行政院及所屬各機關出國報告

（出國類別：會議）

參加 Global IPv6 研討會及參訪日本 IPv6 研發報告書

出國人員：

服務機關	職稱	姓名
交通部電信總局	副局長	高凱聲
交通部電信總局	總工程司	蘇宗弘
交通部電信總局	簡任技正	黃世雄
台灣網路資訊中心	董事長	曾憲雄
台灣網路資訊中心	執行長	陳文生
台灣網路資訊中心	工程師（二）	謝佳男
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成功大學	教授	黃崇明
東華大學	組長	王忍成
中華電信研究所	所長	梁隆星
中華電信研究所	計畫主持人	陳景州
資策會網通實驗室	經理	呂禮仁
國家高速電腦中心	組長	李鳳霖
中華數據通信分公司	處長	鐘福貴
工研院電通所	副所長	王輔卿
工研院電通所	組長	周勝鄰

出國地區：日本橫濱市

出國期間：九十一年十二月十五日至十二月二十二日

報告日期：九十二年二月二十八日

系統識別號:C09200936

公 務 出 國 報 告 提 要

頁數: 72　含附件: 是

報告名稱:

參加「Global IPv6研討會及參訪日本IPv6 研發」

主辦機關:

交通部電信總局

聯絡人／電話:

李菲菲／02-23433679

出國人員:

高凱聲　交通部電信總局　副局長
蘇宗弘　交通部電信總局　總工程司
黃世雄　交通部電信總局　公眾電信處　簡任技正

出國類別: 其他

出國地區: 日本

出國期間: 民國 91 年 12 月 15 日 -民國 91 年 12 月 22 日

報告日期: 民國 92 年 02 月 28 日

分類號/目: H6／電信　H6／電信

關鍵詞: IPv6

內容摘要: 隨著行動網路、3G、資訊家電等新型態網路的即將來臨，現有的IPv4協定呈現不敷所需，IP平台必須進行更新，實爲大勢所驅，放眼世界各先進國家，多已由政府領導積極進行IPv6之推廣活動；而在IPv6領域中，日本爲公認位居領導之國家，其各項IPv6發展、建置、應用及推廣活動均領先全球。由於全世界IPv6的發展尚屬起步階段，而我國也已於2002年正式將IPv6推動列入挑戰2008國家重點發展計畫中，集合國內產、官、學、研的力量共同推動我國IPv6之發展。然爲瞭解日本IPv6發展狀況，並與日本IPv6相關人士進行交流，故由電信總局及台灣網路資訊中心共同邀集NICI IPv6推動工作小組各分組及國內業界共組IPv6合作參訪團，參與在日本年度網際網路盛會「Internet Week 2002」及「Global IPv6 Summit in Japan 2002」，進行參訪及洽商合作事宜。希望藉由本次參訪吸收日本政府、學界及產業界經驗，必擬定未來合作之正確方向，對加速我國推動IPv6之發展應有助益。本次參訪團之主要目的可歸納如下： (1) 參觀訪問日本業界IPv6產業發展之現況與未來之規劃，提供我國政府產經單位及業界參考。(2) 瞭解日本Internet及IPv6的發展狀況，作爲我國舉辦類似活動之參考。(3) 與日本政府總務省及IPv6 Promotion Council召開中日IPv6合作會議，研商未來合作內容。

參加Global IPv6 研討會及參訪日本IPv6研發報告書

目錄

壹、前言

一、第四版網際網路協定(Internet Protocol version 4, IPv4)為目前使用之網際網路定址方式與協定，它以四個位元組(4 Bytes)來定址世界上任一個連上網際網路(Internet)的電腦。近年來由於網際網路的蓬勃發展，上網電腦與人數激增，加上未來行動網際網路(Mobile Internet)之終端設備對網際網路位址的需求與日遽增，IPv4 位址預計也將在 2005- 2010 年間使用殆盡。因應網際網路位址日漸不足與網際網路安全(Security)，移動能力(Mobility)，管理(Management)上等相關問題日趨複雜，下一代的網際網路協定也就是第六版網際網路協定(Internet Protocol version 6, IPv6)因此需要制訂。

二、IPv6 為網際網路組織在 1998 年制訂完成之下一代網際網路協定標準，以 16 個位元組(16 Bytes)的空間來定址任何連上網際網路的設備，足以應付未來數十年網際網路裝置 IP 位址的需求。IPv6 除提高定址能力外，同時內建自動設定(Auto-configuration)，網際網路安全(IP Security, IPSec)，及行動能力支援(Mobile IP)，可以解決目前 IPv4 管理、網路安全及移動能力上的問題，隨著越來越多的國內外學術機構，網際網路服務提供者(Internet Service Provider, ISP)將陸續裝設 IPv6，並上線提供服務。因此，一般相信 IPv6 將漸漸取代 IPv4 成為新一代的網際網路協定的主流，惟此轉換過程將不是短期內可完成的。

三、由於現行網路上的門牌號碼（IP 位址）漸顯不敷使用，故從技術的角度來看，目前 IP 定址方式（IPv4，IP version4）亟需升級為新一代的網路定址協定，即 IPv6(IP version 6)，以滿足 Internet 的長遠發展，而 IPv6 也將成為未來的必然發展趨勢。有鑑於此，行政院國家資訊通信基本建設推動小組（NICI）於 90 年底成立「IPv6 推動工作小組」，以整合產、政、學、研界的資源與力量；並由蔡政務委員清彥擔任總召集人，責成交通部電信總局簡局長仁德擔任召集人，積極推動 IPv6 網路建設及產業應用發展計畫。另 IPv6 推動工作小組並輔導成立民間性質之「IPv6 Forum Taiwan」組織，提高各界對 IPv6 專業技術的瞭解，由工研院電通所出面召集資訊、通訊廠商及 ISP 業者等積極加入，共同推動台灣 IPv6 之發展。

四、為實現 IPv6 網際網路環境，「IPv6 推動工作小組」亦已正式研

擬「加速寬頻網路建設-我國 IPv6 建設中程發展計畫」，並列入挑戰 2008 國家重點發展計畫項目之一，此亦正式宣示 IPv6 成為我國網際網路建設之重要工作計畫。該計畫預計至 96 年漸進達成以下目標：

(一)我國網際網路相關軟硬體設備，需能同時支援 Ipv4 及 IPv6。

(二)我國網際網路之基礎設施，包括學術網路及各 ISP 之骨幹，皆能同時支援 Ipv4 及 IPv6。

(三)全力支援 Ipv4 至 IPv6 網路轉換機制之研究發展建設，以提供各界導入 IPv6 網路平台無縫（seamless）之解決方案。

(四)全面宣導及推廣 IPv6 知識，加強 IPv6 科技人才之培育，並鼓勵以 IPv6 為平台開發新型態之網際網路應用。

(五)促進與 IPv6 社群之國際合作交流，積極參與各項國際標準制定活動，期與先進國家技術同步發展。

(六)積極鼓勵資訊設備（Information Appliances）、無線通信設備及各項終端設備嵌入 IPv6 功能，提昇產品附加價值及國際競爭力。

(七)整合政府及民間資源，共同推動我國 IPv6 之網路建設工作。

五、本次日本 IPv6 參訪團由交通部電信總局籌團參與日本舉辦之 Global IPv6 Summit 及參訪日本對 IPv6 已進行研發測試之廠商，擬藉由其研發經驗以為我國訂定 IPv6 發展策略之借鏡。本參訪團由交通部電信總局高副局長凱聲擔任團長，其餘團員名單請參閱附件一。

貳、會議地點及行程

一、時間：九十一年十二月十五日至十二月二十二日

二、行程及地點：

十二月十五日	台北-東京-橫濱	去程
十二月十六日	東京	上午：參觀訪問 Hitachi，位於橫濱市 Totsuka。 下午：參觀訪問 Fujitsu，位於川崎市，與歐洲代表團共同參訪，梁所長代表台灣參訪團報告我國 IPv6 發展現況。
十二月十七日	東京	上午：參觀訪問 NEC，位於東京都港　。 下午：參觀訪問 NTT West 及 NTT Docomo Town，位於東京都江東　。
十二月十八日	東京	參觀訪問 Yahoo BB Tec. /NTT，位於東京都。
十二月十九日	橫濱	Global IPv6 Summit in Japan 2002 大會及座談會，位於 Pacifico Yokohama。台灣與日本官方性質非正式會議：日方由總務省 MPTHPT (Ministry of Public Management, Home Affairs, Posts and Telecommunications) 派代表與會，我國則由電信總局、推動工作小組及各分組召集人、聯絡人代表出席。
十二月二十日	橫濱	日本 IPv6 Promotion Council Board Member Meeting。
十二月二十一日	橫濱	台灣與日本 IPv6 合作案雙邊會談(第一次中日 IPv6 工作會議)。
十二月二十二日	橫濱-東京-台北	返程

參、Global IPv6 研討會及中日合作案會談

一、Global IPv6 研討會議程

Global IPv6 Summit in Japan 研討會議程

Conference Day1 9 December
9:45 - 10:00 Greetings from the Chairman of the Steering Committee
10:00 - 12:00 Panel1 "Outlooks on IPv6 Deployment"
13:15 - 14:45 Panel2 "IPv6 Home Networks and IPv6 Appliances - Progress and Potential"
15:00 - 16:45 Panel3 "IPv6 Opening the Door to Japan's Next Generation Information Industry"
16:45 - 17:00 Closing
17:30 - 19:00 Reception

二、本次會議(圖一)有別於前兩(2000 及 2001)年，今年著重以國內發展為主(有部分原因是因為台灣 2003 年 2 月即將舉辦亞太區第一屆國際 IPv6 高峰會，故日本擬將本次會議著重於取得日本國內發展之經驗交流為主)，會議之進行分為三大主題以座談會方式進行，分別為：

第一場座談會

主題 Outlooks on IPv6 Deployment;

第二場座談會

主題 IPv6 Home Networks and IPv6 Appliances - Progress and Potential；

第三場座談會

主題 IPv6 Opening the Door to Japan's Next Generation Information Industry。

三、會議進行以日文為主，對外國與會者則提供英文同步翻譯之服務。充分展現出當今日本以擔任國際 IPv6 發展領導者自居，其所較關注的是如何提昇其國內 IPv6 之發展層次與如何加速發展之腳步，因為放眼當今世界 IPv6 之發展，其他國家皆無可與之匹敵。日本在策略上認為只要自己做得好，相信其他國家自然隨市場而跟進，商機自然能浮現。因此，目前雖然 IPv6 並無立即之商機，但世界各國皆希望與日本充分交流與合作，也就是唯恐落後日本太多，大致唯恐 IPv6 市場果真被發展起來時，整個產業發展相形之下又不易追趕了，相信這也就是本次 NICI IPv6 推動工作小組組團訪問日本的主要目標之一。

四、參加台灣與日本官方性質非正式會議：

我國由電信總局高副總局長帶領(圖二)推動工作小組及各分組召集人、聯絡人代表出席，日方由總務省 MPTHPT (Ministry of Public Management, Home Affairs, Posts and Telecommunications)及 IPv6 promotion council 人員出席。中華電信研究所梁所長代表我方簡報我國 IPv6 發展狀況(圖三)。

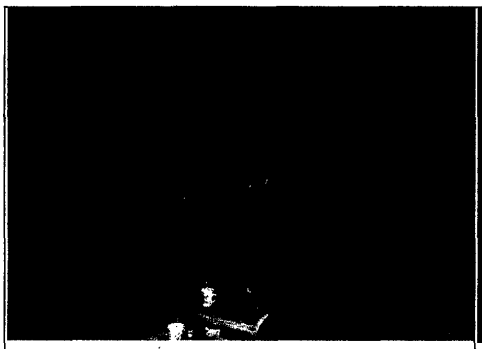
日本總務省簡報資料中較值得關注的是，日本政府對 IPv6 產業無論是政策推動及發展資金挹助等進展與規模都是世界首屈一指。其中，日本政府訂定時程提供獎勵或補助方式，鼓勵各大 ISP 業者投資 IPv4 網路轉移至 IPv6 網路之建設更是不遺餘力。日本較具體的措施為：從 2002 年 4 月至 2003 年 3 月為期一年，提供給 ISP 進行 IPv6 網路與服務建置時有

以下之減稅措施：

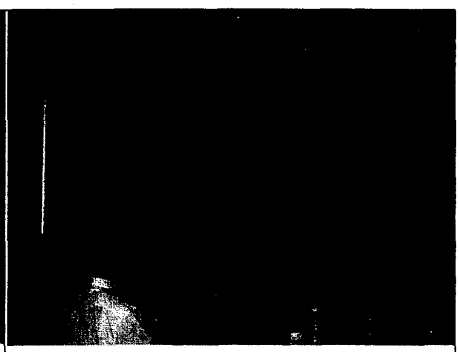
1. 12% decrease for carrier to Subscribers；
2. 25% decrease to carriers' network；

此一明確而務實之做法，相信可提供我國政府單位研擬相關政策時之參考。

圖一：2002 Global IPv6 Summit Conference 首場座談會。



圖二：我方代表團團長高副總局長致詞。



圖三：梁所長代表簡報我國 IPv6 發展狀況，其左手邊三位為日本總務省代表。

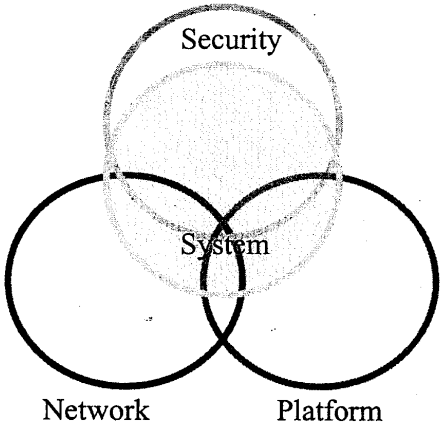
肆、參訪日本 IPv6 研發

一、參訪 Hitachi：

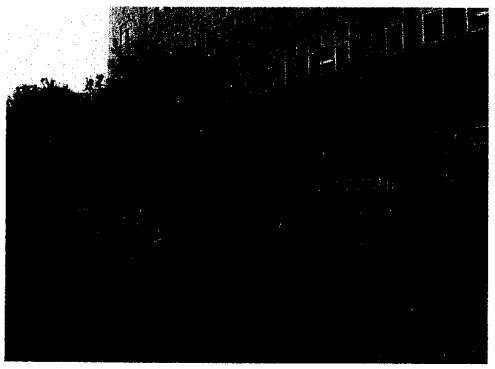
（一） 參觀 Hitachi Ltd. & Systems Development Laboratory (SDL)（圖四）。

