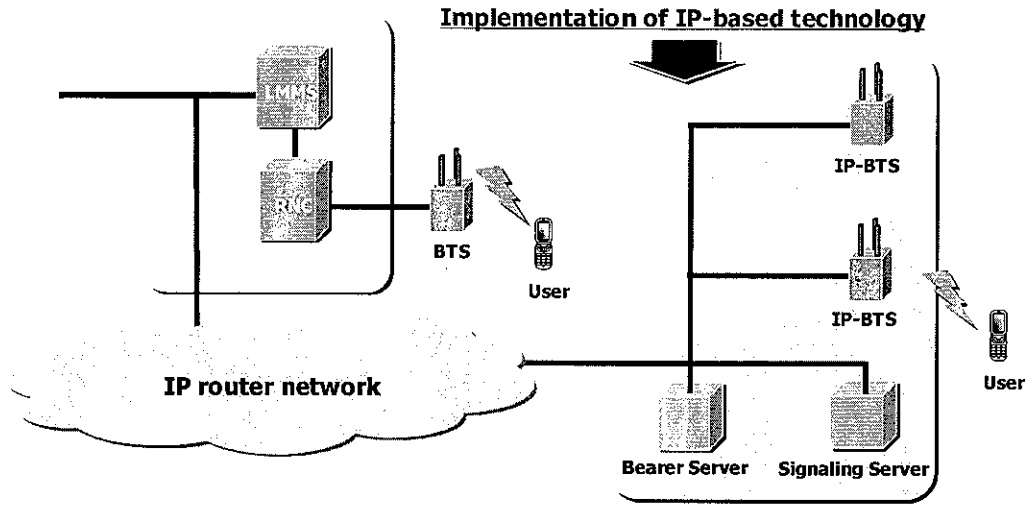
5. Future trend

Based on the IP router network, etc. described in the previous sections, NTT DoCoMo plans use IP technologies for the RAN (wireless) system and core network nodes in order to create an IP-based mobile communication network. In addition, DoCoMo is also investing in research and development aimed at the implementation of a 4th generation mobile communication network. The details of each trend are described below.

5.1 Activities to use IP technology for RAN

Figure 9 shows an image of RAN using IT technology. To use IP in the RAN segment, it is planned to introduce three basic pieces of equipment: (i) IP-BTS (small wireless base station equipment), (ii) a Bearer Server, and (iii) a Signaling Server.

IP-BTS suppresses device output and uses a simple control method specialized for indoor use to provide compactness and economy. The Bearer Server relays user data between the terminal and switching, and the Signaling Server manages the originating/terminating connection of terminals and control signal processing such as handover and wireless circuits. The advantages of introducing an IP-based RAN include that the use of the Bearer and Signaling Servers allows separation of the connecting control processing and wireless circuit processing, thus a more flexible and efficient wireless access network can be configured that is matched to control and communication traffic, respectively.



[FIGURE 9. IP-BASED RAN]

5.2 Activities to use IP technology for core network nodes

Accompanying the incorporation of location registers and various gateway equipment in the IP router network, NTT DoCoMo has been changing interfaces from ATM-to-Ethernet to routing protocols. As traffic increases in future, targeting the limits on throughput and aging of equipment, NTT DoCoMo will review the configuration of each piece of equipment used to ensure equipment is appropriate for IP environments.

5.3 Activities to implement the 4th generation mobile communication

In addition, DoCoMo is also investing in research and development aimed at the implementation of a 4th generation mobile communication network and expects the following innovations:

1) Bit rate: From 384 kbps to 100 Mbps (mobile environment) or 1 Gbps (indoors)
2) Transmission system: IP-based
3) Network cost: 1/10 to 1/100 of the current level

Aiming at launching 4G in 2010, since October 2002 NTT DoCoMo has been successfully experimenting with room transmission speeds of 100 Mbps downstream and 20 Mbps upstream using experimental wireless access devices. The main technologies to implement 4G include Variable Spreading Factor-Orthogonal Frequency and Code Division Multiplexing (VSF-OFCDM), which is a downstream communication standard. The use of VSF-OFCDM is intended to increase the access speed because (i) the optimum dispersion ratio is dynamically used in various signal environments such as outdoors and indoors, and (ii) the frequency band is divided into 768 subcarriers and data is sent in parallel.

Around the time when the 4th generation mobile communication network service is launched, mobile applications must be further developed and, for example, it must be possible to download data equivalent to several music CDs and receive high-quality video equivalent to high-vision broadcasts.

6. Conclusion

In consideration of the need to handle future increases in data traffic in the mobile communication network and improve services, NTT DoCoMo has been adopting IP technologies to actively increase the speed and capacity of its mobile communication network. Such activities bring about significant reductions in network related costs and serve as structural reform necessary to create a highly advanced network that leads to provisioning of more sophisticated mobile communications services. This effort also provides guidelines for planning by other mobile communication operators.

7. Reference

(1) http://www.nttdocomo.co.jp/english/corporate/investor_relations/business/fiscal_e.html
(2) http://www.nttdocomo.com/presscenter/pressreleases/press/pressrelease.html?param[no]=163
(3) http://www.johotsusintokei.soumu.go.jp/whitepaper/eng/WP2004/2004-index.html
http://www.nttdocomo.co.jp/corporate/rd/tech/index.html

附件七

Bypass and Transit - Arbitrage Issues in international Interconnection and Revenue Reporting in Developing Countries

Bypass and Transit – Arbitrage Issues in International Interconnection and Revenue Reporting in Developing Countries

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Abstract

Developing countries often have unbalanced telecommunications tariffs and assistance with sectoral reform is typically conditional on a measure of tariff rebalancing. Technology developments, particularly in Voice over Internet Protocol mean that there are both licensed and unlicensed competitive pressures on operators during the rebalancing phase. As a result, operators will tend to seek alternative revenue streams and this increases the level of supply of transit services. The combination of these effects leads to a significant reduction in settlement revenue but ultimately results in increased gross domestic product and competitive outcomes.

1. Introduction

A characteristic of developing countries is the need for rebalancing of tariffs. The rebalance may be between any or all of line rental, local call prices, long distance and international call prices. Typically, international calls (both outgoing and terminating) are used to subsidise local call prices and line rental prices.

As would be predicted by theory, competitors will seek to address the services where margins are highest – international calls. One simple international bypass solution is to use Voice over Internet Protocol (**VoIP**) over the public Internet. These types of service are often offered on an unlicensed basis. This allows the incumbent operator to argue that rebalancing must be accompanied by rigid controls on other potential competitors and delays in liberalisation.

The paper sets out the approach taken by VoIP operators and provides a model of the benefits to a country of rebalancing from a fiscal perspective and examines some of the social impacts (including the impacts on Government) of such a change.

The evidence of declining international revenue can be persuasive to newly created regulators and this can lead to transit activity by incumbents to minimise reporting of terminated and originated international minutes. The paper sets out the rationale behind this approach and demonstrates the trend in final transit minute pricing and the impact on the incumbent, the country and neighbouring countries.

Finally, the paper shows that rebalancing is, in the long term, a preferable outcome to one where rebalancing is delayed and competition is more limited.

2. Rate rebalancing

2.1 Introduction

The exercise of rebalancing telecommunications rates means that the prices charged for the services should reflect the actual cost incurred in their provision.

Rate rebalancing has been defined by the International Telecommunications Union (**ITU**) as the adjustment of rates charged for domestic and international telephone services {ITU 1999a}. The goal of these adjustments is ensure that the rates charged by the telephone company more closely reflect the cost of providing the services. In many countries, international telephone services are priced well above the cost the company incurs in providing them, while other services are priced below the cost of their provision. As a result, the fee paid by the consumer for domestic telephone service is lower than the cost of providing it. In such instances, the company providing these services will recover the loss, through the fees charged for international service.
In practice, there tends to be a requirement for two forms of rebalancing:

a) increase in the tariffs for domestic (particularly local) call charges and a concurrent reduction in International call tariffs; and

b) increase in the tariff for line rental charges and a concurrent reduction in International call tariffs.

That is, unbalanced tariffs subsidise both domestic call charges and line rental charges. Clearly this level of imbalance is a reflection of the extent to which International call charges extract super-profits.

The sale of line rental below cost raises a particular problem for regulators during the introduction of liberalisation. The difference between the cost and the charge, known as an access deficit, is used by the incumbent to argue that new interconnecting operators must contribute to the cost of the access deficit in their interconnection charges. The domestic call cost issues can mean that the wholesale, or interconnect charge will be higher than the retail charge if cost-based interconnection is introduced.

2.2 Requirements for rebalancing

Historically, domestic rates have been subsidised in order to ensure that consumers have access to affordable telephone services. In a competitive environment, this may not be sustainable for two reasons:

a) without a rebalancing of rates new entrants may cherry pick. That is, only offer services in the markets that are more lucrative such as international calling; and

b) the existing operator is likely to lose revenue from the international sector, previously used to subsidise a low domestic rate.

2.3 Rebalancing in example jurisdictions

In the Organisation of Eastern Caribbean States (**OECS**), the rebalancing exercise, which is a continuing and phased process, has resulted in a decline in international rates and some increase in domestic rates from March 2003.

In Canada, the regulator has implemented a program of tariff rebalancing to move access rates to a level closer to costs. Rate adjustments were introduced in a phased manner each year from 1996 and were completed in 1998.

In the telecommunications market in the United Kingdom {Ros and Banerjee 2000}, rebalancing of the dominant carrier's domestic and international telephone charges was done in 1984. This rebalancing exercise corrected the cross subsidies whose existence was established to the satisfaction of the UK regulator. The exercise was completed in a phased manner from 1984 to 1989.

The United States has been going through rate rebalancing in the telecommunications sector since 1982, resulting in the much lower domestic long-distance rates.

2.4 The regulators role

The role of a regulator is to analyse and assess the information provided to reach a decision on the application to have domestic and international rates rebalanced {Curien et al 1998}.

In review of rate applications, regulators are required to give consideration to the following factors:

- costs incurred by the applicant in providing the services;
- revenues earned by the applicant from each service;
- the extent to which subsidisation of one segment of the market by another occurs;
- the manner in which changes in the rate structure will be phased in;
- social effects of proposed changes, (universal access, affordability and improved quality of telephone service); and
- the effect of the proposed changes on the economy, which will include the promotion of investment and economic growth which translate into job creation.

The issue of rate rebalancing dictates that due diligence must be done by the regulator. This is primarily because the process can be complex and multi-faceted, and thus necessitates a thorough examination of the issues before a decision is arrived at.

2.5 Settlement

The most common accounting rate system of remuneration is the "accounting rate revenue division procedure". Under this system, a net settlement payment is made on the basis of excess traffic minutes, multiplied by half the accounting rate (the accounting rate share, or settlement rate).

One of the effects of rebalancing is that settlement revenue also declines along with call charges. Essentially, the operator moves to consistent cost-based pricing and this includes in International settlement. In turn this leads to network effects benefits. According to the ITU {ITU 1999b}:

"*Net settlement payments have grown larger as traffic flows have become less balanced, during the 1990s. ITU estimates that, between 1993-98, net flows of settlement payments from developed counties to developing ones amounted to some US$40 billion* {ITU 1999b}. *However, an increasing volume of traffic now passes outside the accounting rate system (e.g., via the Internet), or is routed in such a way as to exploit the least-cost route between two end-points, which is not necessarily the most direct one*".

3. VoIP

3.1 Introduction

Sending voice over Internet Protocol based networks reflects a convergence between two network types that have emerged under very different policy and regulatory circumstances:

a) the Public Switched Telephone Network (**PSTN**), based largely on circuit-switched technology, which has been fairly extensively regulated by most countries;

b) the Internet, which is based on packet-switched technology, and which has been subject to few controls.

The availability of new technologies for the delivery of broadband services allows a provider of broadband services to offer Voice over Internet Protocol (**VoIP**) services as the telecommunications element of a "bundle" of telecommunications, broadband access and pay television services.

VoIP is a packet based transmission and switching technology {Black 2000} {Varshney et al 2000} that allows voice to be carried over either:

a) a private Internet protocol network; or

b) the global Internet.

Broadly, there are 3 different types of VoIP services which connect to the PSTN. They are:

a) retail based calling card type services;

b) networks which use VoIP that interconnect the PSTN; and

c) VoIP over broadband which may or may not connect to the PSTN.

The balance of this section outlines each of the technologies and sets out the associated regulatory issues.

3.2 Retail Services

Set out in Figure 1 is the type of implementation that is used to provide "calling card" type services. If customer A wishes to make a call (typically an international call) to party C then they dial into an access number. Once the access number has terminated the call from party A, there is typically a request for a pin or serial number which is associated with value stored in a database. This value is typically the monetary denomination of the calling card. After providing the pin number party A is prompted for the complete telephone number for party C including international access code. The VoIP gateway uses this information to "talk" to a VoIP gateway in the destination country and directs that far end VoIP gateway to originate a call on the PSTN of the country which C resides. Once the call originated to C has been terminated on party C, the VoIP gateways convert to the PSTN telephony call content of each of party A and party C into VoIP packets for delivery across either the public Internet (as shown) or potentially over a private leased line Internet protocol transmission service.

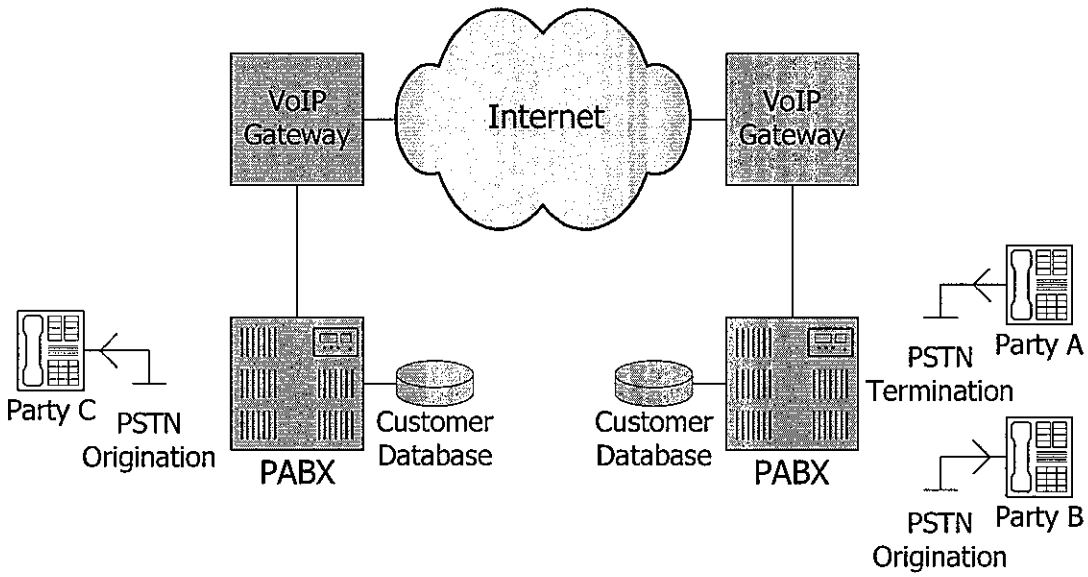

FIGURE 1 – RETAIL VOIP

As a practical matter, the VoIP gateway is used to both terminate and originate calls as the relationship between calling card companies is often a bilateral one although, in some instances, calling card services are offered by more global businesses.