（二） Hitachi 參與人員簡介其 IPv6 發展包括 GR2000 及 AG8100 等 IPv6 路由器及 IPv4/IPv6 轉換器產品，其 Hardware Based Router 的發展是較值得國內業者注意與瞭解的。

（三） Hitachi 另外介紹 SDL 主要的研發項目，包括：System、Network、Platform 及 Security 等領域的研發成果。其研發關聯圖如圖五所示。



圖五：Hitachi SDL 研發關聯圖。



圖四：Hitachi SDL 參訪留影。

二、參訪 Fujitsu：

議程：

1. Welcome speech from Fujitsu
   報告人：Tetsuo Nishino
   Vice General Manager
   IP Business Planning Div, Network System Group (NSG)
   Fujitsu
2. Presentation from Twain NICI IPv6 SC (圖六)
   報告人：梁隆星　中華電信研究所所長
   NICI IPv6 標準測試分組
3. Presentation from EU IPv6 Task Force (圖七、八)
   報告人：Dr. Pascal DRABIK
   Information Society Directorate-General,
   European Commission
4. Presentation from Fujitsu (圖九)。
5. Summary。

梁所長代表簡報 Taiwan NICI IPv6 推動工作小組現況與未來發展時，引起歐盟及 Fujitsu 相當之迴響。歐盟領隊 Dr. Pascal DRABIK 並當場邀請台灣參加歐盟 2003 年 Framework Program 6 (FP6)相關新計劃。梁所長並代表 NICI IPv6 推動工作小組當場表示台灣非常有興趣參與歐盟之 IPv6 相關計劃，將進一步研議後，由 NICI IPv6 推動工作小組正式與歐盟聯繫合作事宜。

Fujitsu 簡報其 IPv6 相關研發活動外，亦請其中國大陸籍員工簡報 Fujitsu 在所謂中國與日本 IPv6 合作計劃中所扮演之角色與相關活動。

三、參訪 NEC(圖十、圖十一)：

議程：

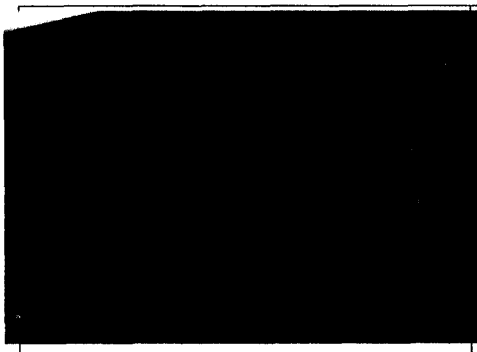
1. Introduction to NEC
   報告人：寺西　康 (Mr. Teranishi)
   NEC 海外第一系統事業部 第一營業部 主任
2. Presentation of IPv6
   報告人：今井 惠一 (Mr. Imai)
   戰略市場本部　科長
3. DEMO and Q&A

NEC 之簡報主要著重其 IPv6 設備與 solutions，包括 IX5000：Integrated Switching Router、CX5210：Core Router、IP8800：Multi-Layer SW、IX1000：Broadband Access Router、CX4210/CX4220：Broadband Service Router 及 IX2000：Enhanced Broadband Access Router 等，可說是目前產品線最齊全的一家公司。

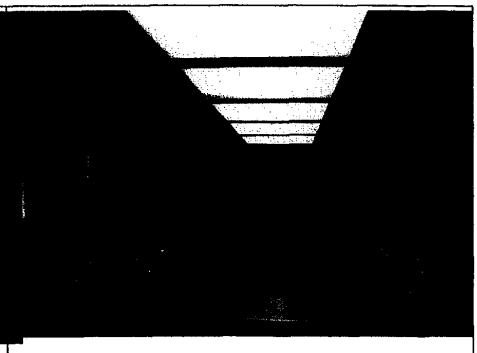
展示部分：展示利用 NEC 設備進行 IPv6 影像傳送，並非十分特殊。

四、參訪 NTT West 及 NTT DoCoMo Town (圖十二、十三、十四、十五)：

本項參訪與 IPv6 較無直接關係。然而，參觀 NTT West 展示中心對日本寬頻網路與服務發展有了新的瞭解，而參觀 NTT DoCoMo Town 更見到許多日本新穎之寬頻有線及無線設備與服務，例如：展示 IPv6 所謂的無縫（Seamless）接取技術，即在下班後使用辦公室個人電腦看一部電影，未播映完即以 PDA 取代讓影片繼續播放，歸途終仍可一路欣賞，到家之後將 PDA 置於電視旁之接收器，整個影片畫面即顯現在電視上繼續觀賞，這種從影片開始至回到家一路並未中斷之通訊過程，即為無縫接取技術充分顯露無餘。此讓團員留下深刻的印象，相信都會感到不虛此行，所見所聞應該也會對國內寬頻網際網路之發展有所幫助。

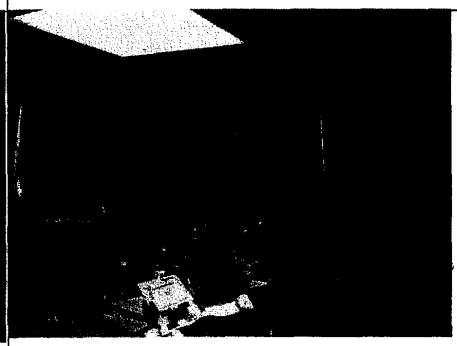


圖六：梁所長代表簡報 Taiwan IPv6 發展。

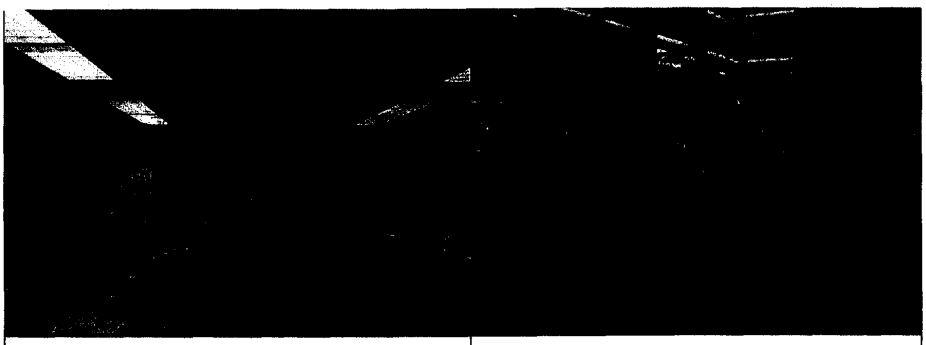


圖七：Taiwan 代表團(右側)及 EU 代表團(左側)共同與會。

圖八：歐盟代表簡報 EU IPv6 發展。

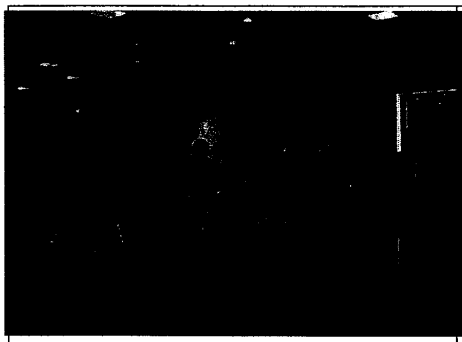


圖九：Fujitsu 簡報 IPv6 發展。

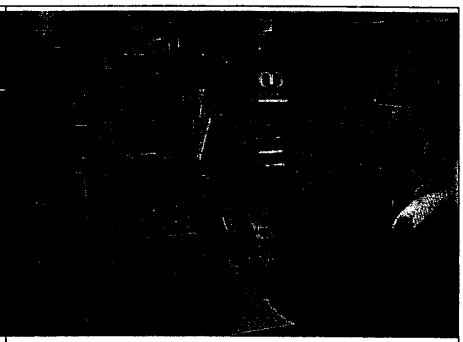


圖十：梁所長代表致贈紀念品給 NEC。

圖十一：NEC 總部參訪結束時合影留念。



圖十二：參觀 NTT West 展示中心後留影。



圖十三：DoCoMo 手機與影像控制結合之服務。

圖十四：DoCoMO 展示影像監控電話。

圖十五：梁所長代表致贈紀念品給 DoCoMo。

伍、觀感及建議事項

一、Hitachi 展示其 IP Network Operations Support System，展現其 MPLS 及 QoS 網管的能力。雖尚處雛型階段，應具發展潛力。

二、在此合作計劃中，日本非常有計劃的由 Fujitsu 負責上海、Hitachi 負責北京及 NEC 負責廣州，分別在華中、華北及華南提供所屬公司之 IPv6 Router 設備為中國大陸構建 IPv6 網路（2.5G POS 骨幹網路），展現出日本對大陸市場的投資及企圖心，非常值得我們進一步了解及研究因應之道。

三、Fujitsu 簡報中最引人注意的是他們所發展之 IPv6 chip，無論是歐盟及台灣代表們皆表達高度的興趣，一致請求有使用及合作之機會。惟 Fujitsu 表示尚處研發階段不便公開。建議各分組皆應尋求個別管道進行瞭解，以協助國內產業與日本合作或能自行研發之機會。

四、NEC 曾透漏 NTT Communication 已試用該公司之產品提供 ADSL IPv6 商用服務(利用 ATU-R 加 SoHo Router 組成)。同時 NEC 表示 IPv6 應用於電子交控與收費系統(Intelligent Transform System)將有非常大之商機，應值得國內業界深入了解與關注。

五、整體而言，日本 IPv6 Promotion Council 對台灣非常友善與熱誠，比起對同行之歐盟而言，我們除了受到相當的禮遇外，日本方面亦展現出希望和台灣密切合作的期待。因此，應可積極把握此一情勢，與當今世界 IPv6 發展最先進的國家維持良好的合作關係，建議儘早規劃 2003 年 2 月日本 IPv6 專家訪問團參訪之事宜，充分準備相關參訪活動與會談事宜，讓日方了解台灣發展 IPv6 的企圖心與雄厚的潛力。

六、本次長達六天的參觀訪問活動行程安排緊湊，然而能在短時間內參觀日本網際網路界最負盛名的幾個大廠，除能實地瞭解日本於 IPv6 的發展情形外，參訪團亦於不同場合獲得公開演講的機會，與日本及各國人士分享我國 IPv6 發展政策及經驗，可感受到日本IPv6 推進協會(IPv6 Promotion Council)對我參訪團的尊重及精心的行程安排。

七、在與產業界及政府的對話中，所有團員皆可感受到日本於 IPv6 領域的野心及遠見，以及政府及產業界通力合作、資源整合的

互惠模式。此種具建設性的經驗將可提供給我國「IPv6 建置發展計劃」終各分組學習參考。

八、本次行程中有關「第一屆中日 IPv6 合作會議」分二個階段進行，第一階段為分組討論，中日雙方代表分成四組，針對「應用推廣」、「研究發展」、「標準測試」及「基礎建設」等四個領域的相關合作議題展開深入的討論。第二階段為一般性會議，將各分組討論結果與所有與會人士分享，並確認即將展開的主要工作及任務分配。由於本次會議達成了多項合作共識，雙方擬於 2003 年 2 月份利用「第一屆亞太區全球 IPv6 高峰會」舉辦期間組團來訪，並於台北舉行第二次合作會議。

九、日本 IPv6 之父慶應大學教授村井純博士(Dr.Jun Murai)於會議結束前表示，台灣是全球網際網路設備的主要供應國家，所以他一直非常關心台灣於 IPv6 的動向，亦期許如此的對話及合作一定要持續進行，並允諾將全力支持。

十、為使中日雙方的合作不是僅為日方單向之付出，我方應以此良好基礎下，建議 NICI IPv6 各分組應加強所負責之工作項目並鼓勵業界積極投入 IPv6 設備與服務之發展，儘早提出一些屬於台灣專有之成果，以展現我國 IPv6 發展之具體成效，讓 IPv6 發展計劃確實能落實。

十一、日方相關人士一再提到台灣用戶端設備發展之能力獨步世界，可見他們非常希望台灣在這方面能有所貢獻，並希望能尋求合作的機會。因此，應可建議特別著重一些能與日本 IPv6 產業有互補或合作機會之產品的發展，並仿傚日本政府之做法，研訂獎勵 IPv6 建置及發展之減稅措施，以鼓勵業界投入 IPv6 發展之意願，以獲取日本、中國大陸及歐美等市場利基。

十二、有關 IPv6 應用服務之發展，個人經過此次參訪，發現日本業界普遍注重 IPv6 與電子化交通系統(e-Transportation)之結合，應該是一項值得政府與業界關注的所謂的具發展潛力之 IPv6 Killer Applications 之一。

十三、參訪 Fujitsu 時，歐盟報告一些 IPv6 相關發展計劃，並主動邀請台灣參加，我國除了注重與日本的合作關係外，能與歐盟建立關係亦非常重要，透過相關活動或可協助政府與歐盟建立另一條溝通管道。因此，當場表示台灣非常有意願參與歐盟之計

劃。建議 NICI IPv6 推動工作小組主導，責成相關分組研究適合我國參與之計劃並擬訂合作方案，儘早與歐盟取得聯繫。

陸、附件

一、參訪團團員名單

出國人員：	服務機關	職稱	姓名
	交通部電信總局	副局長	高凱聲
	交通部電信總局	總工程司	蘇宗弘
	交通部電信總局	簡任技正	黃世雄
	台灣網路資訊中心	董事長	曾憲雄
	台灣網路資訊中心	執行長	陳文生
	台灣網路資訊中心	工程師（二）	謝佳男
	清華大學	教授	黃能富
	清華大學	博士生	于昭平
	成功大學	教授	黃崇明
	東華大學	組長	王忍成
	中華電信研究所	所長	梁隆星
	中華電信研究所	計畫主持人	陳景州
	資策會網通實驗室	經理	呂禮仁
	國家高速電腦中心	組長	李鳳霖
	中華數據通信分公司	處長	鐘福貴
	工研院電通所	副所長	王輔卿
	工研院電通所	組長	周勝鄰

次世代インターネットの世界
～IPv6ことはじめ～

IPv6普及・高度化推進協議会

IPv6普及・高度化推進協議会
IPv6 Promotion Council

IP(インターネットプロトコル)とは

- インターネットに繋がるすべてのものが共通して利用する、通信の手順や決めごと。
  - 通信対象:全世界／全メーカー共通で採用されているために、インターネットでは、全世界と通信できる。
  - 通信手段:物理的な回線の種類(電話回線、イーサネット、無線、光ファイバ、放送電波、通信衛星など)を選ばない。
  - 通信内容:0/1で表現できることであれば、メッセージの内容を選ばない。
- インターネットでは、IPを基盤として共有しているために、どのようなメッセージでも、どのような通信手段を通じてでも端末同士が支障なくコミュニケーションができる.
- これまで主に利用されてきたのは、IPv4(v4はバージョン4のこと)。

IPv6普及・高度化推進協議会
IPv6 Promotion Council

IPv4だと困ること

- IPv4のアドレスは43億個しかなく、地球の全人口(60億人)に足りない
  - 将来、一人が一台のパソコンだけでなく、さまざまなものがインターネットに接続するようになると、さらにアドレスの数は必要になる。
- 機能がつぎはぎである
  - IPsec(なりすましや改ざんを防ぐセキュリティ技術)や、IPマルチキャスト(一度に複数のホストに情報を送る技術)、モバイルIP(移動体用のIP)など、IPが普及した後で追加された機能があるため、特定のホスト同士でしかこれらの技術を利用できない。
- ネットワークもつぎはぎである
  - アドレス数を節約するためのNATという機械が多数利用されており、そのため一般に普及できないアプリケーションが存在する(IP電話など)。
- (管理者が)管理しづらい／(利用者が)設定が面倒

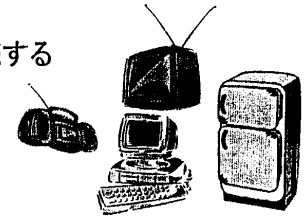
IPv6でできること

- 無限に等しいアドレス
  - アドレスは、3.4×10の38乗個(2の128乗個)。
- IPv4にはなかったさまざまな機能が標準搭載
  - セキュリティ:なりすましや改ざんを防ぐ
  - 帯域制御:伝送路の容量を情報の側で制御できる
  - マルチキャスト:一度に複数のホストに情報を送る
  - 自動設定:ケーブルを接続して電源を入れたら自動的に設定される

- これまでよりも、簡単、安全、自然にインターネットを利用することができる
- PCや携帯電話だけでなく、いろいろなものがネットに接続され、新しい便利なサービスがどんどん生まれる

IPv6がもたらす新しいサービスの例

- 生活に使う様々な家電製品がインターネットに接続する
  - 電話
  - 冷蔵庫・電子レンジ
  - デジタルカメラ・テレビ
  - 家庭用ゲーム機・・・
- 交通機関内でメールを読んだり、情報がリアルタイムに受け取れる
  - 電車で無線LAN
  - まちなかでインターネット・・・
- テレメータリング（遠隔監視、遠隔制御）による施設管理
  - 外出先から家の中の状況をモニタ・制御できる
  - 機器やメータをネットワーク接続し、外部から制御できる



IPv6普及・高度化推進協議会
IPv6 Promotion Council

社会基盤形成のために不可欠なIPv6

21世紀情報社会にインターネットは不可欠

誰でも何でも何時でも何処でも使える
社会基盤とするためには、IPv4に限界

IPv6

量の問題	→340澗個の量は無限大に近く、ほぼ全てがインターネットを使える
安全の問題	→当初からセキュリティ対応がなされ、安く簡単に実現できる
魅力の問題	→QoS等、動画配信のためのしくみが組み込まれている
構成の問題	→大規模でグローバルなネットワークを想定している

技術開発と社会合意の両面で「民間の力を結集」して取り組むことが重要

IPv6普及・高度化推進協議会　概要

名　称
　IPv6普及・高度化推進協議会／IPv6 Promotion Council of Japan.

設　立
　2000年10月.

活動期間
　e-Japan戦略・推進計画に定められた目標である2005年を目途とする。

目　的
　インターネットを21世紀の高度情報通信ネットワーク社会基盤として再確認し、IPv6による次世代インターネットの普及促進をはかり、かつ、国民が利用しやすい環境を形成するための諸事業を行い、もって「e-Japan構想」を推進し、新しい生活と産業の具現化に資すること。

会　長
　村井　純　慶應義塾大学環境情報学部教授

会　員
　280社・団体・個人　(2002年8月23日現在、後援会員を含む)

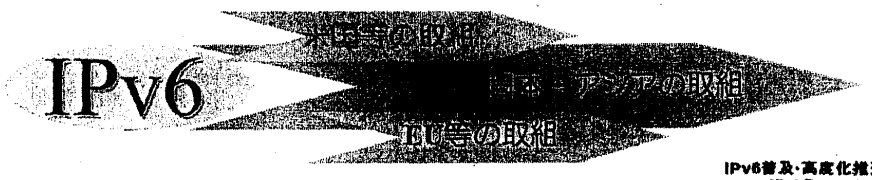
事務局
　(株)三菱総合研究所／三井情報開発(株)総合研究所

IPv6普及・高度化推進協議会の達成目標

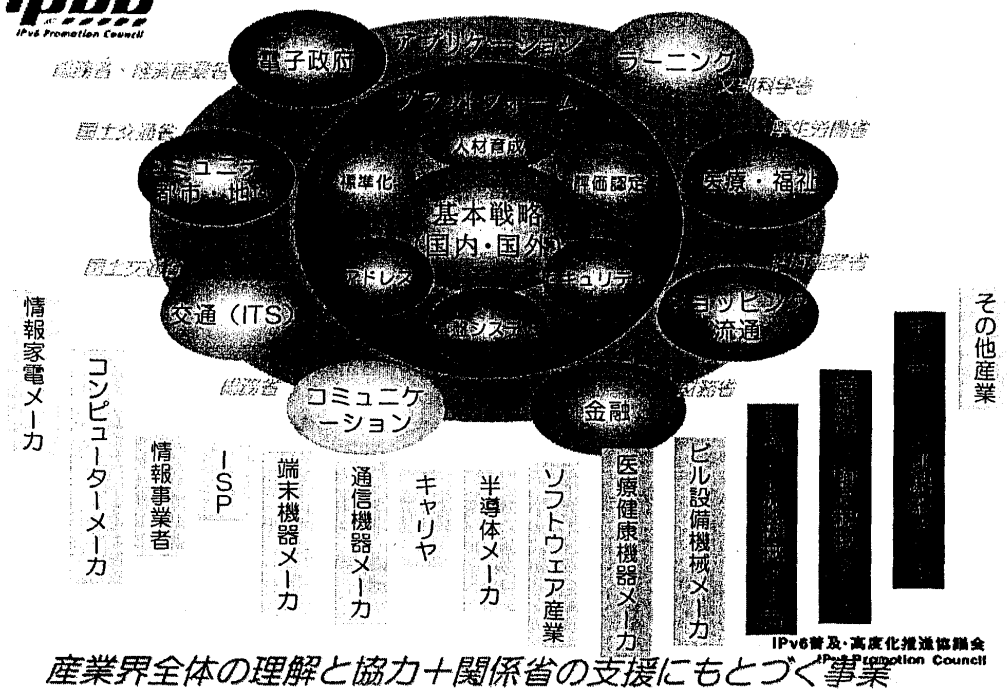
1．わが国がインターネットにおける
　国際的リーダーシップを発揮できるような存在となる。

2．高度情報社会基盤を持続発展させるための
　豊富な人材が育成される。

3．ネットワークや端末などに関わるハード・ソフトおよび
　サービス分野の多様な産業が新興・活性化する。



協議会の事業構成



産業界全体の理解と協力＋関係省の支援にもとづく事業

2002年度事業の焦点

1．海外戦略
- ・中国等アジア地域での実験網との連携
- ・米国・欧州との協働、その他

2．セキュリティ
- ・クライシスマネージメント
- ・情報家電セキュリティ等

3．サーティフィケーション
- ・IPv6レディーマーク発行等の評価認定、標準化

4．国土・生活空間へのアプリケーション拡大
- ・ITS、都市・設備管理
- ・健康・医療・福祉、ラーニング、その他

2002年度いよいよIPv6離陸へ

役　員

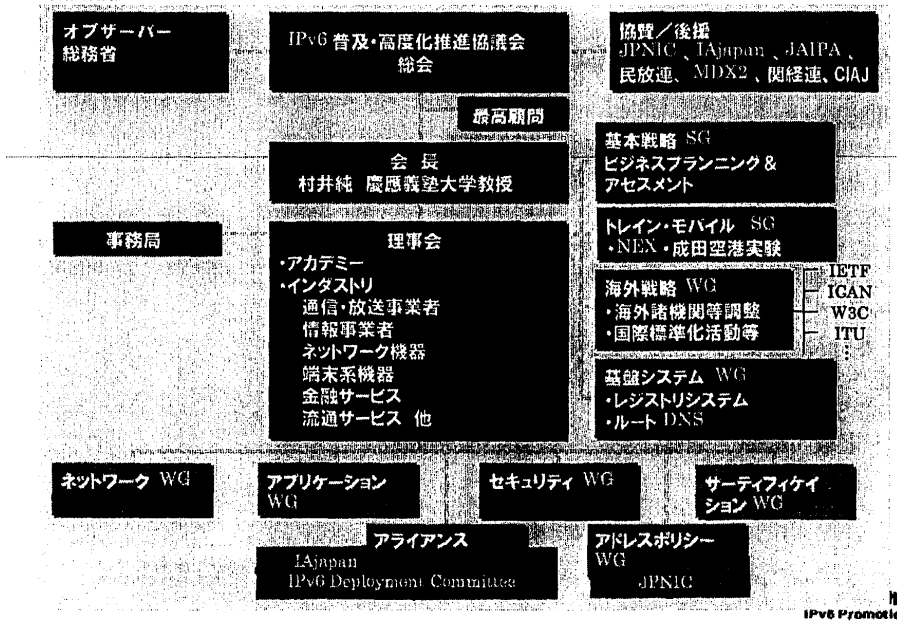
最高顧問	藤井義弘	（日立造船株式会社　相談役）
会　　長	村井　純	（慶應義塾大学環境情報学部教授）
専務理事	江崎　浩	（東京大学情報理工学系研究科助教授）
常務理事	荻野　司	（社団法人日本ネットワークインフォメーションセンター理事）
常務理事	中村　修	（慶應義塾大学環境情報学部助教授）

＜理事＞

株式会社インターネットイニシアティブ	取締役	歌代 和正
エヌ・ティ・ティ・コミュニケーションズ株式会社	代表取締役副社長	富田 修二
キヤノン株式会社	専務取締役 テクノロジー統括本部長	遠藤 一郎
KDDI株式会社	執行役員常務 ソリューション事業本部長	伊藤 泰彦
ソニー株式会社	上席常務取締役	所 真理雄
株式会社東京三菱銀行	執行役員 システム部長	西沢 豊
株式会社 東芝	取締役 専務 モバイルコミュニケーション社社長	溝口 哲也
トヨタ自動車株式会社	取締役	吉田 博昭
ニフティ株式会社	取締役 システム業務部長代理	本名 信雄
日本アイ・ビー・エム株式会社	副社長	丸山 力
日本テレコム株式会社	専務執行役員　技術本部長　兼CTO	弓削 哲也
日本電気株式会社	NECネットワークス執行役員　IPネットワーク事業本部長	山本 正彦
ノキア・ジャパン株式会社	取締役上席副社長	橋田 公雄
株式会社日立製作所	情報・通信グループ　COO　業務役員	古川 一夫
富士通株式会社	執行役 ネットワーク事業本部長	武市 博明
マイクロソフト株式会社	取締役	東 貴彦
松下電器産業株式会社	代表取締役常務	櫛木 好明
三菱電機株式会社	取締役　インフォメーションシステム事業推進本部長	松田 章

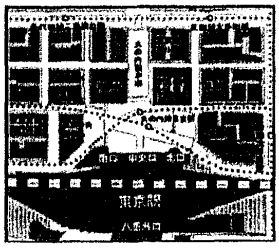
IPv6 Promotion Council

IPv6普及・高度化推進協議会　体制図

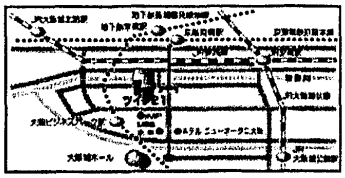


ショールームのご案内

●**GALLERIA v6** 丸の内
〒100-0005 東京都千代田区丸の内1-5-1
新丸の内ビル1F
TEL: 03-3217-0337
営業時間：月～金 11:00-19:00
定休日：土日祝日



●ダウンロードステーション@**OBP**
〒540-6220 大阪府大阪市中央区城見2-1-61
ツイン21ナショナルタワー1F
TEL：06-4791-3555
営業時間：月～金 11:00-20:00
土日祝日 13:00-19:00　定休日：無休

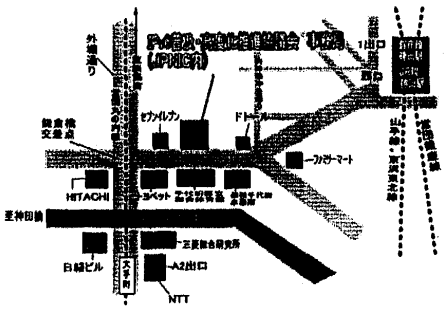


※http://www.v6pc.jp/showroom/　もご覧ください

お問い合わせ先

IPv6普及・高度化推進協議会　事務局

〒101-0047
東京都千代田区内神田2-3-4 国際興業神田ビル6F JPNIC内
Tel. 03-5209-4588
Fax. 03-3255-9955
info@v6pc.jp
http://www.v6pc.jp