This type of service does not present an access issue. Party A pays the local call charges associated with the PSTN access to the PSTN provider on a retail basis. When the calling card operator originates calls which terminate on party B, it also pays a retail rate for those local calls.

This type of service offers competition to the incumbent only causes loss of market share to the extent that it does not offer a card based service itself. That is, an economically efficient incumbent will not lose call minutes to a card operator (but these minutes will be at a reduced per minute value.

3.3 Standard Interconnection

A standard form of interconnection for a VoIP based network to a PSTN is set out in Figure 2. Essentially, the Signalling Standard Number 7 (**SS7**) interconnection from the PSTN connects with the media gateway controller of a VoIP network and the call content interconnection is between the gateway switch of the PSTN and a media gateway in the VoIP network. The configuration and characteristics of the VoIP network itself are unimportant for access issues. Rather, the VoIP network has similar originating and terminating characteristics to the PSTN.

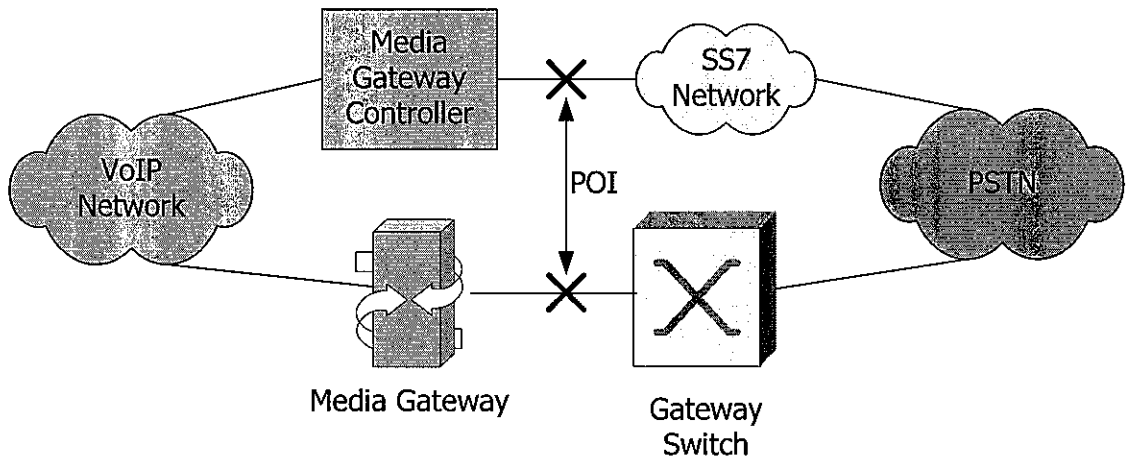

FIGURE 2 – STANDARD INTERCONNECTION

This type of service offers competition to the incumbent only causes loss of market share to the extent that it does not employ VoIP technology itself. That is, an economically efficient incumbent will not lose call minutes to a VoIP based operator if it deploys the lower cost VoIP technology. The speed with which the incumbent is prepared (or able) to deploy such technology is the constraint on a competitive response.

3.4 VoIP Over Broadband

With the increasing prevalence of broadband connectivity to residential premises, a number of international operators are offering low cost VoIP services which have characteristics similar to those of a standard telephone service. There are 2 major variants to this type of offering set out in Figure 3:

a) systems where this is a discrete analogue telephone to VoIP converter box and where telephone numbers are allocated to the residential premises (examples being Vonage in the USA and Engin in Australia); and

b) services which simply provide termination onto other PSTN and have a USB interface to a telephony device (examples being Skype and Microsoft Messenger).

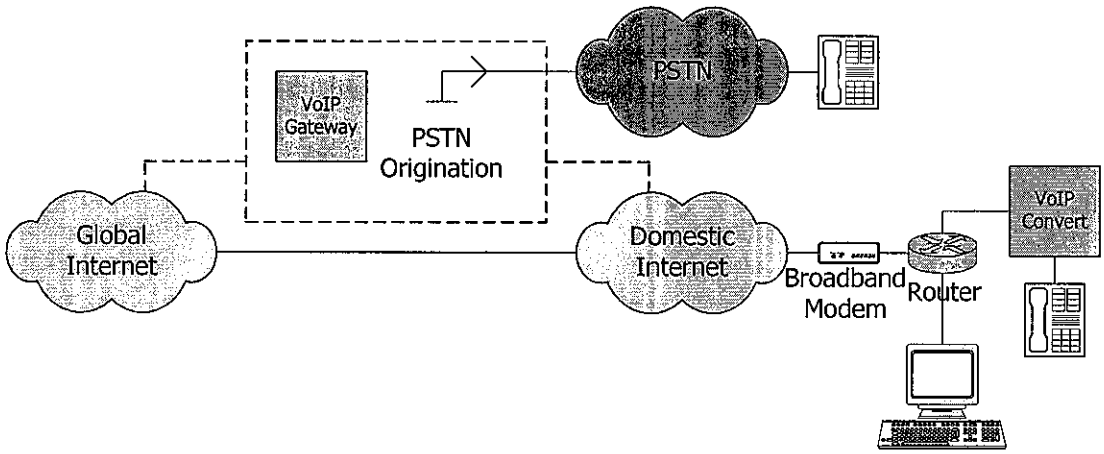

FIGURE 3 – VOIP OVER BROADBAND

In the case of variant a), the domestic user pays a monthly charge as well as per call charge. Typically, the charge per call is based on the number called rather than the location of the origination. Further, Vonage is offering virtual numbers that are not related to geographic location. For example, a user based in the United Kingdom could have a New York telephone number. Each of Vonage and the Australian entity Engin have established bilateral relationships with PSTN or VoIP operators in other countries and offer competitive international call rates. However, their major target is to become a competitive domestic provider of voice calling services which have associated telephone numbers.

Both Vonage and Engin offer free on-net calls and low cost domestic calls. In the US, the Vonage offering is a "bucket" price of US$ 24.99 per month which includes unlimited calls to anywhere in the USA and Canada. There is also a basic offering at US$ 14.99 which provides 500 minutes of calling anywhere in the US and Canada. In general, international calling is approximately US$ 0.03 per minute to popular destinations. In

Australia the Engin service has a monthly charge of A$ 29.95 with 200 free untimed local or national calls.

3.5 Problems raised by VoIP

The effectiveness of VoIP as a competitive force to international direct dial (**IDD**) is indicated by the fact that incumbents are losing settlement minutes to VoIP operators. This means that the licensed operators in other countries have decided that there is benefit in paying the lower termination charges associated with VoIP operators and that the volume of traffic will not be so adversely affected as to make this decision uneconomic.

The effect of this is to reduce income in respect of both originating and settlement minutes. In many countries the drop in originating minutes is as high as 25%. As there is a need for rebalancing, this has a disproportionate effect on profitability. The concurrent loss of settlement revenue is often at a similar level and this compounds the profitability issue.

The impact of VoIP operators often leads the incumbent to decide to offer services using VoIP technology. That is, the competitive effect of VoIP operators has been to promote the introduction of lower cost, lower quality services for those users that are not as motivated by quality issues as others. Broadly, Government and business users have higher quality requirements (both for voice and facsimile) than residential users.

There are a number of alternatives in dealing with unlicensed VoIP operators ranging from the imposition of penalties to providing a class licence. Typically, unliberalised (or partially liberalised) regulatory frameworks do not license VoIP operators automatically.

More modern regulatory frameworks would permit VoIP operators to be licensed in a "light touch" regulatory environment in a class licensing regime. However, it is important to ensure that the regulator does not create a class license where that class might capture Internet cafes. Appropriately, most regulators take the view that Internet cafes do not need to be regulated and that bringing them into a regulatory framework might adversely and inappropriately distort a market that has not been found to have failed.

3.6 Competition in Communications Services – modelling rebalancing

It is possible to model the likely effects of VoIP on the revenue of the incumbent in the presence of a rate rebalancing. Broadly, the impacts of a cost-effective by-pass technology will be as follows:

a) residential international traffic (both originating and settlement) will drop;

b) some business originating traffic will also drop (but that traffic which is quality dependent will not change); and

c) there will be no change in (the limited) level of international mobile traffic.

However, some of the lost IDD traffic will be replaced by card based VoIP and generate revenue. Therefore, the simulation should reflect an underlying demand (as opposed to the measured and falling demand) and this will rise with the rate of business take-up of fixed line phones. At some price point, the poorer quality of VoIP against IDD will mean a shift back to IDD. Based on the available margins in VoIP, it is likely that this price point is going to be at approximately half IDD rates and that VoIP operators will price at half IDD rates as prices drop. The simulation assumes that the rate rebalancing continues into the future (that is, international call prices fall).

The effect of the simulation is that the incumbent's international revenue stays close to static at a time when line growth is large. That is, the rebalancing forces down VoIP prices for those who can tolerate its quality at the same time that IDD prices fall for those who cannot tolerate the line quality of VoIP. This is shown in Figure 4.

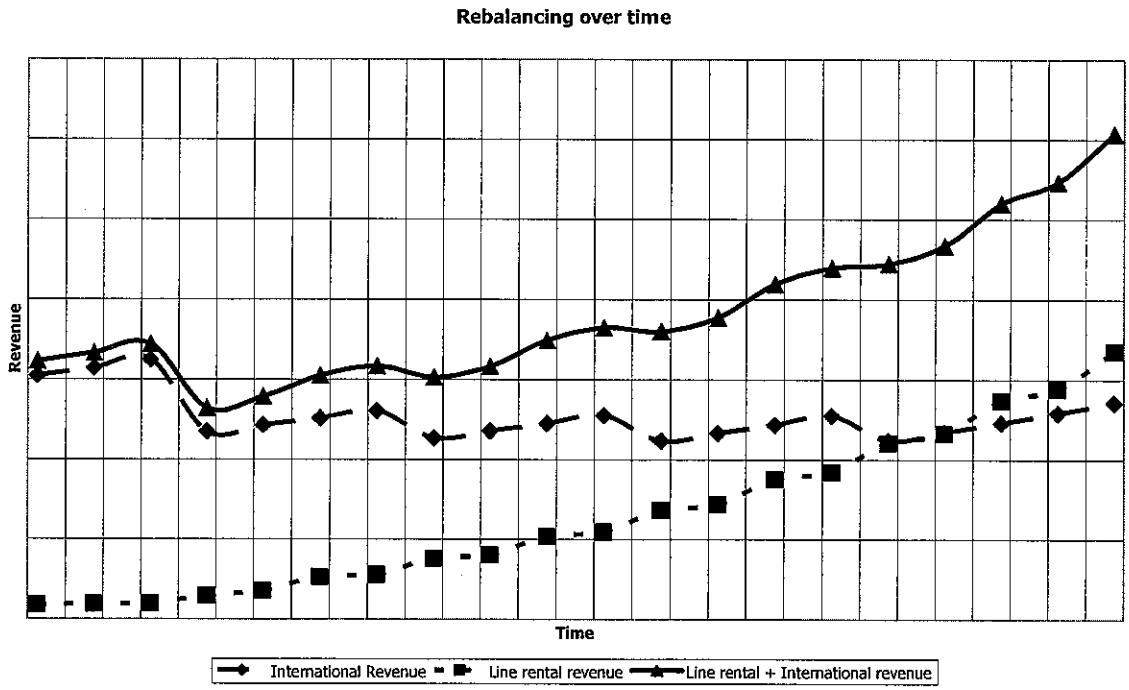

FIGURE 4 – INTERNATIONAL REVENUE FOR INCUMBENT WITH VOIP

Unlicensed VoIP operators have introduced a level of competition to the IDD operators (and particularly incumbents) which has resulted in a reduction in international call charges and the rebalancing will continue that reduction. As the pricing of VoIP call drops with the reduction in the IDD international tariff, inefficient VoIP operators will exit the market. It makes sense that the current VoIP operators be class licensed. That is, in the terms of regulations, the VoIP operators would each be issued with a standard licence. There is no obligation on the regulator to impose Universal Service funding

obligations on all classes of licences and the less regulated class licences such as VoIP operators may not need such an obligation.

4. Transit issues

4.1 Introduction

There is a temptation for incumbents to minimise the number of originated and terminated minutes that are reported. Typically, incumbents are taxed based on their terminating International minutes (which are assumed to be profitable). At the start of the process of liberalisation, the incumbent will ensure that the Government is aware of both the:

a) decline in International terminating and originating minutes that is occurring because of licensed (or unlicensed) VoIP operators; and

b) declining profitability of the business during the rebalancing exercise.

One way to increase revenue with no change in terminating International minutes is to act as a transit operator to another local country which has varying terminating charges to each of its neighbours. This provides a potential arbitrage and the likely equilibrium situation can be assessed.

4.2 Interconnection as a commodity

Traditionally, settlement negotiations are bilateral and private interconnection between carriers has been managed through a series of bi-lateral interconnection agreements which prescribe price and quality along with minimum usage and performance {Kashlak et al 1998} {Nafstad and Saether2000}. A call originating on a network will be terminated on the terminating network either through a bilateral interconnection agreement with the terminating network or an interconnection agreement with another network which has an interconnection agreement with the terminating network. Such negotiations take time and require the establishment of a business relationship. These transactions may result in buyer (or seller) remorse with both sides feeling vulnerable to the lack of price information.