三、歐洲 IPv6 推動策略

IPv6 Promotion Council

Yokohama – 20-12-2002

European Support to IPv6

Pascal Drabik

DG Information Society – Research Networking

European Commission

"The views expressed in this presentation are those of the author and do not necessarily reflect the views of the European Commission"

Information Society

Contents

- Introduction
- IPv6 related European policy aspects
- IPv6 in Framework Programme 5
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- FP6 over IPv6
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Information Society

Contents

-
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- IPv6 in Framework Programme 5
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Introduction

- A new generation of technologies is emerging
  - Keys to did an *all* inclusive knowledge society and economy
  - Europe is well positioned
- Europe can build on strengths, e.g.
  - In Mobile and Wireless,
  - Embedded software,
  - Consumer electronics,
  - Rich content & service provision
- EU RTD in IST provides a unique opportunity
  - To aggregate fragmented effort (European Research Area)
  - Build consensus and provide a "global approach"

Contents

- Introduction
-
- IPv6 in Framework Programme 5
- Framework Programme 6 overview
- FP6 over IPv6
- Conclusion

Vision statement

"Start creating the *ambient intelligence landscape* for seamless delivery of services and applications in Europe relying also upon *test-beds* and *open source software*, develop user- friendliness, and develop and converge the networking infrastructure in Europe to world-class"

George Orwell: 1984

URL: ftp://ftp.cordis.lu/pub/ist/docs/istagscenarios2010.pdf
URL: ftp://ftp.cordis.lu/pub/ist/docs/istag-99-final.pdf

IPv6 European Policy Aspects

At European level, coordinated efforts between:

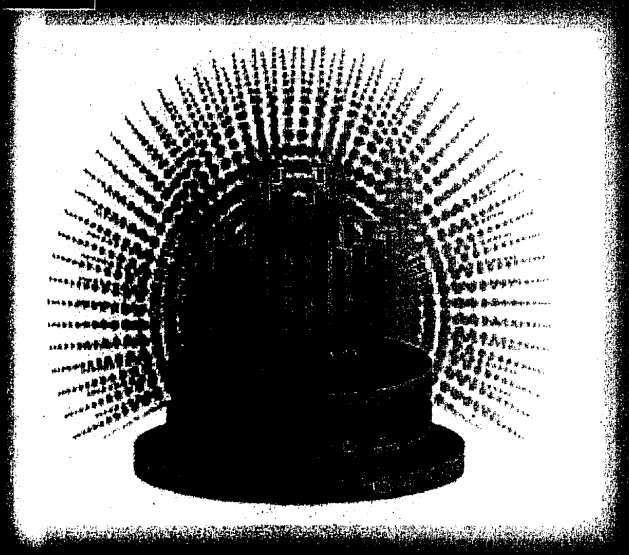
- European Commission
  - Telecom and Information Society Policies
  - EU sponsored Research - The Programme IST
  - Mobilising initiatives such as *e*Europe or European Research Area
- European Council
  - Conclusion of European Summits
- European Parliament
  - Malcom Harbour Report presented to ITRE May 2001

Contents

IPv6 projects financial overview

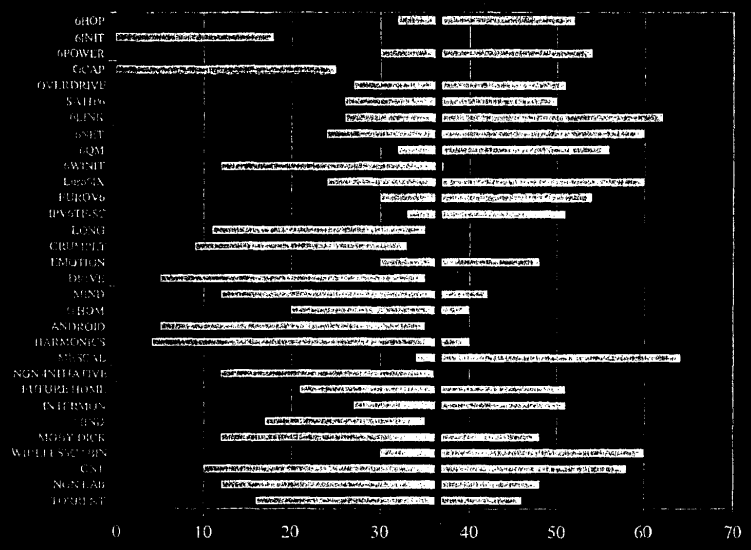
- 1999: IPv6 Awareness creation at EU level
- 2001: A cyberspace odyssey
- 2002: IPv6 financial overview at the EU level:
  - Total budget: 156 M€ (19.4 B¥)
  - Total EU funding: 85 M€ (10.5 B¥)
  - Around 20% for 2 large scale deployment platforms

IPv6 in FP5



- Deployment
  - 6NET
  - Euro6IX
- Promotion
  - Euro6
  - IPv6TF-SC
- Clustering
  - 6Link
- Others
  - more technical

FP5 Projects Life since 01-01-2000



Information Society

Japan and FP5

- Japan is already participating to FP5
  - NTT: LoCoMo: MIND
  - Hitachi Europe: Project coordinator of 6QM
  - Hitachi Japan: Scientific coordinator of 6QM
  - NEC: NGN Lab, MobyDick
  - NTT: 6NET
  - Sony : 6NET, @HOM, MIND
  - ...
- Collaboration agreement signed between IPv6PC and Eurov6
- Participation to the European IPv6 Task Force

Information Society

Contents

- Introduction
- IPv6 related European policy aspects
- IPv6 in Framework Programme 5
- [illegible]
- Framework Programme 6 overview
- FP6 over IPv6
- Conclusion

6NET – Overview

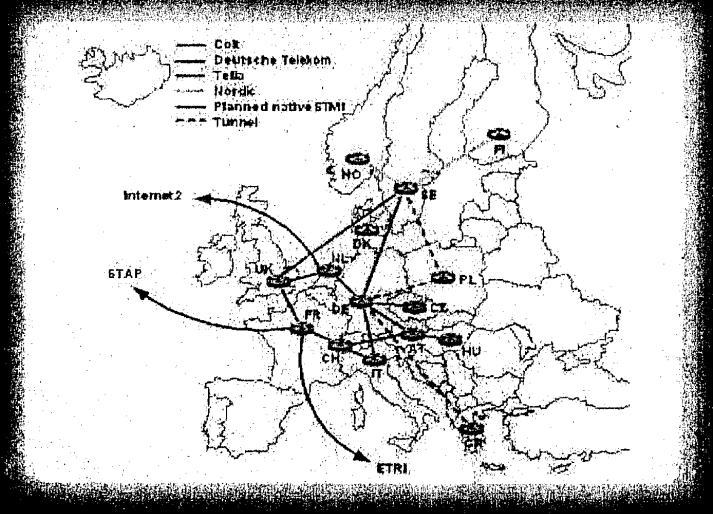
- One of the largest IST project – 18.4 M€ (2.3 B¥) (10.3 M€ (1.3 B¥) EU funding)
- About 35 partners
- 3 years, from 01-01-2002 to 31-12-2004
- About 1237 PM

6net

URL: http://www.6net.org

6net

Network Overview



URL: http://www.6net.org

Information Society

Euro6IX – Overview

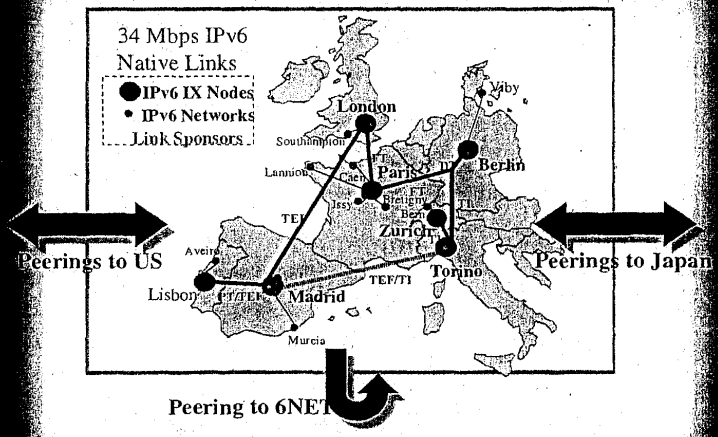
- One of the largest IST project – 15.5 M€ (1.9 B¥) (7.8 M€ (970 B¥) EU funding)
- 17 partners
- 3 years, from 01-01-2002 to 31-12-2004
- About 1300 PM

Euro6IX
IPv6: The New Internet

URL: http://www.euro6ix.org

Information Society

Network Overview



URL: http://www.euro6ix.org

Eurov6 – Overview

- The European IPv6 showcase
- 2 years, from 01-07-2002 to 30-06-2004
- ULB, Ericsson, Telscom, Consulintel

URL: http://www.eurov6.org

Objectives

- To show the usage of IPv6 products and services and their impact to anyone at anytime; This involves:
  - Bringing together vendors as sponsors to test and demonstrate their devices and systems,
  - Showing various users applications based on IPv6 products and services, permanently at a few locations in Europe ("concept of fixed Showcase"), which can be visited physically or accessed remotely through telematic means,
  - Organizing temporary demonstrations at different locations and/or significant events (concept of "nomadic Showcase").

URL: http://www.eurov6.org

IPv6TF-SC – Overview

- Project to support the activities of the European IPv6 Task Force
- 1.5 years, from 01-10-2002 to 31-03-2004
- T-Systems Nova, BT, Consulintel, Ericsson, Philips, Siemens, University of Southampton, University of Oulu

IPv6 TASK FORCE
– Steering Committee –

URL: http://www.ipv6tf-sc.org

Background

- **IPv6 Task Force, phase 1:**
  - Initiated in April 2001
  - Conclusions submitted to the European Council Barcelona Spring meeting in 2002
- **IPv6 Task Force, phase 2:**
  - Renewed mandate 2002-2004
  - Ensure a working liaison of the European industries and Academia with IPv6 related standards.
  - Provide a regularly updated review and plan action on the development and future perspectives of IPv6.
  - Establish collaboration and working relationships with similar initiatives being launched in other world regions.

URL: http://www.ipv6tf-sc.org

Objectives

- Facilitate, support and coordinate the continuation of the work of the IPv6 Task Force until 2004.
- Strategic instrument to create ground for discussion and monitor how the recommendations are transformed.
- Collaborate with other regional groups and initiatives deploying IPv6.

URL: http://www.ipv6tf-sc.org

6Link – Overview

- Project to support the activities of the IPv6 Cluster
- 3 years, from 01-03-2002 to 28-02-2005
- BT, Telscom, T-Systems Nova, University of Southampton, Consulintel, University College London, Universidad Politecnica Madrid, Motorola, DANTE, TERENA, Universidad Carlos III Madrid

6LINK IPv6 Projects United

URL: http://www.6link.org

Information Society Technologies

Objectives

- Support IPv6 Cluster projects by:
  - Consensus building
    - IPv6 development
    - IPv6 deployment
  - Dissemination
  - Exploitation of consensus
    - Common trials
    - Co-ordinated input to standards development

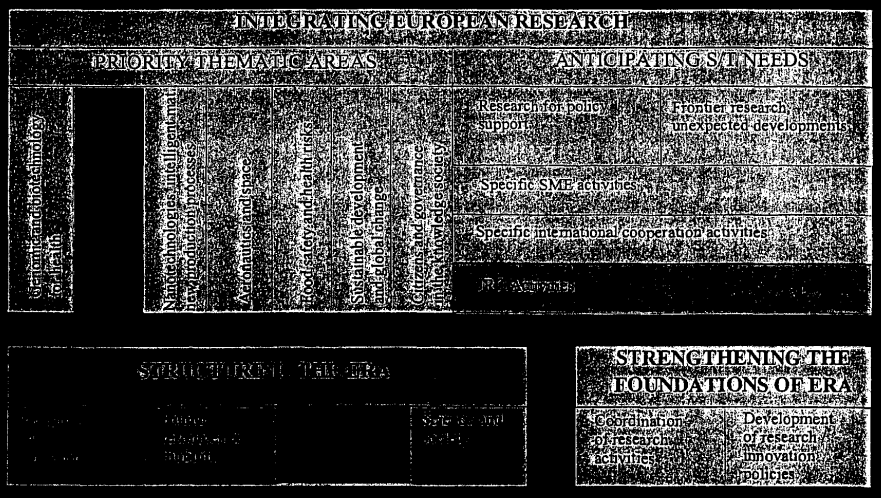
URL: http://www.6link.org

Information Society Technologies

Contents

- Introduction
- IPv6 related European policy aspects
- IPv6 in Framework Programme 5
- The European Delegation projects
-
- FP6 over IPv6
- Conclusion

FP6 Overview



http://europa.eu.int/comm/research/fp6/index_en.html
http:// www.cordis.lu/ist/fp6/fp6.htm

Calls (2003): Integrating ERA (IST)

- First opportunity to participate to projects (Call 1):
  - Address a first set of objectives
  - From 17-12-2002
  - Until 24-04-2003

- Second opportunity to participate to projects (Call 2):
  - Address a second set of objectives
  - From 17-06-2003
  - Until 15-10-2003

http://europa.eu.int/comm/research/fp6/index_en.html
http:// www.cordis.lu/ist/fp6/fp6.htm

Information Society

Calls (2003): mini HowTo

- To create or join an existing consortium
  - The consortium must have a European dimension
  - Legal entity based in European Union (EU) or Associated States (AS), either involved in research, or in the dissemination or use of research results
  - Legal entity based outside EU and AS can also participate on a self-funding basis
- Exchange and visits for researchers

http://www.cordis.lu/inco2/src/participation.htm
http://europa.eu.int/mariecurie-actions

Information Society

IST Call 1

- **Strategic objectives (without FET):**
  - Pushing the limits of CMOS, preparing for post-CMOS
  - Micro and nano systems
  - Broadband Access for All Broadband for all
  - Mobile and wireless systems beyond 3G
  - Towards a global dependability and security framework
  - Multimodal Interfaces
  - Semantic-based knowledge systems
  - Networked audio-visual systems and home platforms
  - Networked organisations, businesses and governments
  - E Safety of road and air transport
  - *e*Health
  - Technology-enhanced learning and access to cultural heritage
  - Products and Services engineering 2010
  - General accompanying actions

IST Call 2

- **Strategic objectives (without FET):**
  - Advanced displays
  - Optical, opto-electronic, photonic functional components
  - Embedded systems
  - Open development platforms for software and services
  - Cognitive systems
  - Applications and Services for the Mobile User and worker
  - Cross-media content for leisure and entertainment
  - GRID-based Systems and for solving complex problems
  - Improving Risk management
  - eInclusion
  - Services and Product engineering 2010
  -
  - General accompanying actions

Calls (2003): Structuring the ERA

- GRID:
  - Open on 17-12-2002
  - Deadline on 06-05-2003
  - Starting late 2003
  - Instruments: I3, CA, SSA
- GEANT:
  - Open on 06-05-2003
  - Deadline on 02-09-2003
  - Starting late 2004
  - Instruments: I3

http://europa.eu.int/comm/research/fp6/infrastructures_en.html

FP6: Further links

http://europa.eu.int/comm/research/fp6/index_en.html
http://europa.eu.int/comm/research/fp6/documents_en.html
http://europa.eu.int/comm/research/fp6/infrastructures_en.html
http://www.cordis.lu
http:// www.cordis.lu/ist
http:// www.cordis.lu/ist/fp6/fp6.htm
http:// www.cordis.lu/rtd2002

IST HelpDesk
Fax : +32 2/296-83-88
E-Mail : ist@cec.eu.int

Contents

- Introduction
- IPv6 related European policy aspects
- IPv6 in Framework Programme 5
- The European Delegation projects
- Framework Programme 6 overview
-
- Conclusion

FP6 over IPv6

- Deployment of the core protocol: Addressed in FP5
- R&D effort still needed about:
  - Mobility
  - Quality of Service
  - Security
  - ...
- Applications & services to be much deeper addressed:
  - GRID
  - Health care
  - e-commerce
  - e-government
  - ...

Contents

- Introduction
- IPv6 related European policy aspects
- IPv6 in Framework Programme 5
- The European Delegation projects
- Framework Programme 6 overview
- FP6 over IPv6
-

Conclusion

- IPv6 is a key enabler technology for a large spectrum of applications and services (ambient intelligence)
- IPv6 is a corner stone for *e*Europe and ERA
- Collaborations EU-Japan are welcome
  - With Research and industrial entities
  - In FP5 and in FP6
  - Common demonstrations
  - e.g. "Global_IPv6" world wide event in 2003
  - ...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Phone: +32 2/295-48-24
Fax: +32 2/299-31-27
Information Society

fujitsu

IPv6 CHINA&JAPAN Collaboration Project

(1) State Development Planning Commission P. R. CHINA

(2) Ministry of Information Industry

IPv6 CHINA&JAPAN Collaboration Project

(State Development Planning Commission P. R. CHINA)

Outline

- Solve lack of IPv4 address problem by both sides
- Under construction of NGN,both sides take an initiative. Joint R&D between JAPAN&CHINA through collaborative experiment aiming for commercialization
- Promote and establish global standard IPv6 technology.
- From both JAPAN and CHINA's win-win aspect,promote IPv6 industry.
- Operation Organization : CERNET(CHINA)、CIAJ(JAPAN)
- MOU Sine : Jun 6, 2002

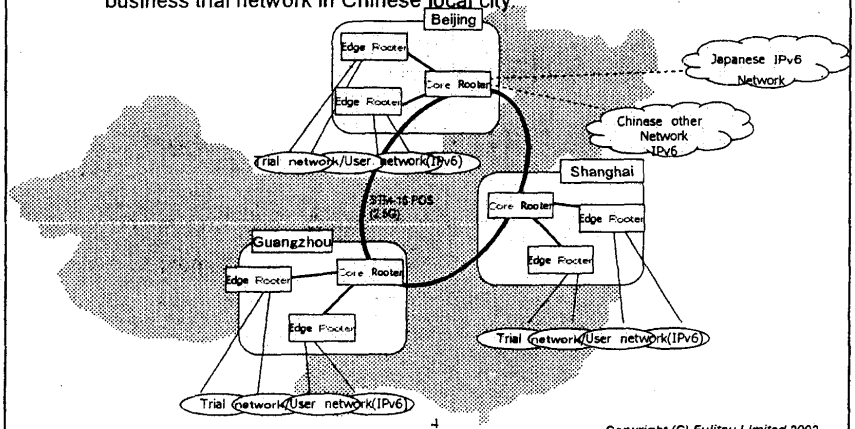
Project outline

(1) Trial Network Construction(Joint R&D Network Access) [1st Step]
(2) Joint R&D Application [2nd and 3rd Step]
(3) Joint R&D System [2nd and 3rd Step]
(4) Progressive collaboration on standardization [2nd and 3rd Step]

Trial Network Construction

(whole network construction)

Make use of existing carrier transmission network and construct IPv6 business trial network in Chinese local city.



IPv6 CHINA&JAPAN Collaboration Project

(Ministry of Information Industry)

Outline

Process: 2002.01 MII and MPM signed IPv6 MOU

2002.04 First Conference

Collaborate style: Japanese public organization and private company will corporate with C.A.T.R MII

Action plan: 2002年 Trial network construction (3places in Beijing) and operation

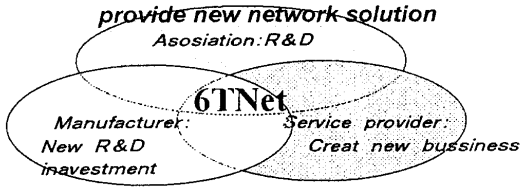
2003-2004年 Promote Research&Development various applications

* MII:Ministry of information industry
* C.A.T.R MII:CHINA Academy of tellecommunication research of MII

Trial network(6Tnet)

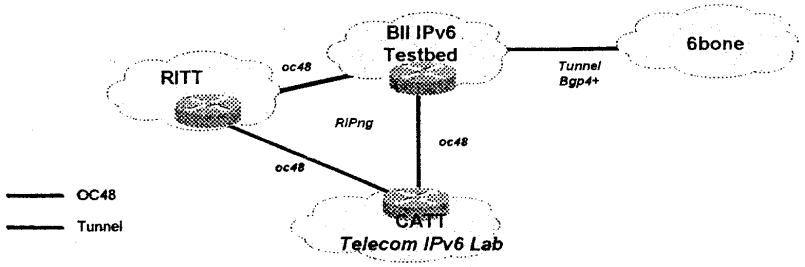
6Tnet's aim

- Break through existing internet network expectation
- Strengthen corporation with Association ,Manufacture and service provider
- Discuss about IPv6 product and service
- Make regulation to diffuse the use of IPv6 and coexistence of IPv4 and IPv6



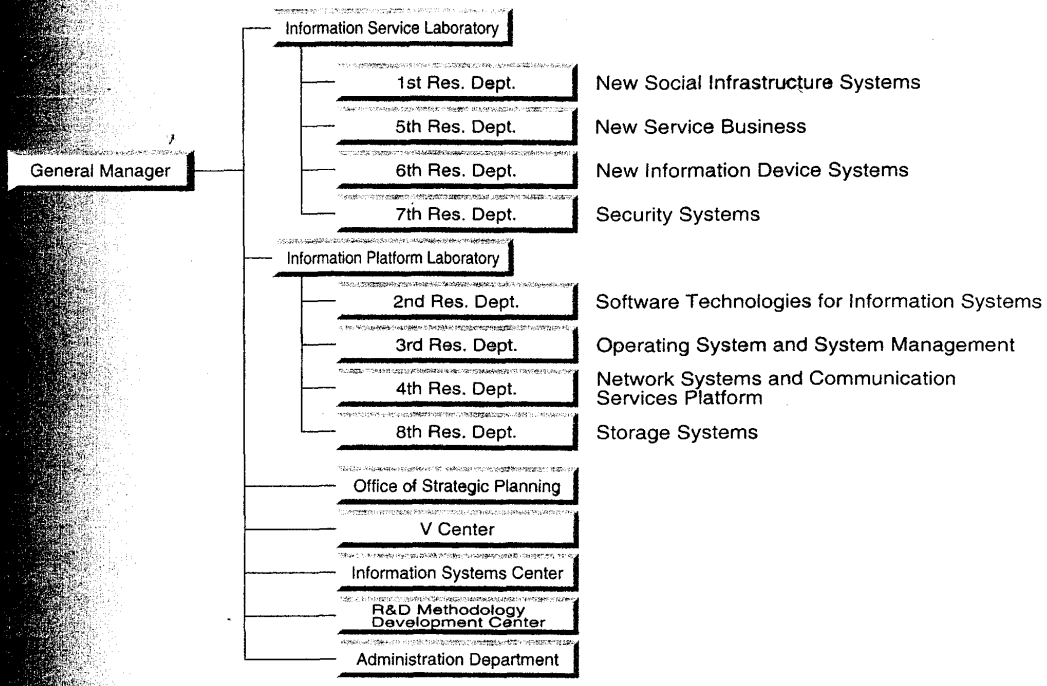
6Tnet Network topology

CATT: China Academy of Telecommunications Technology
RITT: Research Institute of Telecommunication Transmission
NGN Center: BUPT-BII NGN R&D Center

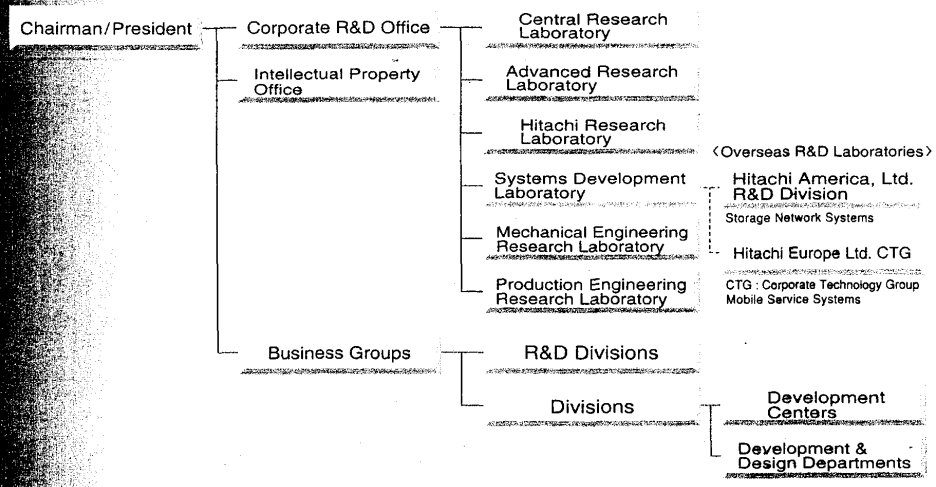


五、日立公司（Hitachi）IPv6 應用研發簡介

Organization (as of April 1, 2002)



R&D Organization of HITACHI (as of April 1, 2002)

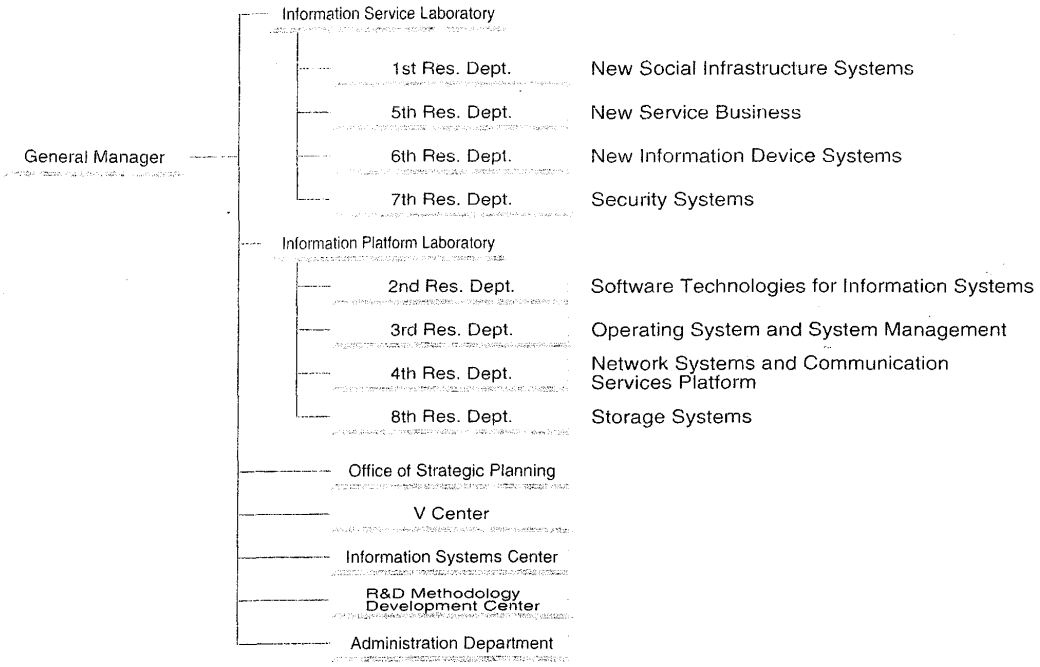


INTERNET HOME PAGE http : // www.sdl.hitachi.co.jp/

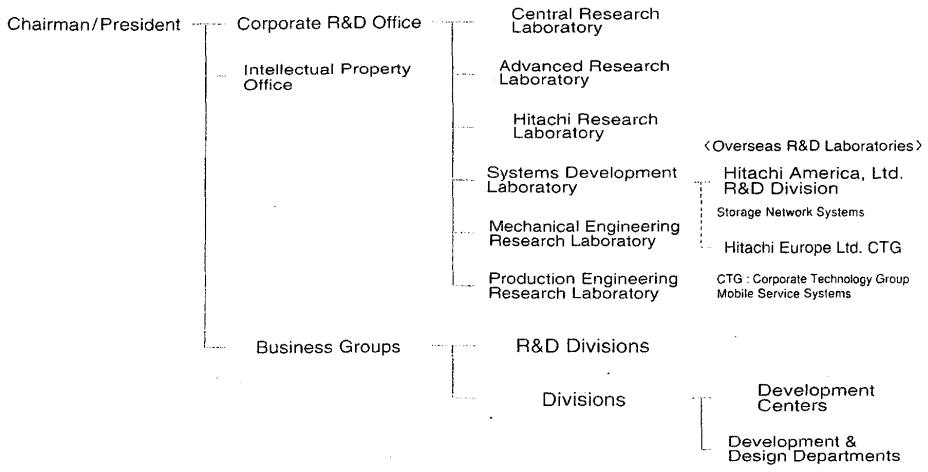
Systems Development Laboratory, Hitachi, Ltd.