4.3 Transit as a commodity

Traditionally, settlement negotiations are bilateral and private interconnection between carriers has been managed through a series of bi-lateral interconnection agreements which prescribe price and quality along with minimum usage and performance. A call originating on a network will be terminated on the terminating network either through a bilateral interconnection agreement with the terminating network or an interconnection agreement with another network which has an interconnection agreement with the terminating network. Such negotiations take time and require the establishment of a

business relationship. These transactions may result in buyer (or seller) remorse with both sides feeling vulnerable to the lack of price information.

If bandwidth were a commodity, there would be no requirement for negotiations in order to trade. To trade bandwidth efficiently and effectively, an infrastructure has to be established so that capacity can be physically traded and appropriately delivered.

A necessary feature for a product to be viewed as a commodity is that it has to be generic. Voice minutes are generic with the exception of Quality of Service (**QoS**) differentiation. For every commodity, financial instruments (derivatives) can be created to ensure market efficiency. These financial instruments are designed to be priced such that there are no opportunities to make risk-free profits.

However, there are several major differences specific to bandwidth trading that require special consideration and that associate this commodity with other network commodities (such as electricity) rather than physical ones such as wheat and pork belly:

a) voice minutes are not storable, thus there is no opportunity to buy low, store them and then sell high; and

b) there is a geographical consideration: one can satisfy the voice minute requirement between any city pair using alternative routes. Thus, voice minute capacity on related routes/segments has to be consistently priced.

4.4 Arbitrage issues

There are likely to be at least four arbitrage opportunities in transit trading:

- temporal arbitrage;
- product arbitrage;
- geographical arbitrage; and
- distributional arbitrage.

Consider the model set out in Figure 5:

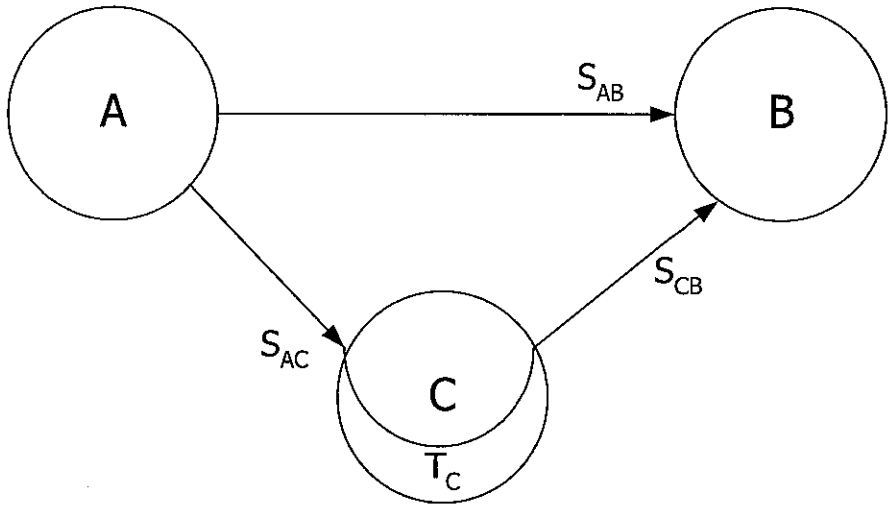

FIGURE 5 – MODEL FOR TRANSIT

Operator A exchanges traffic with operator B. The settlement between A and B is S_{AB} per minute. Operator C also exchanges traffic with operator B. The settlement between C and B is S_{CB} per minute.

If operator A also exchanges traffic with operator C then the settlement between A and C is S_{AC} per minute. There is an opportunity for operator C to generate revenue if: $S_{AC} + S_{CB} < S_{AB}$

In this case, C will charge a transit charge T_C to A for the carriage of traffic to B. As long as:

$S_{AC} + S_{CB} + T_C < S_{AB}$

then C will be able to charge the equivalent of a settlement charge plus a transit charge which will be greater than the settlement rate S_{CB}.

One of the issues that arises in liberalisation is that there is an increasing International expectation that transit charges will be a small fraction of termination charges. This means that the amount charged by C will tend towards S_{CB}. That is, C will forego the settlement with A and charge little more than the marginal cost of transit. That is, the temptation of the arbitrage opportunity reduces the number of settlement minutes, creates a marginal income stream from A, increases traffic from C to B but reduces B's settlement income.

4.5 Effects of Transit

Consider an example where A is a US operator which terminates 50,000 minutes per month on network B and S_{AB} is $0.50 per minute. Network B is in a South East Asian developing country and Network C is in an adjacent developing country. Assume that

S_{CB} is \$0.10 per minute and that S_{AC} was \$0.30 per minute. Ultimately, operator C charges a transit charge T_C to A of \$0.03.

The effect for operator B is the loss of \$300,000 per year in settlement revenue. The effect for operator C is increased non-settlement revenue of only \$18,000 per year. That is, the net effect is that the value of telecommunications for developing countries is a loss of \$282,000 in hard currency and the benefit has flown to a developed country.

The European Union has reported {ECC 2003}:

"*Already about 20% of international traffic is being re-filled via a third country which has a low settlement rate with the terminating country, this amount depends heavily on sanction possibilities of the originating and terminating countries to prohibit such mechanisms, but arbitrage mechanisms help to level rates in order to prevent different rates for different countries, so with further liberalisation, removing rate differences between low and high rate countries, a downward trend might be expected again*".

5. Benefits of rebalancing

Tariff rebalancing is an essential part of the introduction of competition in a liberalising market. Although there are short-term problems in rebalancing (particularly with respect to universal service funding) the long term benefits are:

a) more investment focused in the network; and

b) improvement of the network performance.

However, developing countries have restrictions on applying a cost related approach for each separate tariff item and they are political, social, marketing and strategic {Khan 2003}. Once rebalancing has been completed, the cost of telephony will be significantly lower as a proportion of gross domestic product (**GDP**). Further, there is a significant linkage between GDP growth and teledensity {Ure 2004}.

6. Conclusions

This paper has set out the characteristics of rebalancing and the issues facing developing countries in the process of rebalancing of tariffs. It has shown that the rebalance may be between any or all of line rental, local call prices, long distance and international call prices. Further, international calls (both outgoing and terminating) are used to subsidise local call prices and line rental prices.

The paper has set out the ways in which VoIP technology can be used to address the services where margins are highest – international calls. When these types of service are often offered on an unlicensed basis, the incumbent will seek to deal with the competitive pressures imposed by VoIP operators.

The issues in transit traffic have been set out and a simple model presented that indicates the adverse effect on developing countries that occurs from the process of transit. The paper set out the rationale behind transit and demonstrated the trend in final transit minute pricing.

References

Armstrong, Mark. "Network Interconnection in Telecommunications." *The Economic Journal* 108, no. 448 (May 1998): 545 - 564.

Black, U. *Voice over IP*. Upper Saddle River, NJ: Prentice Hall, 2000.

Curien, Nicolas, Bruno Jullien and Patrick Rey. "Pricing Regulation Under Bypass Competition." *RAND Journal of Economics* 29, no. 2 (Summer 1998): 259 - 279.

Electronic Communications Committee (ECC) within the European Conference of Postal and Telecommunications Administrations (CEPT). *Accounting Rates and Settlements Evolution*. ECC report no. 28. Maastricht: ECC, 2003.

ITU. *Direction of Traffic: Trading Telecom Minutes*. Geneva: International Telecommunications Union, 1999. http://www.itu.int/ti/publications/.

———. *Tariff Rebalancing*. 1999. International Telecommunications Union. 21 November 2004 http://www.itu.int/telecom-wt99/press_service/information_for_the_press/press_kit/backgrounders/backgrounders/telecoms_pricing-next.html

Kashlak Roger J, Rajan Chandran and C. Anthony Di Benedetto. "Reciprocity in International Business: A Study of Telecommunications Alliances and Contracts." *Journal of International Business Studies* 29, no. 2 (2nd Qtr 1998): 281 - 304.

Majumdar, Sumit K. and S. Venkataraman. "Network Effects and the Adoption of New Technology: Evidence from the U.S. Telecommunications Industry." *Strategic Management Journal* 19, no. 11 (November 1998): 1045 - 1062.

Nafstad, Halvor and Jan-Petter Saether. "The International Telephone Traffic Settlement the Accounting Rate System Versus Interconnection Principles." In *Towards Global Markets*, chair Ana Valero Huete. Some Regulatory Issues conducted at the ITS 2000. Buenos Aires, 2 - 5 July, 2000.

Ros, Agustin J. and Aniruddha Banerjee. "Telecommunications Privatization and Tariff Rebalancing: Evidence from Latin America." *Telecommunications Policy* 24, no. 3 (19 May 2000 2000): 233 - 252.

Ure, John, Telecommunications Research Project - Hong Kong University. "Infrastructure in EAP: The Way Forward." Bali: World Bank, 27-29 June, 2004.

Valletti, Tommasso M. *The Practice of Access Pricing: Telecommunications in the United Kingdom*. Policy Research Working Paper Series no. 2063. Washington: World Bank, 1999. http://econ.worldbank.org/docs/328.pdf.

Varshney Upkar, Andy Snow, and Matt McGivern and Christi Howard. "Voice Over IP." *Communications of the ACM* 45, no. 1 (2000): 89 - 96.

附件八

The End of Universal Service: Modeling the Market Effects of Internet Telephony

The End of Universal Service: Modeling the Market Effects of Internet Telephony

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Abstract

Using available telecommunication deployment statistics in the United States and iThink? modeling software, this paper presents a series of scenarios about the impact of Internet telephony on the Universal Service Program. These address whether advances in computing and communications technology will sufficiently reduce prices for communication services that further subsidies to carriers and their contributions to the Universal Service Program fund may no longer be necessary.

1. Introduction

Creative destruction and the development of disruptive technologies, such as voice over Internet protocol (VoIP), has not yet had its full impact felt in various countries. The role of regulatory agencies as barriers to change and innovation, impeding the reduction of cost, destruction of jobs and outmoded technologies, has not been adequately recognized. Internet telephony will lead and require the end of the Universal Service Program (USP) as it is conventionally understood. This will result in a redefined need for a universal access policy, as part of a broader open communication innovation policy.

Just as firms find it difficult to give up on older technologies, which have become profitable 'cash cows,' so too have telecommunications regulators, whether at the state or federal level in the U.S. been able to give up the easy money of over-regulation. This includes excessive and unnecessary licensing fees, access charges and taxes, and some left over from the Spanish-American War in the case of the US. According to a recent World Bank study (World Bank, 2005) inefficient institutions in the form of regulations and government agencies are one of the biggest obstacles to investment.

Contrary to popular belief, the improvement in productivity enabled by widespread deployment of new technologies is still in its initial phases in telecommunications industries. In this study we present the views from the scholarly community about the services that they believe should be part of a universal service program. In their view, basic telephony is not enough. Equipment and advanced services that are possible through broadband are the key to an innovative information society. Given the expense that such a plan will entail they also believe that the traditional contributions of the universal service fund are not enough. This will not be the first time that this argument has been proposed. Mueller has argued in the past that a Universal Service Fund is not the appropriate way of achieving universal goals specifically that of affordability (Mueller 97). Their views are further validated with a simulation that we developed in this paper. It presents two scenarios: one where only the incumbent local exchange carrier

contributes to the USP and a second called parity where both the incumbent and the new entrant contribute. In both scenarios it is clear that the funds collected will not be enough to support such visions of technology. We thus argue that the elimination of the universal service program will more effectively achieve those goals.

The process of creative destruction that is likely to emerge from the introduction of disruptive technologies like VoIP can reduce prices and accelerate the rate of innovation that can make these services affordable and accessible to the population. We nonetheless recognize that existing regulation and legal play can prevent this from happening. The alternative, we argue is to at least leave VoIP unregulated and let market forces to gradually result in the deregulation that we envision.

2. Internet telephony technology and regulation background

1994 was the year when technology first emerged to allow people to use their computers to make a voice transmission (Kelly, McTaggart, Petrazzini, Shaw, & Woodall, 2001). In those early days people who wanted to make a call using the Internet needed to coordinate the time for both of them to be at their computers. The technology since then has progressed and it is now possible to use the public Internet to make calls using a conventional phone on both sides of the line.

This is among the greatest technological innovations that has happened in voice communications since the telephone was invented. Unlike the traditional connection that uses circuit switching and ties the entire line for the length of the conversation, Internet based telephony uses instead a different set of communications protocols, the Transmission Control Protocol (TCP) and the Internet Protocol (IP), which utilize packets that could be routed through the multiple networks that make the Internet. The packets contain addressing and some control information that enables these them to be routed. Because the telephone network was designed to allow real-time synchronous communications between two individuals, the network relies on a hierarchical set of local, urban and international switches between the called and the called party (Kelly et al., 2001). The Internet designed for data transmissions thus relies on asynchronous connections. As a result, early use of this technology for voice communications experienced considerable delay and poor voice quality. The technology has much improved, with delay being almost as little as the traditional method and quality also being comparable.

One of the early entrants to this field was Net2phone which thanks to the gateways that now exist between the public switched telephone network and the Internet it is possible to make calls from computers to telephones and from IP phones to conventional phones.

Because of the significant advances in this technology a migration towards this service has begun. There are several reasons why this is happening. The cost of a call is considerably cheaper. Vonage, one of the most popular companies, charges $15 per

month for 500 minutes of local, domestic, and calls to Canada. For $25 customers can obtain unlimited access. The service includes caller ID, three way calling, call waiting, call forwarding, call transfer and repeat calling for free. This compares favorably with a company such as Verizon that charges between $48 and $55 dollars for an unlimited package with similar added value services.

The migration is also happening at the corporate level. As described by Greenblatt (Greenblatt, 2003), companies can take advantage of a cost effective use of their networks that results in savings if it is compared with leased lines that they have traditionally contracted. It also allows for better network utilization and simplified network management because both voice and data can be integrated. This obviates the need for the staff that managed two networks and they can potentially become more productive given the additional features that are possible with the computer telephony integration that Internet telephony makes possible.

When the technology was first introduced in the early 1990s the Federal Communications Commission (FCC) decided not to regulate it. At that time there were still many quality problems and it was not possible yet to use a traditional phone set to make calls using the Internet. Similarly in the European Union, the European Commission's Directorate General for Competition decided not to regulate the technology because it was not real time. Recently the FCC requested comments to enable it to make a decision regarding the regulatory treatment of VoIP. The FCC has not yet decided about how the technology should be regulated but the chairman, Michael Powell, has stated on several occasions that it should remain unregulated. If this is the case then Internet voice providers will not have to contribute to the universal service fund. They also do not have to pay access fees or settlement rates to foreign carriers. Traditional telecommunications operators, on the contrary, will remain regulated as common carriers and will have to pay these fees. The fear is that under such circumstances the revenue base from which contributions are made will decrease, thus negatively affecting the funds finances.

3. Universal Service Policies

Until the 1996 Telecommunications Act, universal service was generally conceived as the provisions of basic telephone services to residential users (Bar & Riis, 2000). It was not until the Act passed that the definition was formalized and expanded to include libraries and schools and the scope of services to be subsidized to include computer equipment and Internet access.

Since the Telecommunications Act of 1996 passed, scholars have written extensively about universal service objectives. The research written to this point focuses primarily on two areas, the definition of a universal service program and the mechanisms that can be used to fund it.

Those that have focused on the definition generally argue that we can no longer think of a universal service program to include only basic telephony. This is particularly true when 95% of the population has access to basic telephony (Belinfante, 1993). The focus should thus be changed to consider, for example, basic computer literacy and end user equipment (Gillett, 2000). This is because, in Gillett's words, we are moving towards an information infrastructure where the intelligence does not reside in the network anymore but at the edges through sophisticated equipment that allow end users to have greater control over the applications and services that they want. This is the end to end scenario that Saltzer, Reed, and Clark first described in 1984 (Saltzer, Reed, & Clark, 1984). The expansion of the definition to include computers instead of telephones and a more efficient use of networks may appear to imply that we need greater subsidies but emerging technologies hold the promise of making this possible without any subsidies. As was stated above, networks that rely on the Internet protocol use this infrastructure and thus potentially increase revenue or reduce costs by carrying not only voice but also other types of content. If we think of a universal service that expands the scope of services provided, it will be difficult for the government to subsidize it. As stated by Gillett (Gillett, 2000), creative business initiatives have substantially reduced the barriers for people to purchase computers and access to the Internet.

Similar to Gillett, Goggin (Goggin & Newell, 2000) proposed to look at universal service with the concept of disability in mind. Taking this into consideration, a universal service definition should thus take into consideration the special needs of certain people. The definitions should thus not be focused on availability, which is normally conceived on geographic terms but on accessibility. The U.S. government he argues should make sure that technology is empowering. This view of universal services is consistent with the suggestions by scholars to expand the scope of services to include access to advanced communications that would normally include the Internet.

Similarly Lievrouw (Lievrouw, 2000) acknowledges the trend in developed countries towards an information based society. He emphasizes that content is the basis for discourse and participation of individuals in the social/political institutions is that constituted an advanced society. Under this conception of universal service Lievrow argues that it should include training and education to cultivate human capacity. This is similar to Bar's (Bar & Riis, 2000) conception of a universal program that should be aimed at fostering innovations. It is thus clear that, according to scholars, the scope of universal service policies in the United States should be expanded.

Taking into consideration that there is a desire for a universal service program to be conceived in a broader way, how can it be funded? In this respect there are two prominent views. One side supports the use of explicit subsidies that should be allocated through reverse auctions. Others instead believe that the market alone can accomplish more ambitious goals.

Some scholars have proposed the use of auctions. A traditional approach is the one proposed by Weller (Weller, 1999) who suggested the use of single round sealed bid actions of single residential users. In addition to the use of auctions Peha (Peha, 1999) argues that the universal service obligations that carriers agree to fulfill should also be tradable. Carriers should be permitted to trade not only the obligations but also the deadlines for completion. He argues that this system would allow a more efficient allocation of universal service obligations.

Nett (Nett, 1998) argues that carriers should not be obliged to provide access to regions it is not interesting in serving. He suggests that the government should ask carriers if they are willing to provide service to a specific region without any compensation. If none agree then the use of reverse auctions should be used.

Considering that basic telephony objectives have already been accomplished one should then focus on projects that provide more advanced services. These nonetheless could be done by the organizations that required them on a contract basis instead of having the government administering them.

While a system of auctions has worked reasonable well in less developed countries one needs to question their use in the United States. As mentioned above, 95% of the population already has a telephone line. Critics could argue that the existing infrastructure is not able to provide the advanced services that most scholars have identified and would like to include. At this respect one could also argue that it is in the carriers interests to upgrade the existing infrastructure even though it is not entirely conditioned to provide broadband access. This is in their interest because it will make their infrastructure more efficient. It will also allow them to provide other services. They also face the threat from satellite and cable companies that are also upgrading their technologies to offer bundles of services that include both voice and data communication.

If 95% of the population has a telephone line this means that they can potentially contract broadband access through DSL, which uses the same infrastructure. DSL does, however, have a distance limitation. This means that houses located more than 18,000 feet from the central office cannot obtain DSL because the signal degrades. This distance likely to increase because companies are currently working on expanding it (Bostoen, 2004). Given the distance limitations it is likely that rural users will have fewer choices if they decide to become broadband subscribers. In May 2003 the Pew Internet and American Life project conducted a survey about broadband adoption. According to the respondents 71% reported that they lived in an area where broadband was provided, 17% did not know if the service was available in their location, and 12% indicated that they could not get service at home (Horrigan, 2003). This survey indicates that most U.S. residents can obtain a broadband connection if they desire.

Given this evidence there have been scholars who have proposed the elimination of the current Universal Service Program. They thus believe that market forces can more

effectively achieve these broader goals. For example Mueller (Mueller, 1993) argues that the competition that existed during the 1894-1920 period resulted in a more rapid diffusion of telephone service than regulated monopoly. As shown by Jayakar (Jayakar, 1999) between 1894 and 1907 teledensity grew from .42 to 7.03 per hundred inhabitants, a compound annual growth rate of more than 24%. During the period of the AT&T monopoly (1921-1982) the growth rate was 3%. It is thus not surprising that these scholars argue that deregulation and competition will force these carriers to modernize their networks and introduce bundles of services that are affordable to the population.

Because of the high penetration of lines that already exist in the U.S. and the emergence of technologies that are likely to exert greater competitive pressure on the industry we believe that the Universal Service Program in this country could be eliminated. In the following section we talk about the benefits that can be achieved by the process of creative destruction that is likely to happen in this more competitive environment thanks to the introduction of disruptive technologies such as Internet telephony.

4. Disruptive technologies, creative destruction, and universal service

Christensen (Christensen, 2000) first proposed the concept of disruptive technologies in 1997. In his study of corporations that failed he found out that there are some technologies that have the capacity to change the dynamics of a marketplace at the expense of the existing established corporations and products. These technologies are able to provide value to consumers at a comparatively lower cost. One of the reasons why these technologies have tended to have such devastating effects on incumbents is because many of them are substitutes of existing products and services, which compete directly with those that exist in the market. Christensen explains that one of the reasons why incumbents tend to lose their advantage over the new entrants is because these new products exhibit for the most part lower revenue margins and tend to cannibalize existing product offerings. Unable to respond without losing profits they begin to experience an erosion of their market share.

This is what Internet telephony is now doing to traditional telephony. The technology relies on a different architecture that uses the existing telecommunications and Internet networks more efficiently. There are several reasons why traditional telephone operators are unable to respond to the offerings that now new enterprises are providing to customers with broadband connections. First Internet telephony services are charged similarly to those charged by cellular carriers where subscribers can pay for a number of minutes. These minutes include both local and national long distance calls including Canada. The traditional carriers on the other hand charge on a per minute basis or for unlimited calls but these only include local calls. Long distance is metered for both domestic and international calls. Because of the difference in tariffs traditional carriers are bound to lose revenue if they give up this pricing scheme, as they will be losing revenues from long distance calls.

Even before new entrants began to offer telephony using the public Internet, traditional carriers delayed the introduction of broadband service through their DSL technology. Before DSL, subscribers connected to the Internet dialing up to their Internet Service Provider. Because this connection tied up the line it would not be possible for this individual to make or receive calls. This benefited telephone carriers because people began to order second lines. DSL, which splits the line to allow for data and voice to be carried on the same network, obviates the need of a second voice line. It is thus not surprising that traditional carriers delayed the introduction of this service as with one line users could get both Internet access and basic telephony service at a lower price than two lines. It was the entry of cable companies into the provision of data that accelerated DSL offerings. According to Walsh, "established firms rarely commercialize disruptive technologies and then prefer to use market-pull strategies to accomplish this" (Walsh, Kirchhoff, & Newbert, 2002).

Because broadband is a prerequisite for Internet telephony, subscribers that already connect to the Internet using DSL or cable modems can benefit from canceling their contract with their local and long distance telephone provider for VoIP. They will benefit from the similar unlimited offering that the local carrier provides at a lower rate and benefit as well from much reduced international rates. In addition, services that are generally paid for separately to traditional carriers can be offered for free by Internet telephony providers. These include, for example, caller ID, voicemail, three way conferencing and call forwarding.

But will this disruptive technology severely affect the revenue stream of traditional carriers and negatively affect any further investment in telecommunications infrastructure? In our view, Internet telephony will lead to creative destruction, whereby innovations would destroy existing technologies and methods of production only to be assaulted themselves by imitative rival products with newer, more efficient configurations (McKnight, Vaaler, & Katz, 2001) in both the private and the government sector through the reconfiguration of regulation and the law that is likely to happen as technology evolves.

While in other sectors of information technology, creative destruction has happened at a more dynamic pace, telecommunications has evolved much more slowly. There are several reasons that have prevented a greater development of communication technologies.

Even though the telephone was invented in 1876, people are now still using the same infrastructure with a few changes happening at the central offices by the inclusion of applications that allowed these carriers to provide services beyond basic telephony that would complement the revenues that they were offering.

As a result of the convergence between computers and data communications there has been an explosion of the number of services and applications that entrepreneurs have introduced in the last ten years. We have seen during this process that great

enthusiasm emerged as a result of the ease at which information could now be represented in web pages and the possibilities that both entrepreneurs and venture capitalists saw in the evolution and application of information and communication technologies (ICTs). A process of creative destruction happened that was evident by the introduction of new businesses of which many eventually failed and resulted in the dot com crash. While innovation, creation, and destruction was happening in the data field, companies in voice communications have on the contrary evolved at a much slower pace and have instead tried to delay the introduction of new technologies and services.

This reluctance to innovate is in part due to regulation and benefits from the monopolized market that they have tried to defend even after liberalization efforts by the government. The creative destruction that is now beginning to happen in the voice segment of communications is happening through the pull of new entrants offering substitute services.

As stated by Caballero (Caballero & Hammour, 1996) part of the reason why companies fail to adapt to the changing environmental circumstances is because making transitions is slow. There are high transactions costs in the process of change and government policy that can further exacerbate what Caballero calls technological sclerosis.

As was stated by Brown (L. D. Brown, 1992) when referring to health care reforms, the adoption of new policies will lead to considerable creative destruction that will disturb the institutional status quo. Policies about the universal service for communication services will need to go through significant changes in the same way.

The reason why traditional telecommunications carriers are now beginning to adopt IP based communication is because the entry of entrepreneurs offering substitute services has forced them to respond to the challenge and provide these services. In the process of creative destruction that is happening now in communications, we are experiencing knowledge spillovers (Stein, 1997)where the introduction of Internet telephony is forcing carriers to offer these services as well. The expectation of highly reliable networks is also forcing these entrepreneurs to improve the technology to the point that their offerings are of similar quality. There is a redistribution of wealth that comes as a result of the disruptions that new technologies and entrepreneurs bring to the market. This means that there will be losers and winners in this process of transformation.

In the process of transformation companies have generally relied on a series of competitive weapons that they have used on an as needed basis to fend off new challengers and with it the process of creative destruction (Stein, 1997). These generally have included, for example, a large installed base of loyal customers and a well-established network of distributors that allows them to market their products much more efficiently.

Scholars in telecommunications have identified many advantages that incumbent carriers have which have allowed them to maintain their monopoly position even in the

presence of liberalization and efforts that regulators have made to foster entry. These are, for example, customer inertia; the control of essential facilities; established national networks; and developed vertically and integrated production facilities, which include local, long distance, and wireless offerings (Intven, Oliver, & Sep veda, 2000).

In addition to the traditional business related competitive resources that they have at their disposal they also have other policy related resources. As pointed out by Garc燰 Murillo (Garcia-Murillo, 2004), companies can make strategic use of the courts to delay the entry of new competitors. There has also been much use in telecommunications of "legal play", which García-Murillo defines as the use of lawsuits as a mechanism to create delays in actions that negatively affect a target firm (Garcia-Murillo, 2004). Incumbent carriers have challenged government decisions in state courts. These legal battles have taken years to resolve thus buying time for them to cream the last drop of their monopoly rents while improving their networks to provide more advanced services. This has also been facilitated because the United States courts have the ability to overrule FCC decisions.

5. Simulation

Regulatory treatment of new technologies has always been a challenge. They enter the market inconspicuously and their potential, more than their actual performance, appears to disrupt the market and they negatively affect the incumbent players. Internet telephony is one of those technologies but it is only one among the many more that will continue to appear.

The greatest challenge for regulators is their inability to determine in the long term the impact that these technologies can have on the market, the existing regulatory framework, and social goals. It is difficult to determine without any data whether or not these new technologies have a negative or positive impact on society. As Schumpeter states, capitalism by nature entails economic change. It is a process of industrial mutation that constantly revolutionizes the economic structure from within incessantly destroying the old. (Schumpeter, 1975 [orig. pub. 1942]). A natural reaction to the destruction that happens when change occur is resistance. It is thus not surprising that the existing players have pressured policy makers to look at Internet telephony to impose on them similar regulatory obligation to the ones that they are subject to.

It is often the case that regulation for new technologies is difficult to determine because there is not data from which decisions can be made. This is not the exception. Rapid technological advances and the lack of field data prevents us from using econometric tools to analyze and evaluate the effects of different regulatory alternatives. We use instead, with the help of modeling software, a simulation that allows us to determine the impact of Internet telephony on universal service obligations.

In this model we use a duopoly setting where one of the firms represents the new entrants, Internet Telephony Providers (ITPs) and the other player represents the wired

and wireless carriers, both of which are subject to common carrier regulation. Although simplified it allows to capture the dynamics of price differences between these providers and the impact that the existence of contributions or lack thereof will have on universal service obligations.