Recycled Paper (36)

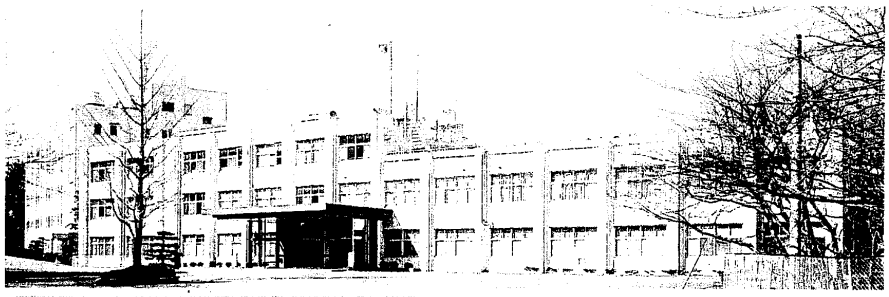
Organization (as of April 1, 2002)



R&D Organization of HITACHI (as of April 1, 2002)



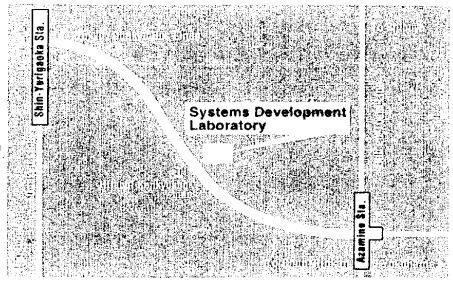
INTERNET HOME PAGE http : // www.sdl.hitachi.co.jp/

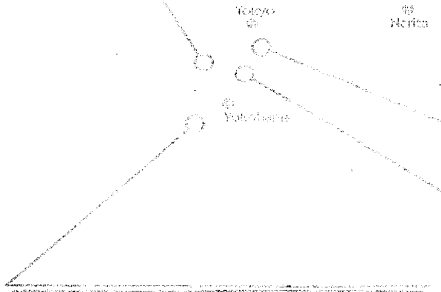


Kawasaki Laboratory

1099 Ozenji, Asao, Kawasaki 215-0013
Phone:+81-44-966-9111

- At Shin-Yurigaoka, take a bus(about 15 minutes). Take a bus for Azamino or Kenzan Sports Garden from bus stop #9 on the east side of the station, and get off at "Hitachi Kenkyusho-mae."
- At Azamino, take a bus(about 15 minutes). Take a bus for Shin-Yurigaoka and get off at "Hitachi Kenkyusho-mae."





7th Research Department Hamamatsu-cho division

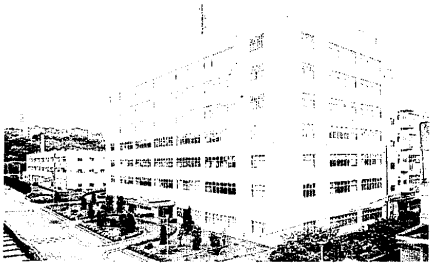
2-4-1 Hamamatsu-cho, Minato, 105-6131

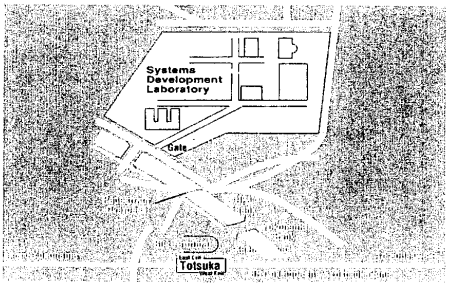
5th Research Department

890 Kashimada, Saiwai, Kawasaki 212-8567

Yokohama Laboratory

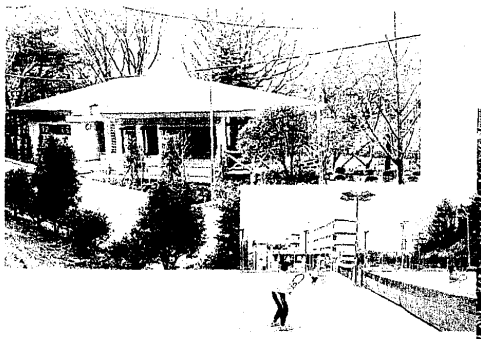
292 Yoshida-cho, Totsuka, Yokohama 244-0817





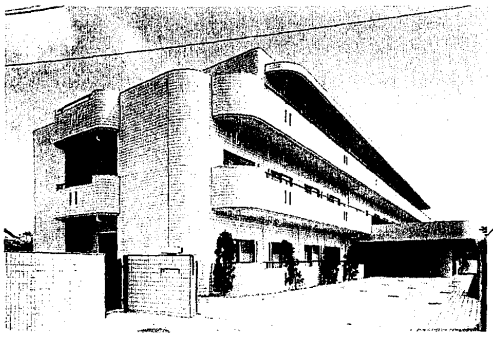
- 10-minute walk from Totsuka Station

For Bringing Comfort to Daily Living

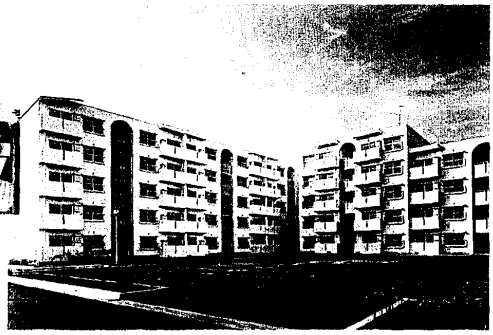


Tennis Courts & Club House

Community Lounge

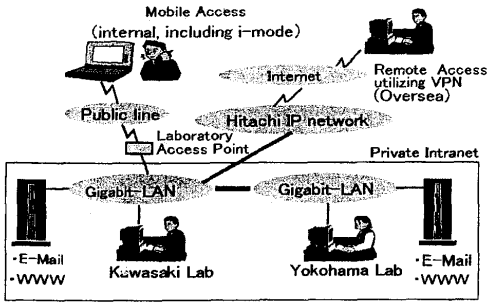


Dormitory



Company Housing

Information Infrastructure

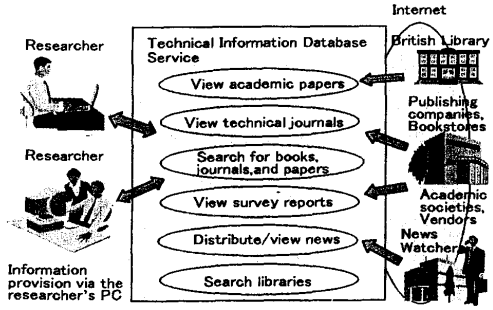


Information Infrastructure (Remote Access)

We have constructed the advanced information infrastructure such as the remote communication environment which can be remotely accessed even from home or overseas. With this infrastructure, SDL researchers can have easy access to intranet whenever and wherever they need.

WWW : World Wide Web
VPN : Virtual Private Network

※ "i-mode" is NTT DoCoMo's Registered Trademark in Japan.

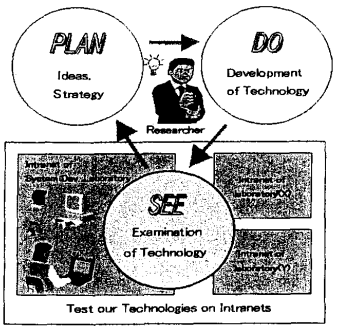


Technical Information Database Service

We provide SDL researchers with the technical information database service over the Internet to support their research activities in information technology, the field where technological innovations are rapidly made.

The researchers can instantly obtain up-to-date technical information from academic papers, market news reports, and other documents on the database by using search engines.

PC : Personal Computer



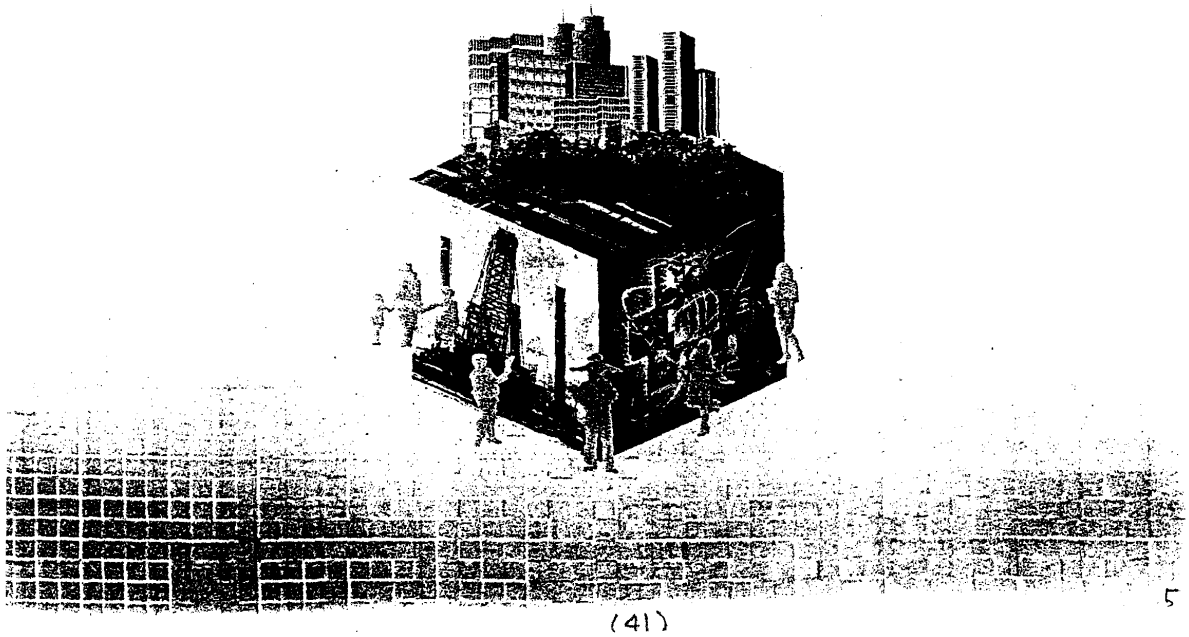
Test-bed for our Technologies

By utilizing the intranet as a test-bed, SDL researchers can examine the practicability and the operability of their technologies or prototypes. Hereby, the researchers can detect points to be improved. We now give operational tests and evaluations on web-access performance applying the web gateway-system technology and the server reliability applying Nanokernel technology on our intranet.

Provided with the practical environment for experimental tests and evaluations in their laboratory, SDL researchers can shorten the lead-time for commercial products.

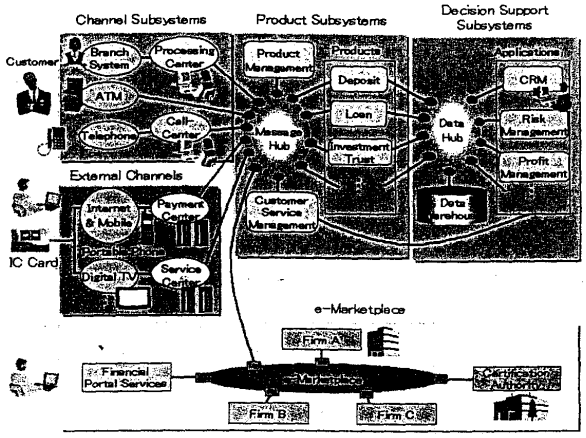
WWW : World Wide Web

System



Topics

Banking System Architecture and Applications



The diversification of the products and services of financial firms is in progress stimulated by the deregulations. On the other hand, their customer services via new channels such as internet and mobile phones play more important role.

As for financial information systems, along with the further reduction of paperwork, quick addition of new services and channels into the existing operations is indispensable. To meet this requirement, we develop the following systems:

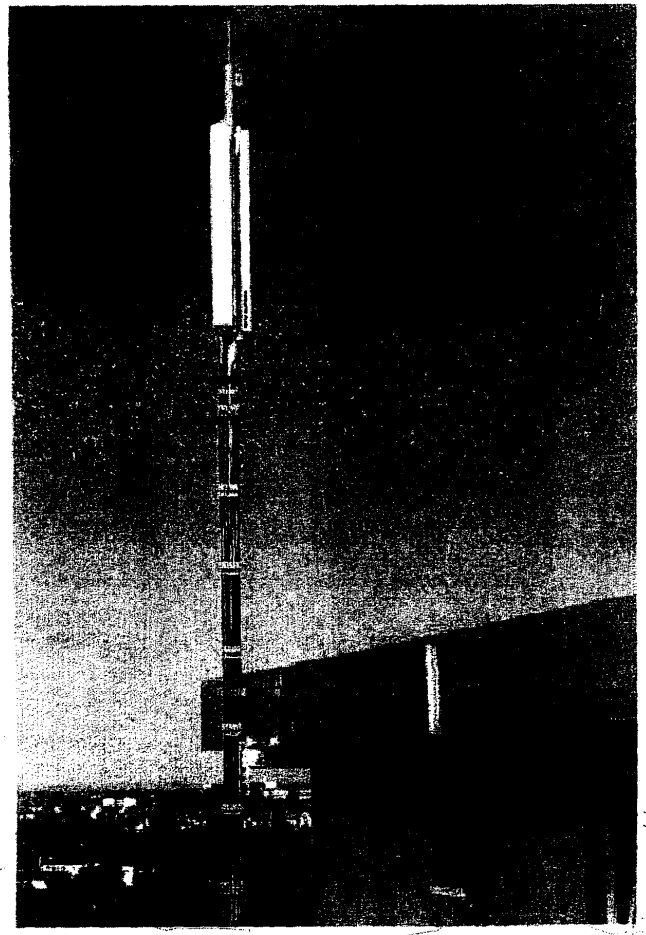
[Channel Subsystems] - Centralized processing of work at bank counters using the image processing and workflow technologies
- Mobile/TV banking system over mobile phones and digital television.