We consider two scenarios. The first represents the *status quo* where ITPs are not regulated while traditional carriers are. In the second, the *parity* scenario, ITPs are required to contribute to the universal service fund just as the traditional carriers to develop a level playing field for all participants.

The model takes into account the price and quality differences of the two services, to determine the attractiveness of internet telephony over the traditional voice service and a contribution amount for the Universal Service Program. Table 1 presents each of the elements of the model with the formula that was used to calculate each of them.

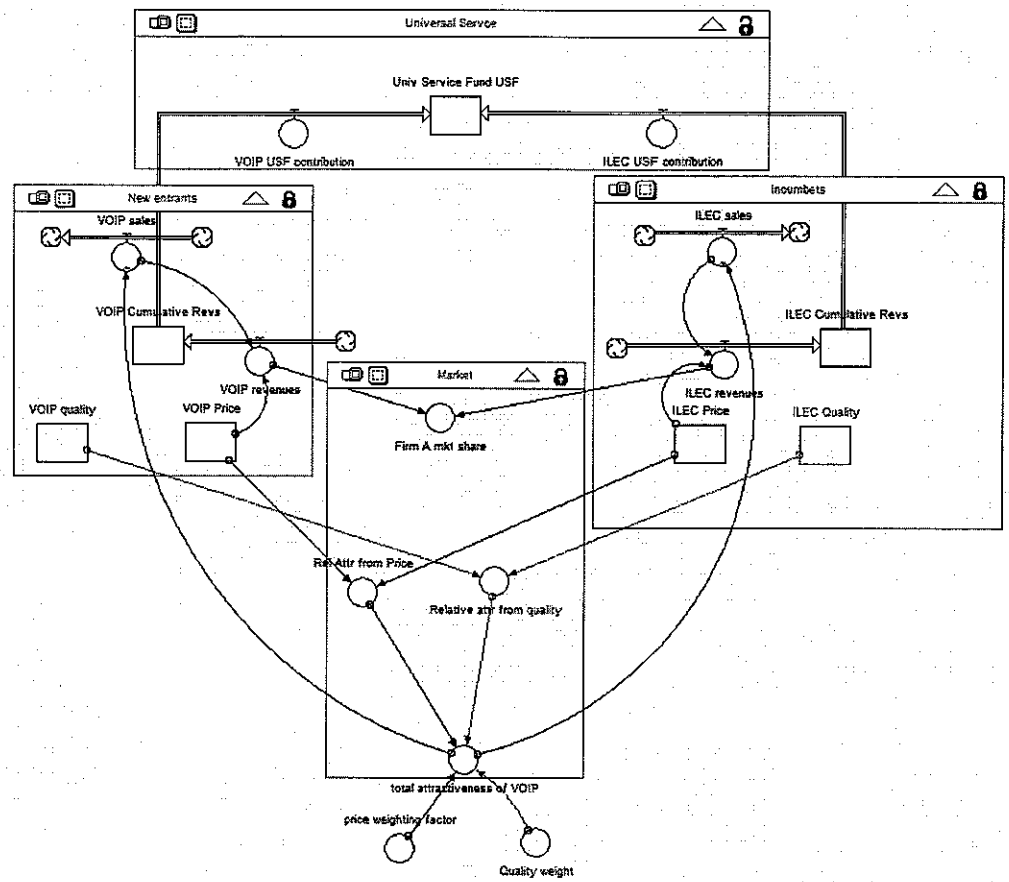
TABLE 1: DEFINITION OF MODEL COMPONENTS

Element	Formula	Explanation
Price	Constant	This variable was adjusted to determine the effect of revenues and the market as a result of changes in this price
Market share	Constant	The market share for incumbents is assumed to be 80% and for VoIP providers 1%
Number of households	127,000,000	Total number of households with a phone line in the U.S.
VoIP subscribers	Number of subscribers * .01	Share of VoIP subscribers from the total number of households.
ILEC subscribers	Number of subscribers * .8	Share of ILEC subscribers from the total number of households
VoIP Revenue	Number of subscribers* Price	Total number of subscribers times the average price
ILEC Revenue	Number of subscribers*Price + other revenue	Total number of subscribers times the average price plus a fixed amount per year for other revenues
USP contribution factor	Constant	Contribution factors as determined by the FCC

The system is set up to simulate a market where individuals can decide between a traditional provider and a VoIP one. Figure 1 shows the two providers, the market and the Universal Service Program fund. The market is simply the number of households that have telephone lines and the market share that each of the carriers has. The number of subscribers for each of these services is what then determines the revenues of the carriers. Revenues, as indicated in the table, are calculated as the multiplication of price and quantity. Because traditional carriers already have a significant installed based we began the simulation with 100 million initial subscribers and one million subscribers for VoIP carriers. From the revenues generated, the contributions to the universal service fund are then calculated. In the first scenario we simulate the status

quo where the traditional carriers contribute to the fund while the VoIP carriers do not. The contribution that was used for the simulation was .089, which is the current contribution according to the FCC (FCC, 2004).

FIGURE 1: MODEL FOR USP CONTRIBUTION SIMULATION



5.1 Status Quo Scenario

According to the FCC (Commission, 2003) in the United States, there are 127.1 million residential and single line business lines. Of these, 103.7 million are calculated to be primary lines. Among these residential lines 6.3 million are part of the Federal Lifeline program. Because of the migration to wireless ADSL and Cable modems, the Commission predicts that secondary lines will decline 10% per year and predicts that 8% of primary lines will be served through these means by 2007. Based on the line count the FCC then determines the revenue base from which universal service contributions are made.

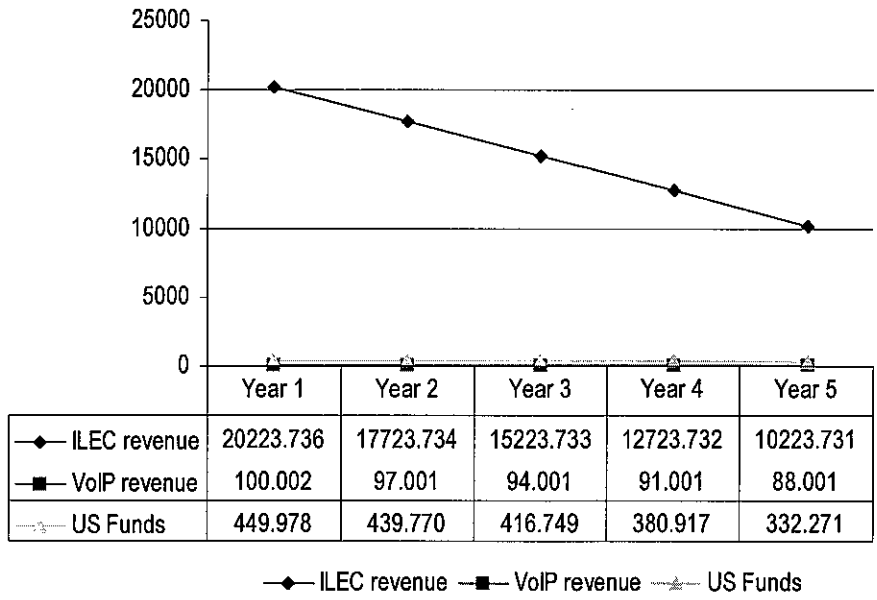
For VoIP operators we calculated their revenue based on the current 1 million users that generate approximately $30 a month. We assume that most users spend less than $30 a month as the unlimited package includes all local, long distance and international service to Canada. The company also states in its agreement that they reserve the right to bill more frequently if the monthly bill exceeds $50. This means that most of their calls are below that price.

While land connections will be declining over the ten year period, it is expected that voice services through the Internet will increase. According to industry trade news there are 1 million people who subscribe to commercial Internet telephony subscribers and another million make free Internet calls through broadband connections. (K. Brown, 2004). Using this forecast we develop a model where we could see how changes in prices and quality can affect the revenues of these carriers.

In the status quo model we use a price of $25 a month for VoIP services and $50 for traditional carriers. Because the existence of competitors is likely to lead to the further reduction of prices in traditional telephony we simulated a decrease in price for traditional services equivalent to a half of its current price to $30 and decrease even further the price of VoIP services to $22 a month. At the beginning of the year VoIP for unlimited access was $35. About eight months later the company reduced the price almost 30% to 25. It is thus not unreasonable to think that the price will continue to decline over time. This is also not an unreasonable decrease considering that their plan for 500 minutes offering all of the additional services is currently priced at $15. This thus means that the company is able to provide the service at that price. Given the calculations from the FCC, we input in the model a decline of market share to 70% from 85% for ILECs and an increase in market share from 1% to 15% for VoIP over five years. Using the revenue predictions for both operators we included a 0.089 contribution factor which is the most recent figure published by the FCC in September of 2004 (FCC, 2004). This was increased to 0.13 for the 5 year period. According to FCC documents the contribution has been increasing one tenth of a percent per year. We assume that as people migrate from traditional to IP based telephony the current carriers will have to increase their contributions to be able to cover the $1,457.259 million that the FCC projected. The increase to 0.13 is not unfeasible considering that the contribution factor has been increasing in recent years. For example, in 2000 the contribution factor was 0.055, in 2002 it was 0.087735, which was a significant increase from the second quarter of that year that was calculated at 0.072805.

Figure 2 shows the numerical results of this simulation. The revenues for both the ILECs and the VoIP providers decrease primarily as a result of the decline in price. Because this simulation does not take into consideration the installed base that the existing traditional carriers have, the simulation assumes that all of the users are at a point were they have to select between the two choices given the price and quality offering that they offer.

FIGURE 2: ILEC, VOIP REVENUES AND US FUND CONTRIBUTIONS WITH ILEC ONLY CONTRIBUTING TO THE USP (MILLIONS)



	Year 1	Year 2	Year 3	Year 4	Year 5
ILEC revenue	20223.736	17723.734	15223.733	12723.732	10223.731
VoIP revenue	100.002	97.001	94.001	91.001	88.001
US Funds	449.978	439.770	416.749	380.917	332.271

Under those circumstances we see that even with an increase in the USP contributions from ILECs the universal service program fund revenues experiences a considerable decline of almost 30% over the five year period. According to the FCC the fund will require approximately $ 6,000 million per year for all USP programs. Local exchange carriers contribute about one third of the Universal Service Program, interexchange carriers contribute approximately 50% and mobile carriers contribute approximately 20%. This means that the fund will in the first year have a total contribution of approximately $ 3,599 million if we extrapolate the amount in the simulation to be 100%. This figure declines to $ 2,658 million in the fifth year. In the FCC projections the contribution is forecasted to be $76,000 million. This forecast assumes that prices will remain the same for the services that ILECs provide. Given the strong growth of IP telephony and the aggressive price competition that both IP phone providers and cellular providers are offering, it is unlikely that the FCC will achieve its $76,000 million projection. Given the decline in prices and subscribership to traditional carriers the fund is unlikely to meet its projected funding goals. This simulation thus shows that the increasing competition from VoIP carriers will put pressure on prices.

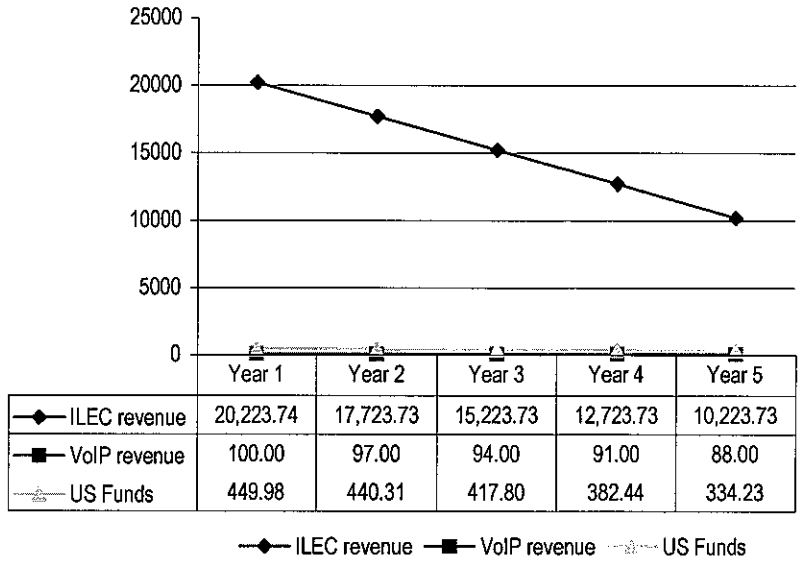
5.2 Parity scenario

Figure 3 shows the result of the second simulation where we make the VoIP providers to contribute to the Universal Service Program we start with a zero contribution which is subsequently increased to .089 over the five year period. We assume a lower

contribution because they could obtain this more favorable rate in the same way that cellular carriers have a lower rate. This is something that the FCC has generally done to favor a technology instead and foster its development and growth. The results are quite similar to those in Figure 2. This is because the share of consumers from VoIP is quite small and the price for this as well as for the traditional carriers is declining. The increase of the Universal Service Program even with the VoIP carriers contributing is quite small. The amount increases from $ 2,658 million when VoIP carriers do not contribute to $2,673 million with their contribution. This is a minor increase and not enough to support the type of services that scholars have proposed to be part of an information society.

These two simulations thus indicate that the Universal Service Program is likely to decrease over time even if all carriers contribute. Because the current USP provides subsidies to rural, low income, basic telephony, and advanced services for libraries, schools and health clinics, it is unreasonable that it could support all of the advanced services that people expect with such declining revenue.

FIGURE 3: ILEC, VOIP REVENUES AND USP CONTRIBUTIONS WITH VOIP CONTRIBUTING TO THE USP (MILLIONS)



	Year 1	Year 2	Year 3	Year 4	Year 5
ILEC revenue	20,223.74	17,723.73	15,223.73	12,723.73	10,223.73
VoIP revenue	100.00	97.00	94.00	91.00	88.00
US Funds	449.98	440.31	417.80	382.44	334.23

Given that basic telephony has been achieved in the U.S. and taking into consideration the cost of administering the service and the additional cost that this fund poses to subscribers it is not unreasonable to believe that the elimination of this program could actually result in greater benefits. In the absence of a Universal Service Program, the final price for the consumer is likely to be reduced considerably. VoIP subscribers, for example, pay only a dollar more in taxes on top of their monthly subscription. ILEC subscribers, on the other hand, pay as much as $15 more in taxes and fees which

include universal service contributions, access charges of which some also go to the universal service fund. In the absence of these fees and letting competition to reduce the price of basic and advanced services users will be able to afford them even without a subsidy. This is the type of creative destruction that we believe needs to happen for the population of the U.S. to realize the benefits from innovation that Bar (Bar & Riis, 2000) suggests. It is also possible that software-based telephony will more easily able to respond to the needs of the users giving them more control and possibilities as described by Gillett (Gillett, 2000) and even facilitate access for people with disabilities (Goggin & Newell, 2000), given that computers rather than specialized equipment are more likely to offer the aid than they need.

Finally if the FCC decides to maintain the program and implement asymmetric contributions or even no contributions for new technology, incumbent and new entrants are likely to engage in legal play (Garcia-Murillo, 2004) and further delay the benefits of this disruptive technology.

6. Analysis of results

We find that new communication technologies are likely to be disruptive given the difficulty that traditional carriers have because of their privileged quasi monopoly status and the fact that it is not easy for them to cannibalize their products by offering inexpensive alternatives that offer greater value to the consumer. The entry of new competitors should cause a process of creative destruction where prices experience a significant decline and services offered are also more sophisticated, giving control to the user and giving multiple possibilities to disabled individuals as well.

The greatest challenge for allowing this process of creative destruction to happen is existing regulation and the potential future regulation of VoIP. FCC officials have different alternatives. They could, for example, exempt VoIP from regulation. They could impose universal service obligations, even if at a lower percentage. This could be done in the same manner that they have requested a lower percentage contribution from commercial mobile radio service providers. In both of these scenarios it is likely that new players will engage in legal play to prevent the imposition of these obligations. These delays along with the increase in VoIP prices that results from administration of the fund and the administration of the contributions will slow the process of creative destruction.

The alternative to these two scenarios is the elimination of the Universal Service Program as a mechanism to fund telephony for residential users and value added services for libraries, schools and rural health clinics. The simulations show that the Universal Service Program fund will not be enough even if the new carriers contribute. If instead the program is eliminated, prices will decline to the point that phone service is affordable for everybody. Continuous innovation and competition is also likely to make advanced services affordable. If the price is not low enough, libraries and schools could then negotiate aggregated agreements to obtain lower prices. The greatest challenge

for this scenario is the path dependent regulation that affects this industry. A change of this will require a change in the Telecommunications Act. Additionally state governments face not only political opposition from their constituencies but they are unlikely to want to forego the revenues that this program generates.

Given that a change of such magnitude is not easy to accomplish and given that the contributions from the new entrants is too small to make a difference in the Universal Service Program fund, the FCC could leave VoIP unregulated and then allow existing carriers to migrate from traditional to IP telephony which will not be regulated. This is a back door entrance to the unregulated scenario.

We thus conclude that the existing Universal Service Program is not adequate to the current more advanced needs of the U.S. society.

References

Bar, F., & Riis, A. M. (2000). Tapping user-driven innovation: A new rationale for universal service. *Information Society, 16*(2), 99-108.

Belinfante, A. (1993). *Telephone subscribership in the United States.* Washington, DC: Federal Communications Commission.

Bostoen, Tom. (2004). *Dynamic Spectrum Management in Practice: Increasing DSL Rate/reach Performance by Avoiding or Mitigating Crosstalk Interference.* Alcatel. Retrieved October 9, 2004, from the World Wide Web: http://whitepapers.cramsession.com/detail/RES/1090604460_979.html

Brown, Kenneth. (2004). *VoIP Economics in 2004.*Unpublished manuscript, Washington, D.C.

Brown, Lawrence D. (1992). Policy reform as creative destruction: political and administrative challenges in preserving the public-private mix. *Inquiry, 29*(2), 188.

Caballero, Ricardo J., & Hammour, Mohamad L. (1996). On the timing and efficiency of creative destruction. *Quarterly Journal of Economics, 111*(3), 805.

Christensen, Clayton M. (2000). *The Innovator's Dilemma: The Revolutionary National Bestseller that Changed the Way We Do Business.* New York, NY: HarperCollins.

Commission, Federal Communications. (2003). *Commission Seeks Comment on Staff Study Regarding Alternative Contribution Methodologies* (FCC-03-31). Washington, DC: Federal Communications Commission.

FCC. (2004). *Proposed Fourth Quarter 2004 Universal Service Contribution Factor.* FCC. Retrieved October, 2004, from the World Wide Web: http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-04-2976A1.pdf

Garcia-Murillo, M., and Pick, J. (2004). Interconnection Regulation: Explaining Dominance by Incumbents in Mexico and the United States. *Communications and Strategies, 53*(1).

Gillett, S. E. (2000). Universal service: Defining the policy coal in the age of the Internet. *Information Society, 16*(2), 147-149.

Goggin, G., & Newell, C. (2000). An end to disabling policies? Toward enlightened universal service. *Information Society, 16*(2), 127-133.

Greenblatt, David. (2003). *A Call heard 'Round the World.* New York, NY: AMACON.

Horrigan, John. (2003). *Adoption of Broadband to the Home*. Pew internet and American Life Project. Retrieved October 9, 2004, from the World Wide Web: http://www.pewinternet.org/pdfs/PIP_Broadband_adoption.pdf

Intven, Hank, Oliver, Jeremy, & Sep veda, Edgardo. (2000). Competition Policy. In H. Intven (Ed.), *Telecommunications Regulation Handbook*. Washington, DC: The World Bank.

Jayakar, K. P. (1999). Local exchange competition in early US network development: considerations for developing countries. *Telecommunications Policy, 23*(5), 375-387.

Kelly, Tim, McTaggart, Craig, Petrazzini, Ben, Shaw, Robert, & Woodall, Mark. (2001). *ITU Internet Reports: IP Telephony*. Geneva: International Telecommunications Union.

Lievrouw, L. A. (2000). The information environment and universal service. *Information Society, 16*(2), 155-159.

McKnight, Lee, Vaaler, Paul M., & Katz, Raul. (2001). *Creative Destruction: Business Survival Strategies in the Global Internet Economy*. Cambridge, MA: MIT Press.

Mueller, Milton. (1993). Universal service in telephone history: A reconstruction. *Telecommunications Policy, 17*(11), 352-369.

Nett, L. (1998). Auctions: An Alternative Approach to Allocate Universal Service Obligations. *Telecommunications Policy, 22*(8), 661-669.

Peha, J. M. (1999). Tradable universal service obligations. *Telecommunications Policy, 23*(5), 363-374.

Saltzer, J.H., Reed, D.P, & Clark, D.D. (1984). End-to-End Arguments in System Design. *ACM Transactions in Computer Systems, 2*(4), 277-288.

Schumpeter, Joseph A. (1975 [orig. pub. 1942]). *From Capitalism, Socialism and Democracy*. New York, NY: Harper.

Stein, Jeremy C. (1997). Waves of creative destruction: firm-specific learning-by-doing and the dynamics of innovation. *Review of Economic Studies, 64*(219), 265.

Walsh, Steven T., Kirchhoff, Bruce A., & Newbert, Scott. (2002). Differentiating market strategies for disruptive technologies. *IEEE Transactions on Engineering Management, 49*(4), 341.

Weller, D. (1999). Auctions for Universal Service Mechanisms. *Telecommunications Policy, 23*(9), 645-674.

World Bank. (2005). *World Development Report 2005: A Better Investment Climate for Everybody*. Washington, D.C>: World Bank.

附件九：Spectrum Wars

Spectrum Wars

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January 2005

Disclaimer: The views expressed herein are those of the author and do not necessarily reflect those of the FCC or any Commissioner

Background

- Background on spectrum management –
  - Wireless telegraphy first real use of radio spectrum (i.e., ship to shore)
  - Technology improved – led to more commercial services and actually cracked monopolies – e.g., VSATs, microwave
  - Increased use – led to need to coordinate uses – hence ITU
  - Scarce resource – hence battles

Spectrum Primer

- Different uses are better at different frequency bands....because of technical issues.
- Main issues over spectrum scarcity and the potential for harmful interference
- Hence led to allocation scheme
- When look at spectrum – need to evaluate:
  - Proposed frequency band for operation
  - Cost and delay in obtaining access to a specific band
  - Amount of spectrum required for use
  - Current allocations and use of the band
  - Propagation issues associated with use
  - Required signal strength
  - Types of interference likely to be encountered
  - Cost differentials in using other bands and what other bands possible
  - Operating characteristics of transmitters and receivers including cost, etc.
  - Government regulator and regulatory regime
  - Market demand for service
  - Amount of spectrum available for the same and similar uses
  - Cost of obtaining access to spectrum and impact on the business case
  - Ability and cost to use terrestrial landline networks for same service
  - Ability to obtain rights of way for network build out

Key participants

- Domestic government as user (including self-regulation)
- Public safety
- Telecomm svc providers and broadcasters
- Telecom equip manufs
- Consumers
- Often success on access depends on:
  - Political power of advocate
  - Amount of resources advocate willing to expend
  - Public interest benefits of service
  - Types of services to be provided and consumer demand
  - Sorts of commitments advocate willing to give to offer service
  - Lasting power of participant in protracted spectrum battles

Wireline versus Wireless

- Wireless
  - Advantages of wireless
    - Mobility
    - Geo reach
    - Avoidance of large up front costs
    - Quick deployment
    - Anytime, anywhere communications
    - Less anticompetitive concerns
    - Less regulation
    - Ability to supplement wireline network
  - Disadvantages:
    - Propagation concerns
    - Interference potential
    - Expense of regulatory fees
    - At times reliance of wireline network
    - Interference issues
- Wireline
  Advantages...
    - Reliable communications
    - Elimination of interference concerns
    - Decrease in network cost as use increases
  - Disadvantages
    - Need for imbedded infrastructure
    - FS only
    - Slow deployment

Regulatory Regime Governing Spectrum

- Goals of spectrum regulation:
  - Make certain efficient use of spectrum
  - Properly manage the scarce resource to ensure its use is maximized
  - Coordinate radiocomm spectrum uses to guard against the potential for harmful interference
  - Ensure radiocomm systems of different countries can interconnect with one another (especially important in close geographic proximity, such as Europe)
- These are the prime motivators. However – often subsidiary goals of governments – including: national security, privacy, security, public safety, foreign policy, military and welfare
- Each country has own structure – but int'l regime very important

International Regulatory Regime

- Spectrum Allocation issues handled in WRCs –
- WRC process - -frequency allocation, participation and preparation, agendas, etc.
  - Fed into by regional bodies including CEPT, CITEL and APT.
- ITU goals – ensure efficient, economical and equitable use of spectrum by all radiocomm services and carry out studies to adopt suitable recommendations
- Studies for WRC occur in study groups on issues such as spectrum management, FSS, etc.
- The ITU-R itself handles administering master international Frequency Registar and assisting in resolution of cases of harmful interference

Domestic Regulation – Int'l Representation

- Domestic gov'ts have following roles
  - Int'l representation: includes possibly gov't, industry and consumers – and domestic prep (e.g., US WRC prep process)
  - Domestic spectrum allocation: id, change rules, create flexible use, relocate existing users
  - Determining use of specific frequency bands
  - Domestic assignment of spectrum: look at factors – financial and technical viability, efficient use, public interest and potential for harmful interference - - can do assignments through: comparative hearings, negotiated solutions, lotteries, auctions, straight licensing process (not if mutual exclusivity exists)
  - Implementation and enforcement of operational and technical rules
  - Regulation of secondary markets

Solutions to Harmful Interference

- Minimizing potential for conflicts:
  - Incentives to use underutilized bands
  - Incentives for deployment of new technologies
  - User importance or priority
  - Requiring use of efficient technology
  - Efficiency in assignment and licensing methods
  - Standards in ensuring efficiency for spectrum
  - Flexible use
  - Creation of unlicensed bands
- Let's discuss a few of these

Unlicensed uses

- Benefits:
  - Save time and costs associated with regulatory process
  - Lack of technical standards saves time and money
  - Flexibility increased
  - Preserves spectrum for future use
  - Promotes spectrum sharing
  - Promotes innovation and mobility
  - Etiquette rules may limit greed
- Drawbacks
  - Unpredictability increased
  - No protection
  - Increases in inefficiency
  - Increases potential for interference and overuse

Solutions to sharing in licensed bands

- Private sector coordinators
- Informal negotiations – blessed by gov't
- Formal negotiations
- Rulemaking proceedings
- unilateral government actins
- Tools: co-frequency sharing and frequency band segmentation
- Last ditch effort – relocate users - -but need comparable spectrum and reasonable compensation

附件十

Law Enforcement and National Security Concerns Impacting Investment in Global Networks: Lessons from Global Crossing

Law Enforcement and National Security Concerns Impacting Investment in Global Networks: Lessons from Global Crossing[1]

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Abstract and Introduction

In recent years, and particularly in the post-September 11 era, the Committee on Foreign Investment in the United States ("CFIUS") has significantly tightened restrictions on foreign investment in "critical infrastructure," a large sector of the U.S. economy that includes telecommunications and technology-related businesses. The most comprehensive restrictions are contained in a network security agreement that Global Crossing Limited ("Global Crossing") and its Asian parent, Singapore Technologies Telemedia Pte Ltd ("ST Telemedia"), entered into in late 2003. While those restrictions potentially make Global Crossing's network the most secure in the United States, they also demand a significant resource commitment to implement and maintain. Moreover, with that agreement, the national security review process has become more complex, uncertain and time consuming than ever before. Foreign investors need to be aware that the process not only could take much longer to complete than in the past, but could result in substantial limitations on their ability to manage key aspects of the companies they seek to acquire and to integrate U.S. operations into a broader global organization.

1. U.S. Regulatory Review of Foreign Investment in Telecommunications

While historically it has held itself out as a world leader in efforts to open telecommunications markets to foreign competitors, the United States in fact has long restricted foreign investment in telecommunications. As discussed below, the Federal Communications Commission ("FCC") is required by law to determine whether such foreign investment serves the U.S. public interest, and the Executive Branch's views of the national security implications of a transaction are highly relevant to the FCC's analysis. But regardless of whether FCC licenses are involved, CFIUS also may review a transaction involving foreign ownership and impose significant restrictions on the deal. Thus, for transactions involving proposed foreign investment in U.S. telecommunications businesses, consideration of national security issues is critical.