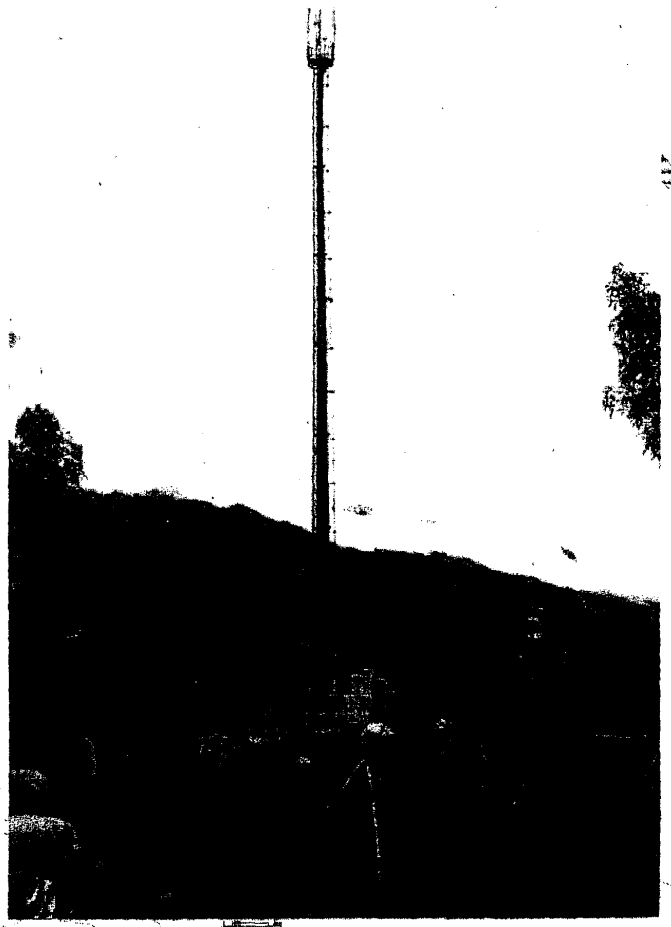
[Back-end Subsystems] - Message Hub, the platform for rapid and flexible connections between channel subsystems and back-end subsystems
- Product management that realizes multiple provision by the component-based combinations of financial products and services.

[Decision Support Subsystems] - Customer relationship management (CRM) and risk management based on the analysis of the customer information and the transactions.

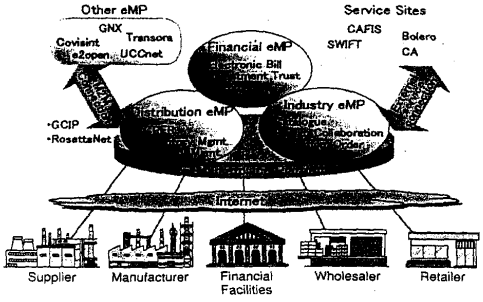
[e-Marketplace] - Authentication service and settlement service on e-marketplace

CRM : Customer Relationship Management





Distribution & Industrial System

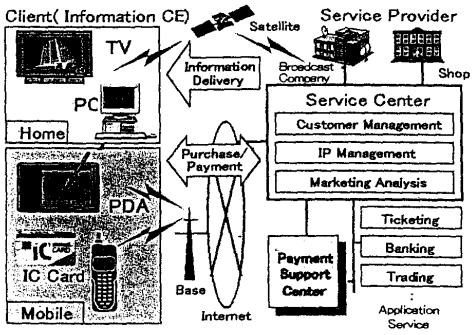


e-Marketplace Service System Technologies

With progress of BtoB EC, many e-marketplances, eMP, have been established over the Internet. We develop various technologies to realize the following functions:

1) CPFR
2) Cooperation between multiple eMP and external services such as "payment and authentication"
3) Multipurpose platform that facilitates the construction of various types of eMP.

CA : Certification Authority
CAFIS : Credit And Finance Information System
CPFR : Collaborative Planning, Forecasting, and Replenishment
eMP : e-Marketplace
GCIP : Global Commerce Internet Protocol
M2M : Market to Market
SWIFT : Society for Worldwide Interbank Financial Telecommunications

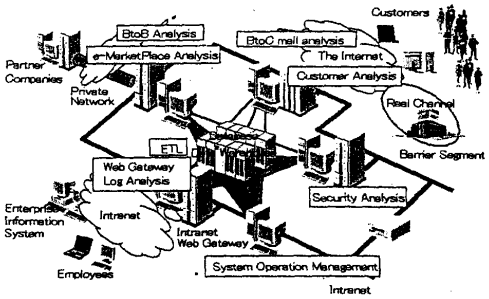


TV & Mobile Commerce System

We conduct researches and development into the service system technologies for consumers with digital broadcasts or mobile communication infrastructures.

The management technologies at service centers and the settlement technology realize more convenient and secure services such as TV Banking and Electronic Ticketing with Information Appliances.

CE : Consumer Electronics



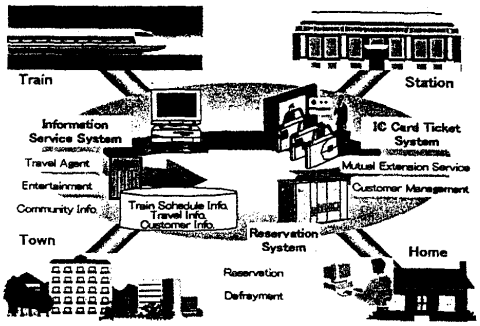
e-Business Management Technology

Information technology, IT, has realized e-business processes in many companies. Hereby, the large amount of business logs has been stored and then become available for other businesses. With the intensity of the global competition, new approaches to business improvements using business trace data are demanded in various phases of BtoB and BtoC or intra enterprises.

We conduct researches into new business applications and basic technologies to meet the demands.

ETL : Extraction, Transformation, & Loading

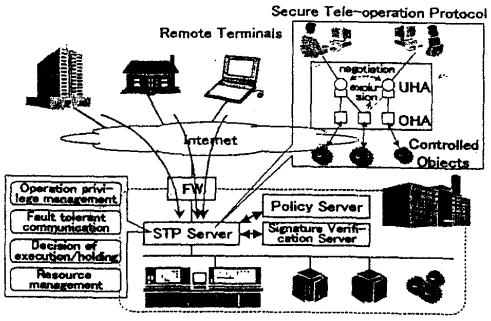
Social System



Train Passenger Service System

Many applications based on Information Technologies, IT, such as Contactless IC Card tickets have been rapidly spread to the field of transportation businesses.

We currently conduct researches into new systems to enhance the quality of passenger services such as travel agents and ticket reservation systems, which utilize personalized information and a variety of new services at stations.



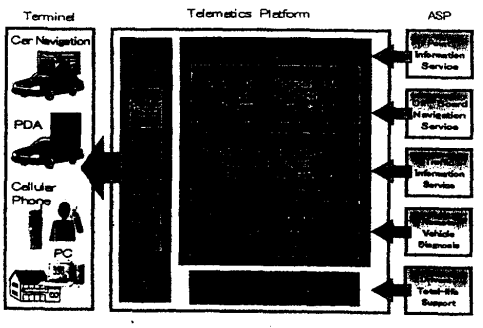
Remote Control and Maintenance Service System

We aim at the realization of the secure and reliable remote control and maintenance service systems for the integrated management and advanced diagnosis of facilities.

Whereby, we develop the secure protocol for tele-operations, the fault tolerant communication, and the service system which maintains the reliability of the remote operations.

STP : Secure Tele-operation Protocol
UHA : User-Hosting Agent
OHA : Object-Hosting Agent

※The specification of STP had been developed under the contract research from Information-technology Promotion Agency, Japan.



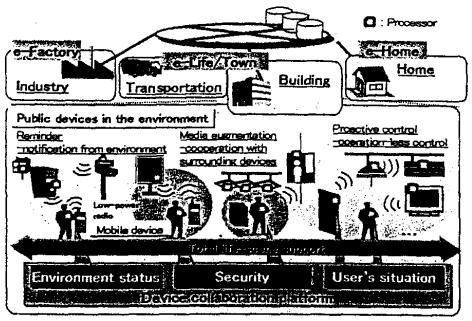
ITS/Telematics Service System

We conduct researches and development into the telematics service system which provides people with more comfortable drives.

This platform offers various services such as the "concierge" service system based on positional and personal information using voice recognition technologies, the insurance services for automobiles, and the remote vehicles diagnostic services.

PDA : Personal Digital Assistant
DSRC : Dedicated Short Range Communication
HMI : Human Machine Interface
ASP : Application Service Provider

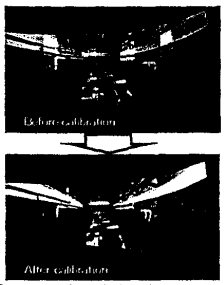
System Technology



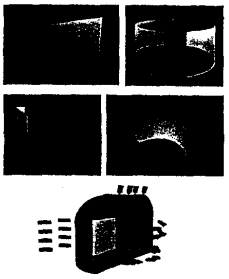
Super Distributed System

We develop the system architecture and its middleware platform aiming at context-aware service systems in the coming ubiquitous information society. This architecture makes users' private mobile devices and the devices embedded in the environment cooperate with each other depending on the situations.

The architecture has been proposed to Object Management Group, OMG, and other standard organizations.



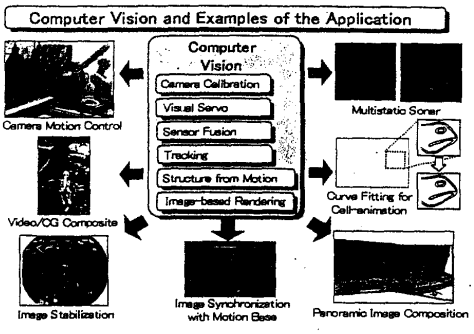
Seamless-blended and geometry-corrected image projected on a hemispherical screen



Wide variation of screen form

Visualization Technology

We develop visualization technologies including computer graphics, virtual reality, and immersive projection system. We have also achieved a super-high resolution projection system called Projector Array. This Projector Array system has been applied to various fields in the real world.

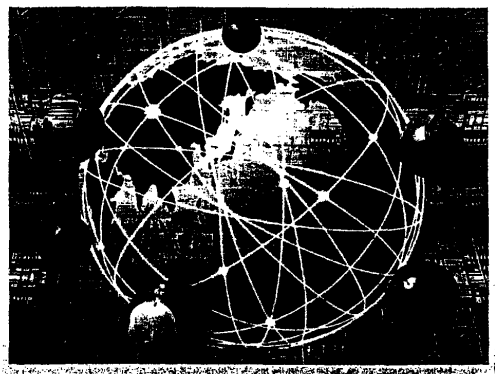


Computer Vision and Application

Computer Vision is a fundamental technology to recognize and extract information from images by using technologies such as image processing, statistical method, and projective geometry. We conduct researches into this technology from the both theoretical and practical aspects.

CG : Computer Graphics
VR : Virtual Reality

Network



DGT

壁掛型基地台

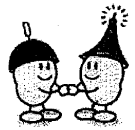
通常架設於人口更密集，
建築物阻隔更多之市區。

- 壁掛型貼牆式基地台
- 壁掛型延伸式基地台

9(c)

壁掛型貼牆式天線基地台

因人口高度聚集，故架設數量多，通常為微細胞型基地台。



●香港市區

●澳洲雪梨商業大樓

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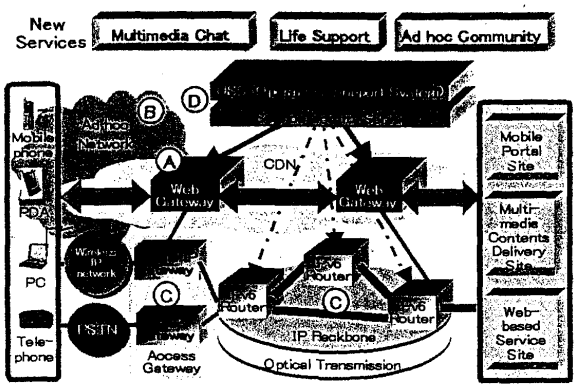
Topics

Next-generation Internetworking Technology —Active Network—



To realize a dependable IP-based network system as a social infrastructure, the development of next-generation internetworking technologies as an integration of communication and information processing is one of the most important missions of our laboratory.

This includes;

(A) Web Gateway System technology that enables highly scalable and QoS guaranteed CDN (Contents Delivery Network) by distributed gateway servers with intelligent caching and congestion control functions.

(B) Ad hoc networking technologies that provide flexible and local area communication services among wireless terminals such as mobile phones and PDAs.

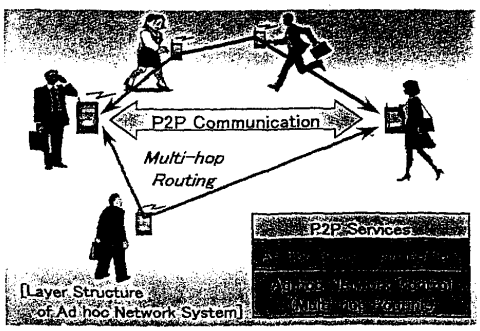
(C) IPv6 enabled Gigabit Router and Access Gateway technologies that provide QoS guaranteed network services.

(D) Service control and management technologies that enable network administrators to define flexible networking policies and enforce them on networks of heterogeneous equipment, e.g., IP routers, Storage Area Networks, applications such as accounting and billing, and Web Gateways comprising corporate and/or provider networks.

As the significance of national and global collaboration grows, a number of joint research and development activities are going on: partnerships with foreign research institutes, participation in national projects, and sponsoring of the International Working Conference on Active Networks (IWAN).