1.1 The FCC Process

The Communications Act of 1934, as amended, governs the FCC's review of foreign investment in telecommunications carriers. Among other things, the statute authorizes the FCC to grant licenses, and approve transfers of control or acquisitions of domestic

and international common carrier authorizations,[2] cable landing licenses[3] and common carrier radio licenses,[4] if it finds that such grants or approvals serve the public interest. In addition, if the FCC's review involves direct or indirect foreign investment in a common carrier radio licensee in excess of 25% of a corporation's capital stock, the FCC must find that the public interest will not be served by denying or revoking a license.[5] Under its policy implementing the United States' commitments under the World Trade Organization ("WTO") Basic Telecommunications Agreement, the FCC presumes that foreign investment from WTO member countries serves the public interest, so long as that investment does not pose a "very high risk to competition" in the United States that it cannot address through license conditions,[6] and so long as the Executive Branch does not raise national security, law enforcement, foreign policy, or trade policy concerns.[7]

The views of the Executive Branch agencies play an important role in the FCC's analysis. If the agencies – including the Department of Justice and Federal Bureau of Investigation, the Department of Homeland Security, and the Department of Defense – have concerns with respect to a particular transaction, they frequently request that the FCC defer its ruling until the agencies have completed their own review,[8] and the FCC routinely complies with this request. Once the Executive Branch has completed its review and possibly entered into an agreement with the transaction parties to address specific concerns, the agencies typically petition the FCC to condition its approval on compliance with that agreement, and the FCC also routinely complies with this request.[9] While the FCC itself has not rejected an application based on foreign ownership grounds since the WTO Agreement took effect in February 1998, the Executive Branch's views have increasingly come to dominate the regulatory landscape.

1.2 The CFIUS Process

Originally established by Executive Order in 1975 to monitor and evaluate the impact of foreign investment in the United States,[10] CFIUS is an inter-agency group chaired by the Secretary of the Treasury and comprised of eleven other Executive Branch departments and agencies: The Secretaries of State, Defense, Commerce and Homeland Security, the Attorney General, the Director of the Office of Management and Budget, the U.S. Trade Representative, the Chairman of the Council of Economic Advisers, the Director of the Office of Science and Technology Policy, the Assistant to the President for National Security Affairs and the Assistant to the President for Economic Policy.[11] In today's security-focused environment, the Departments of Justice, Defense and Homeland Security have tended to dominate the group's deliberations.

CFIUS is charged with implementing the 1988 Exon-Florio Amendment to the Defense Production Act of 1950 (the "Exon-Florio Amendment").[12] The Exon-Florio Amendment empowers the President "to make an investigation to determine the effects on national security of mergers, acquisitions, and takeovers . . . by or with foreign persons which could result in foreign control of persons engaged in interstate commerce in the United States."[13] If the President finds that "there is credible evidence . . . to believe that the foreign interest exercising control might take action that threatens to impair the national

security," and that other provisions of law (other than the International Emergency Economic Powers Act[14]) do not "provide adequate and appropriate authority to protect the national security," then "the President may take such action for such time as the President considers appropriate to suspend or prohibit any acquisition, merger, or takeover . . . ."[15] The President has delegated key aspects of this authority to CFIUS.[16]

Technically, CFIUS review of a transaction involving foreign investment is "voluntary." The transaction parties' joint filing of a voluntary notice of their transaction formally triggers the process.[17] As a practical matter, however, the agencies may effectively begin the review process on their own by asking informally for information about a transaction that agency staff may have read about in the press or become interested in as a result of an FCC inquiry to the Executive Branch. Moreover, because the agencies reserve the right to review and reopen a transaction after it has closed if no filing was made,[18] parties who close their deal without seeking CFIUS approval do so at their own risk.

The statute sets strict time deadlines on the agencies' review. Once it receives a voluntary notice, CFIUS has 30 days to review the notice and determine whether to undertake an investigation.[19] If CFIUS declines to investigate, the transaction is deemed approved and the parties need take no further action. If a transaction is referred for a formal investigation, the agencies have up to 45 days to complete their investigation, at the end of which time they must submit a written report and recommendation to the President.[20] The President then has 15 days to decide whether to take action to suspend or prohibit the transaction.[21] The law does not provide for judicial review.

In practice, very few transactions are ever investigated, only a handful make their way to the President, and only one transaction has ever been blocked.[22] Experienced parties typically approach the agencies informally and attempt to resolve concerns ahead of time, turning the actual filing process into a formality that occurs once the issues have been resolved. In addition, because the agencies are not empowered to extend the statutory deadlines, parties may file, withdraw and re-file notices – sometimes several times – in an effort to extend the time for informal review. In significant transactions, parties also may undertake extensive lobbying campaigns involving the highest levels of the U.S. and foreign governments.

The Exon-Florio Amendment lists several factors that CFIUS may consider in reviewing a transaction. These factors are: (i) the domestic production needed for projected national defense requirements; (ii) the capability and capacity of domestic industries to meet national defense requirements, including the availability of human resources, products, technology, materials, and other supplies and services; (iii) the control of domestic industries and commercial activity by foreign citizens as it affects the capability and capacity of the U.S. to meet the requirements of national security; (iv) the potential effects of the transaction on sales of military goods, equipment or technology to a country that supports terrorism or proliferates missile technology or chemical and biological weapons; and (v) the potential effects of the transaction on U.S. technological leadership in areas affecting U.S. national security.[23] In addition, the statute specifically

calls for heightened scrutiny where foreign government-owned entities are involved.[24] The agencies also typically consider issues such as the United States' strategic relationship to the foreign investor's home country, and the extent to which the target company provides services to the U.S. government or military. In practice, however, because the term "national security" is left undefined for purposes of CFIUS's review, and because the CFIUS review process is confidential by law,[25] transaction parties often may have little insight into the issues actually concerning the agencies and how to address those issues to the agencies' satisfaction.

To resolve its concerns, CFIUS may require transaction parties to agree to sometimes significant conditions, including the restructuring of their transactions, as the price of entering the US market. Historically, CFIUS often has imposed these restrictions through a "network security agreement,'" or "NSA." While the conditions are negotiable to some extent, there is no question that a negotiation with the U.S. government over issues that the government deems to affect national security is quite different from a commercial negotiation, and private parties may have limited bargaining power.

2. Global Crossing's Experience

2.1 The Transaction

Global Crossing's experience highlights some of the difficulties foreign-owned companies can face in seeking to enter the U.S. telecommunications market. Global Crossing had deployed and operated a global IP backbone network consisting of both subsea and terrestrial components serving Western Europe, the United States, South America and the Asian/Pacific Rim. Global Crossing was predominantly a carrier's carrier, although it did serve large multinational corporations. The company also has extensive business with the government of the United Kingdom and provides critical telecommunications services to many U.K. government agencies.

As the Internet bubble burst and the economic shock wave rippled through the telecommunications industry, Global Crossing came under severe economic stress as well, and was forced to seek protection under Chapter 11 of the U.S. Bankruptcy Code. In conjunction with the bankruptcy filing, Global Crossing signed a letter of intent with Hutchison Whampoa of Hong Kong and the Singapore government-owned ST Telemedia for an investment in the company in exchange for 61.5% of the equity.

Several months later, Global Crossing entered into an agreement to sell the company to Hutchison Whampoa and ST Telemedia. Each company sought to invest $125 million in cash in the company, in exchange for 30.75% apiece of the total equity and voting power. For reasons not fully understood, but apparently having to do with Hutchison Whampoa's alleged ties to the government of the People's Republic of China, it soon became clear that CFIUS was unwilling to approve the transaction in a form acceptable to the parties, and Hutchison Whampoa withdrew from the transaction. ST Telemedia agreed to assume Hutchison Whampoa's share of the investment and continued to pursue completion of the transaction.

Even after ST Telemedia assumed Hutchison Whampoa's portion of the investment, however, the deal continued to face heavy scrutiny, this time focused on Singapore, an important U.S. ally. CFIUS ultimately commenced a formal investigation of the transaction, and Global Crossing and ST Telemedia subsequently entered into an NSA with the Departments of Justice, Homeland Security and Defense, and the Federal Bureau of Investigation.[26] On September 19, 2003, the President decided to take no action to suspend or prohibit the transaction.[27] On October 8, 2003 the FCC approved the transaction, conditioning approval on compliance with the NSA.[28] The company closed the transaction and emerged from bankruptcy in December 2003, and has been operating under the NSA since then.

2.2 The Network Security Agreement

Global Crossing's NSA differs markedly from previous NSAs. Prior to the Global Crossing deal, NSAs typically imposed restrictions that investors certainly would have preferred to do without, but that were not particularly onerous. For example, typical pre-Global Crossing NSAs principally required that companies ensure that (i) the U.S. government could engage in lawful electronic surveillance, (ii) documents relating to the U.S. network be stored in the U.S. (unless there was a bona fide commercial basis for storing them elsewhere), and (iii) domestic traffic not be routed outside the U.S. (unless there was a bona fide commercial basis for doing so).[29]

The Global Crossing NSA is the most comprehensive NSA to date and is significantly more restrictive than anything that came before it. In particular, the agreement reflects a major concern that companies that do business in the United States should bar foreign entities or individuals from access to or control of the U.S. network and data related to the U.S. network. Essentially, Global Crossing's NSA combined the Department of Justice's historic concern with surveillance and jurisdiction with the Department of Defense's concern with protecting critical infrastructure and classified information. Global Crossing's NSA therefore contains both strong law enforcement measures and strong defense measures.

Since it was the first of its kind, implementation of Global Crossing's NSA has been both time consuming and resource intensive. Many of the measures contained in the NSA are derived from practices employed by the Department of Defense to compartmentalize the classified operations of a contractor from its unclassified operations. Applying this model to a global telecommunications company with a global network presents some unique challenges and certainly impacts the ability of network operators to globalize their operations. Future foreign investors in the United States need to be particularly mindful of this aspect because it impacts the extent to which U.S. operations can be integrated into larger global organizations and the ability of global operators to operate in a truly global manner.

Some examples of the measures contained in the NSA include:

- The company must locate in the United States its "domestic communications infrastructure," thus prohibiting the placement of equipment used to serve U.S. customers outside of the United States.

- The company must store data relating to domestic communications and domestic customers in the United States.

- The company must route domestic U.S. traffic only domestically (with limited specified exceptions).

- The company must implement a comprehensive visitation policy restricting visits by non-U.S. persons or entities to domestic communications infrastructure.

- The company must Implement a comprehensive Information Security Plan.

- The company must implement a comprehensive personnel screening policy, and subject personnel in certain sensitive positions to veto by government officials.

- The company must establish a Security Committee of the Board comprised of "Security Directors" (resident U.S. citizens holding or eligible to hold U.S. government security clearances, and independent under NYSE guidelines) who are responsible for overseeing security policy and implementing the NSA.

- The company faces prohibitions on outsourcing certain functions without government approval.

- The company is subject to limitations on procurement, and all material network hardware and software purchases must be reviewed by the Security Committee.

- The company must have an annual audit of compliance with the NSA conducted by a neutral third party acceptable to the U.S. government.

- The company must comply with various recordkeeping and reporting requirements, especially with respect to communications with ST Telemedia.

3. After the Global Crossing Deal

The Global Crossing transaction clearly established a new "baseline" for the CFIUS agencies' review of telecommunications transactions. Whether because the attention that the agencies gave to the Global Crossing transaction highlighted broader fears in some parts of the U.S. government about foreign investment in the United States in general, or whether it is just a sign of the times, the agencies have since been reviewing an increasing number of telecommunications transactions, often starting with the Global Crossing NSA as the new "template." Over the last year, the agencies also have implemented a new framework for analysis under which they first determine the "threat" a transaction may pose, then the "vulnerability" of the U.S. network to that threat and

the "consequences" of that vulnerability, and ultimately the resulting "risk" that requires protective measures.

Unfortunately, even under this new analytical framework, it is not always possible to know ahead of time the degree of scrutiny a particular transaction is likely to face. In some instances, the agencies have sought to impose the Global Crossing NSA, or at least its key terms, on transaction parties.[30] In other instances, the agencies have been satisfied with agreements that are far less stringent than the Global Crossing NSA,[31] while in still other instances, they have asked the FCC to defer transactions, or consulted informally with the transaction parties, but in the end have declined to impose any restrictions on the investment.[32] The resulting delay and uncertainty raises serious questions about not just the openness of the U.S. telecommunications market, but also the viability of global networks that serve the United States.

Nevertheless, there are certain factors that consistently tend to interest CFIUS. These factors include:

- *The nationality of the buyer.* Even investors from good allies of the United States are not immune from review,[33] although investors from certain countries probably can expect a smoother process than investors from other countries.

- *The extent of the target company's nexus with the United States.* Where the company being acquired only has relatively minor assets in the U.S., and instead principally serves other countries, there may be less concern than a circumstance where, as the Executive Branch believed with respect to Global Crossing, the target company has a substantial U.S. network. Conversely, where the target has a large U.S. network, or does substantial business with the U.S. government or U.S. military, the parties can expect closer scrutiny.

- *Foreign government ownership.* Where the acquiror has foreign government ownership, the agencies tend to find additional risk.[34] This concern arises not only from the statutory requirement for heightened scrutiny of such transactions, but also from the general view that governments have the unique power to engage in particularly nefarious activities (*e.g.*, spying).

Based on these and other factors, the agencies have reached varying conclusions about the risks entailed in recent transactions. Below is a sample of some of the investments that the agencies have reviewed since the Global Crossing NSA was completed:

- *News Corp.'s acquisition of DIRECTV.*[35] Due to News Corp.'s incorporation in Australia, the agencies required oversight by the satellite company's U.S. citizen-comprised Audit Committee to ensure the FBI's ability to engage in surveillance (particularly in view of foreign privacy laws), and to guard against the provision of domestic information to foreign governments.

- *Intelsat's acquisitions of Loral and Comsat General.*[36] Because of Intelsat's dispersed foreign ownership, the agencies required similar oversight by a Security Committee for both transactions, and with respect to Comsat General, additional commitments to assist with electronic surveillance and to give prior notice before providing common carrier switched services.

- *VSNL's US entry.*[37] Wholly outside of the CFIUS process, which did not apply because no acquisition was involved, the agencies imposed many of the key terms of the Global Crossing NSA on the U.S. subsidiary of VSNL, the partially government-owned Indian carrier. The FCC in turn adopted that NSA as a condition of granting the subsidiary international long distance authority.

- *Telefónica Móviles' acquisition of Puerto Rican cellular system.*[38] The NSA with the Spanish-owned company contained many of the key terms and conditions of the Global Crossing NSA.

- *Blackstone's investment in New Skies.*[39] The agencies conditioned investment in a Netherlands satellite company from a U.S. private equity fund with foreign limited partners and an off-shore investment vehicle. The private parties committed to assist the U.S. government with lawful electronic surveillance, notify the agencies of the names and nationalities of the company's directors, and provide advance notice before providing common carrier switched services. Indeed, over the past year, the agencies increasingly have reviewed private equity firms' telecommunications investments in light of concerns arising out of the presence of foreign limited partners and the use of off-shore funds.[40]

4. Conclusion

Recent experiences with the United States' national security review of telecommunications transactions raise some very real concerns for foreign investors. While industry can hope that the Executive Branch soon will gain sufficient comfort with the important role that foreign investment can play in the rapidly changing global telecommunications sector, in the meantime investors must plan for the process to entail at least delay, if not significant burdens. As a result, foreign investors serious about making major investments in the United States telecommunications market should assume the agencies will review their transaction and build extra time – possibly even several months – into the closing schedule. Foreign investors should also understand that they will need to make concessions in order to reach a successful agreement. These concessions may well include limitations on their ability to manage key aspects of the companies they seek to acquire and restrictions on the provision of service on a global basis.

ENDNOTES

[1] The conclusions and opinions expressed in this article are the authors' own and do not necessarily reflect those of Latham & Watkins LLP or Global Crossing Limited, its affiliates or subsidiaries. Allthough this article may provide information concerning potential legal issues, it is not a substitute for legal advice from qualified counsel. The article is not created or designed to address the unique facts or circumstances that may arise in any specific instance, and you should not and are not authorized to rely on this content as a source of legal advice. This material does not create any attorney-client relationship between you and Latham & Watkins.

[2] 47 U.S.C. ? 214.

[3] *Id.* 壯 34-35; *see also* Executive Order No. 10530, 119 Fed. Reg. 2709 (May 10, 1954) (delegating President's authority under Cable Landing License Act to FCC).

[4] 47 U.S.C. ? 310(d).

[5] *Id.* ? 310(b)(4). The statute prohibits the grant of common carrier radio licenses to (i) any foreign government; (ii) aliens or any representative of an alien; (iii) any corporation organized under the laws of a foreign government; and (iv) any corporation of which more than 20% of the capital stock is owned of record or voted by aliens, foreign governments, or their representatives, or by any corporation organized under the laws of a foreign country. 47 U.S.C. ? 310(a), (b)(1)-(3).

[6] *Rules and Policies on Foreign Participation in the U.S. Telecommunications Market*, Report and Order and Order on Reconsideration, IB Docket No. 97-142, 12 FCC Rcd 23,891, 23,913-23,918, ¶¶ 50-58 (1997) ("*Foreign Participation Order*"). With respect to applications relating to carriers from non-WTO Member countries, the FCC continues to apply its "effective competitive opportunities" test, under which the FCC permits entry where the applicant's foreign market offers effective competitive opportunities to U.S. carriers seeking to provide the same or similar services there. *See Market Entry and Regulation of Foreign-Affiliated Entities*, Report and Order, IB Docket No. 95-22, 11 FCC Rcd 3873 (1995).

[7] *Foreign Participation Order,* IB Docket No. 95-22, 12 FCC Rcd at 23,919-23,921, 順 61-66.

[8] *See., e.g.,* Letter from Laura W. Parsky, Deputy Assistant Attorney General, and Patrick W. Kelley, Deputy General Counsel, FBI, to George Li, Deputy Chief, Policy Division, FCC International Bureau (Oct. 21, 2004), in *Intelsat Ltd., Transferor, and Zeus Holdings Limited, Transferee, Application for Consent to Transfers of Control and Petition for Declaratory Ruling*, IB Docket No. 04-366 (on file with the Federal Communications Commission).

[9] *See., e.g., VSNL America Inc.*, Order, Authorization and Certificate, ITC-214-20030728-00376, 19 FCC Rcd 16,555, 順 23-25, 30, Attachment A (2004) (VAI/Executive Branch Agreement); *General Motors Corporation and Hughes Electronics Corporation, Transferors, and The News Corporation Limited, Transferee*, Memorandum Opinion and Order, MB Docket No. 03-124, 19 FCC Rcd 473, 492-495,

628, 順 35-38, 374, Appendix E (2004) (Arrangement with Executive Branch); *Global Crossing Ltd. (Debtor-in-Possession), Transferor, and GC Acquisition Limited, Transferee,* Order and Authorization, IB Docket No. 02-286, 18 FCC Rcd 20,301, 20,338-20,343, 20,347, 順 46-51, 61, Appendix D (2003), *recon. pending* (Executive Branch Agreement).

[10] Executive Order 11858, 40 Fed. Reg. 20263 (May 17, 1975).

[11] Authority is typically exercised through staff-level officials.

[12] Omnibus Trade and Competitiveness Act of 1988, Pub. L. 100-418, ? 5021, 102 Stat. 1107 (1988), (as amended at 50 U.S.C. App. ? 2170 (1991)).

[13] 50 U.S.C. App. ? 2170(a). The regulations implementing the Exon-Florio Amendment broadly define "control" as "the power, direct or indirect, whether or not exercised, and whether or not exercisable through the ownership pf a majority or a dominant minority of the total outstanding voting securities of an issuer, or by proxy voting, contractual arrangements or other means, to determine, direct or decide matters affecting an entity." For example, the regulations provide that the right to vote on "[t[he dissolution of the entity" constitutes control. 31 C.F.R. ? 800.204(a). Unless a proposed investment is to be held "solely for the purpose of investment," an investment in excess of 10% of outstanding voting securities constitutes control. *Id.* ? 800.219, 800.302(d)(1).

[14] 50 U.S.C. 壯 1701-1706.

[15] *Id.* App. ? 2170(d).

[16] Executive Order 12661, 54 Fed. Reg. 779 (Dec. 27, 1988).

[17] 31 C.F.R. ? 800.401.

[18] The Treasury Department's rules prohibit CFIUS from instituting a review more than three years after the date of conclusion of a transaction, unless the Chairman of CFIUS, in consultation with other members, requests an investigation. *Id.* ? 800.401(c).

[19] 50 U.S.C. App. ? 2170(a); 31 C.F.R. ? 800.501-800.503.

[20] 31 C.F.R. ? 800.504.

[21] 50 U.S.C. App. 2170(d).

[22] The only transaction ever blocked was the acquisition by China National Aerotechnology Import and Export Corporation, a company affiliated with the government of the People's Republic of China, of MAMCO Manufacturing Inc. of Seattle, an airplane parts manufacturer for Boeing.

[23] 50 U.S.C. App. ? 2170(f).

[24] National Defense Authorization Act for Fiscal Year 1993, Pub. L. 102-484, 106 Stat. 2315, 2463, 50 U.S.C. App. ? 2170(b).

[25] 50 U.S.C. App. ? 2170(c). The statute permits disclosure only "as may be relevant to any administrative or judicial action or proceeding." *Id.*

[26] *Global Crossing Ltd*, 18 FCC Rcd at Appendix D (reproducing the NSA). The NSA is a public document.

[27] *See* Letter from the President to the Speaker of the House of Representatives and the President of the Senate, dated Sept. 19, 2004, located at http://www.whitehouse.gov/news/releases/2003/09/20030919-4.html.

[28] *Global Crossing Ltd.*, 18 FCC Rcd at 順 46-51, 61.

[29] *See, e.g., XO Communications, Inc.*, Memorandum Opinion, Order and Authorization, IB Docket No. 02-50, 17 FCC Rcd 19,212, Attachment (2002) (Executive Branch Agreement); *Lockheed Martin Global Telecommunications, Comsat Corporation and Comsat General Corporation, Assignor, and Telenor Satellite Mobile Services, Inc. and Telenor Satellite, Inc., Assignee*, Order and Authorization, ITC-ASG-2001050-00302, 16 FCC Rcd 22,897, Appendix B (2001) (Telenor/DOJ/FBI Agreement); *Application of VoiceStream Wireless Corporation, PowerTel, Inc., Transferors, and Deutsche Telekom AG, Transferee,* Memorandum Opinion and Order, IB Docket No. 00-187, 16 FCC Rcd 9779, Appendix B (2001) (DT-VoiceStream/DOJ/FBI Agreement); *AT&T Corp., British Telecommunications, plc, VLT Co. L.L.C., Violet License Co. LLC, and TNV [Bahamas] Limited Applications*, Memorandum Opinion and Order, IB Docket No. 98-212, 14 FCC Rcd 19,140, Appendix B (1999) (Agreement); *The Merger of MCI Communications Corporation and British Telecommunications plc*, Memorandum Opinion and Order, GN Docket No. 96-24512, FCC Rcd 15,351, Appendix B (1997) (Agreement).

[30] *See, e.g., VSNL,* 19 FCC Rcd at Attachment A (VAI/Executive Branch Agreement); *Wireless Telecommunications Bureau and International Bureau Grant Consent for the Transfer of Control of Licenses and Authorizations Held by NewComm Wireless Services, Inc. from ClearComm, L.P. to TEM Puerto Rico, Inc.*, Public Notice, WT Docket No. 02-366, 19 FCC Rcd 15,488, Appendix A (2004) (Network Security Agreement); *Bell Atlantic New Zealand Holdings, Inc., Transferor, and Pacific Telecom Inc., Transferee*, Order and Authorization, IB Docket No. 03-115, 18 FCC Rcd 23,140, Appendix B (2003) (Pacific Telecom/Executive Branch Agreement).

[31] *See, e.g., Intelsat, Ltd., Transferor, and Zeus Holdings Limited, Transferee,* Petition to Adopt Conditions to Authorizations and Licenses, IB Docket No. 04-366, Exhibit 1 (filed Nov. 24, 2004) (letter committing to continue commitments made by Intelsat in prior transactions, including maintenance of (i) a proxy agreement covering operations with respect to government and certain customer contracts and (ii) a Security Committee; notify the agencies prior to providing common carrier switched services; and notify the agencies of the identities of initial and subsequent Board members); *Application of New Skies Satellites N.V. (Transferor) and New Skies Satellites B.V. (Transferee),* Public Notice, IB Docket No. 04-247, DA 04-3419, 2004 FCC LEXIS 6237, Appendix B (released Oct. 27, 2004) (letter committing to assist U.S. government with lawful electronic surveillance, notify agencies of names and nationalities of directors, and provide advance notice of provision of common carrier switched services); *Comsat General Corporation, Lockheed Martin Global Telecommunications LLC, Comsat New Services, Inc., Intelsat LLC, and Intelsat MTC LLC*, Public Notice, IB Docket No. 04-235, DA 04-3418, 2004 FCC LEXIS 6119, Appendix B (released Oct. 27, 2004) (letter

committing to assist U.S. government with lawful electronic surveillance, ensure Security Committee oversight and give prior notice before providing common carrier switched services); *Loral Satellite, Inc. (Debtor-in-Possession) and Loral SpaceCom Corporation (Debtor-in-Possession), Assignors, and Intelsat North America, LLC, Assignee*, Order and Authorization, 19 FCC Rcd 2404, Appendix C (2004) (letter committing to place certain security oversight obligations in Security Committee); *General Motors Corporation and Hughes Electronics Corporation*, 19 FCC Rcd at Appendix E (letter arrangement committing to place certain security oversight obligations in U.S. citizen Audit Committee).

[32] *See, e.g.,* Letter from Baruch Weiss, Assistant General Counsel, U.S. Department of Homeland Security, to Rebecca Halstead, Industry Analyst, FCC (Feb 3, 2004), in *LATAM Telecomunicaciones, L.L.C.*, File No. ITC-ASC-20031126-00544 P (on file with the Federal Communication Commission) (withdrawing petition to defer without request for conditions).

[33] *E.g.,* News Corp. (incorporated in Australia), in *General Motors Corporation and Hughes Electronics Corporation.*

[34] *E.g.*, ST Telemedia (Government of Singapore) and Telenor (Government of Norway).

[35] *General Motors Corporation and Hughes Electronics Corporation,* 19 FCC Rcd at 492-495, 628, 順 35-38, 374, Appendix E.

[36] *Comsat General Corporation, Lockheed Martin Global Telecommunications LLC, Comsat New Services, Inc., Intelsat LLC, and Intelsat MTC LLC*, Public Notice, IB Docket No. 04-235, DA 04-3418, 2004 FCC LEXIS 6119, Appendix B (released Oct. 27, 2004) (letter committing to assist U.S. government with lawful electronic surveillance, ensure Security Committee oversight and give prior notice before providing common carrier switched services); *Loral Satellite, Inc. (Debtor-in-Possession) and Loral SpaceCom Corporation (Debtor-in-Possession), Assignors, and Intelsat North America, LLC, Assignee*, Order and Authorization, 19 FCC Rcd 2404, Appendix C (2004) (letter committing to place certain security oversight obligations in Security Committee).

[37] *VSNL America Inc.*, Order, Authorization and Certificate, 19 FCC Rcd at 順 23-25, 30, Attachment A (2004) (VAI/Executive Branch Agreement).

[38] *Wireless Telecommunications Bureau and International Bureau Grant Consent for the Transfer of Control of Licenses and Authorizations Held by NewComm Wireless Services, Inc. from ClearComm, L.P. to TEM Puerto Rico, Inc.*, Public Notice, WT Docket No. 02-366, 19 FCC Rcd 15488, Appendix A (2004) (Network Security Agreement).

[39] *Application of New Skies Satellites N.V. (Transferor) and New Skies Satellites B.V. (Transferee),* Public Notice, IB Docket No. 04-247, DA 04-3419, 2004 FCC LEXIS 6237, Appendix B (released Oct. 27, 2004) (letter committing to assist U.S. government with lawful electronic surveillance, notify agencies of names and nationalities of directors, and provide advance notice of provision of common carrier switched services).

[40] *See, e.g.,* Zeus Holdings in *Intelsat, Ltd., Transferor, and Zeus Holdings Limited, Transferee* (proposed investment by four private equity firms).