OSS : Operations Support System
IP : Internet protocol
VoIP : Voice over IP
PDA : Personal Digital Assistant
PSTN : Public Switched Telephone Network
QoS : Quality of Service
SAN : Storage Area Network

Network Platform



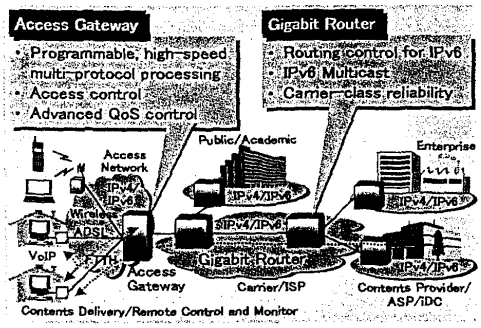
Ad hoc Network System

We conduct researches on Ad hoc network technology, which realize dynamic and flexible P2P based network links among mobile communication terminals. This technology may drastically change the wireless network architecture and create new mobile services.

We have established a joint research project with Eurecom research institute in southern France.

P2P: Peer to Peer

△ standards :

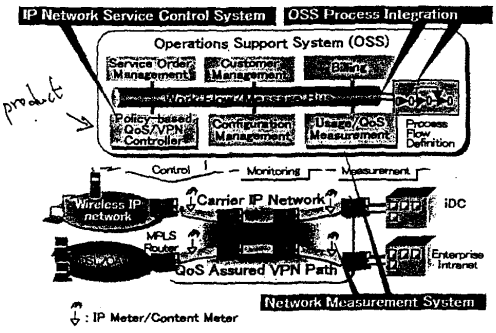


IPv6 Network Platform

IPv6 technology is expected to accelerate the formation of the advanced information communication network infrastructure which supports various information services with security and safety.

We are working on the development of the technologies of Access Gateways and Gigabit Routers to provide seamless internetworking between IPv6 and IPv4 based networks, and to support smooth transition to fill IPv6 based services.

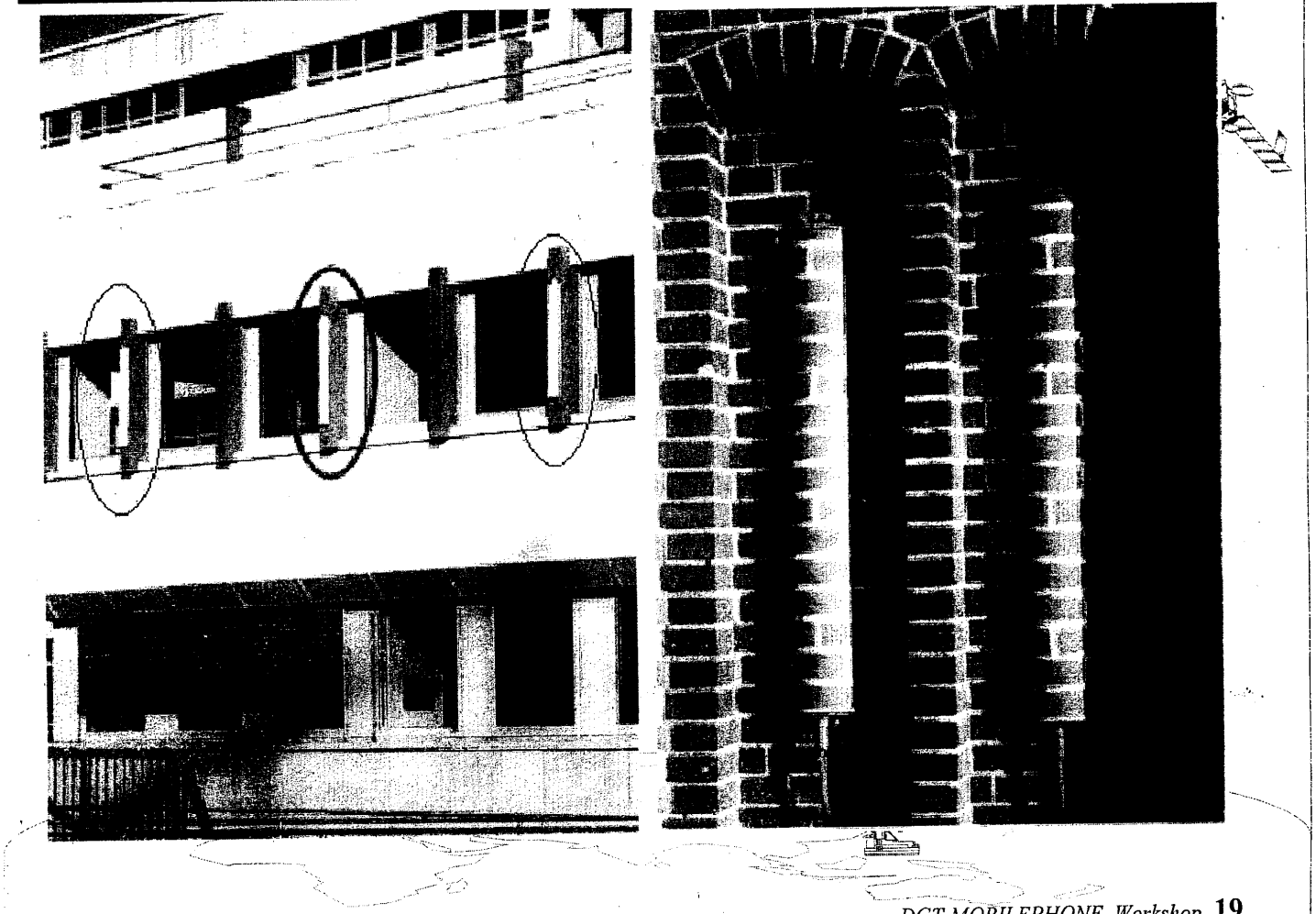
ADSL : Asynchronous Digital Subscriber Line
ASP : Application Service Provider
FTTH : Fiber To The Home
iDC : Internet Data Center
IP : Internet Protocol
ISP : Internet Service Provider
QoS : Quality of Service
VoIP : Voice over IP



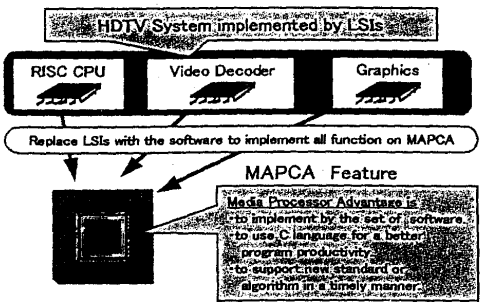
IP Network Operations Support System

We develop IP network service control and management technologies that include a high precision QoS measurement system and system integration technology to realize the improvement of the service quality, the shorter lead time for a new services, and the efficiency of the operation of carrier scale networks.

QoS : Quality of Service
VPN : Virtual Private Network
MPLS : Multi Protocol Label Switching
ADSL : Asynchronous Digital Subscriber Line
CATV : Cable TV
IDC : Internet Data Center
OSS : Operations Support System



Client

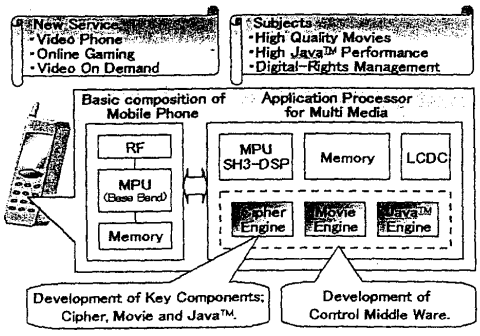


Media Processor, "MAPCA"

We conduct researches into VLIW architecture dedicated to media processing to meet the platform requirements in coming broadband communication era. The media processor MAPCA with the VLIW architecture enables full software-based HDTV decoding. With this cutting edge technology, we won R&D 100 Award and Best Media Processor Award in the U.S. in 2001.

MAPCA is now widely used as a commercial product in digital media products such as STB, video surveillance systems, video-conference systems, and printer controllers.

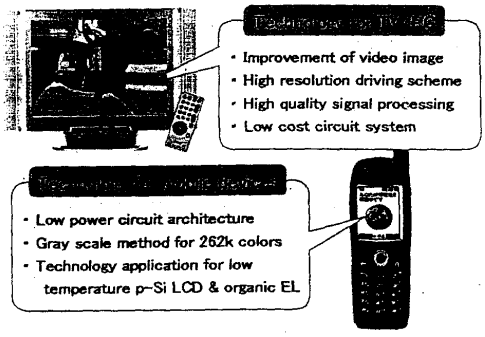
MAPCA : Media Accelerated Processor for Consumer Appliances
VLIW : Very Long Instruction Word
HDTV : High Definition Television
STB : Set Top Box
LSI : Large Scale Integration



System LSIs Solutions

To meet the demand in implementing new services on PDAs and mobile phones, we develop key LSI technologies such as cryptographic processing and JPEG/MPEG decoding modules designed as system LSI on-chip components, and also Java™-based middleware that controls the whole system by real time synchronization of the hardware/software components.

DSP : Digital Signal Processor
LCDC : Liquid Crystal Display Controller
MPU : Micro Processing Unit
LSI : Large Scale Integrated circuit
PDA : Personal Data Assistant
RF : Radio Frequency



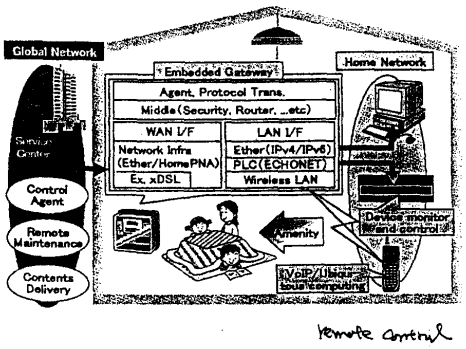
Flat Panel Display Technologies

Hitachi has value-added FPD products such as high quality large-sized LCD for TV/PC monitors, low power small-sized LCD, and organic EL for mobile devices.

To keep our technology advantages, we conduct research and development on the new LCD pixel structure for sharper and brighter images, the driver LSIs for lower power and higher performance, and the total FPD system architecture.

FPD : Flat Panel Display
LCD : Liquid Crystal Display
EL : Electro Luminescence

New Network Service

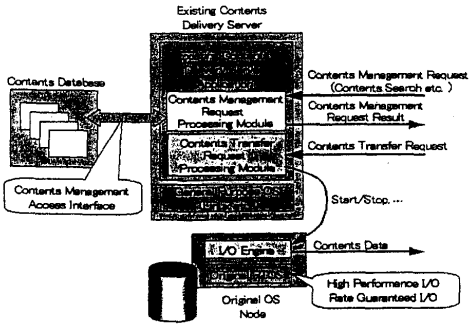


Home Network

We develop system management technology for home network services by controlling home appliances from the Internet.

The services are provided by Residential Gateway servers with IPv6-enabled networking over wireless LAN or Power Line Communication links. Services for remote maintenance and energy conservation are implemented with agent technologies to realize secure and comfortable daily life.

PLC : Power Line Carrier
VoIP : Voice over IP
ECHONET : Energy Conservation and Homecare Network
xDSL : x Digital Subscriber Line
PNA : Phone line Networking Alliance



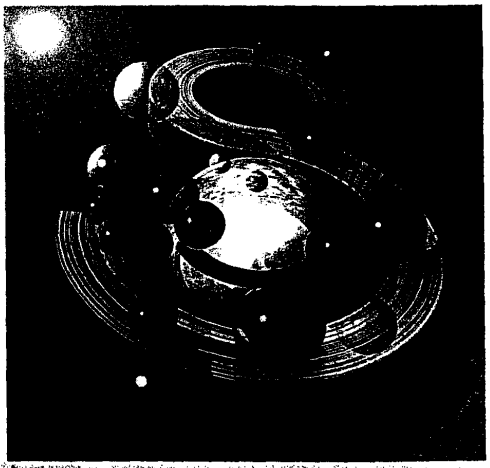
Contents Delivery Technology for Broadband Networks

The demand for High-quality stream data delivery services has been increasing along with the popularization of the technologies for broadband networks.

We realize such services by developing the high-performance content delivery system. The system improves the existing content delivery service by using our original real-time operating system and realizes about tenfold increase of the initial performance with guaranteeing the quality of the content data delivery.

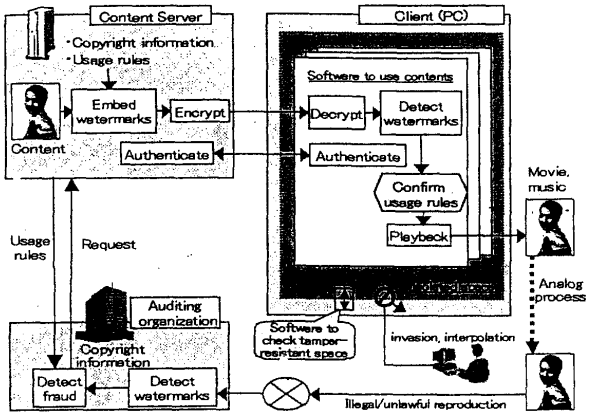
OS : Operating System
RTOS : Real Time Operating System
QoS : Quality of Service

Security



Topics

Copyright Management Technology



We have developed the digital watermark technology that detects unauthorized copies of contents such as images, movies, or texts by embedding the copyright information into the contents themselves.

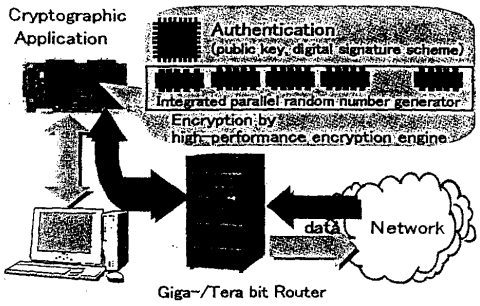
The embedded information is invisible to human eyes but can be detected by computers. It can be detected even after being processed in various ways such as JPEG/MPEG digital compression and the analog processing by printer output or scanner input.

We also develop the tamper-resistant software that creates an isolated space in a PC to detect watermarks. In addition to these new technologies, we study the methods to protect copyrights by combining encryption and authentication technologies through the activity of the content ID forum.

JPEG : Joint Photographic Experts Group
MPEG : Moving Picture Experts Group

16

Security Platform

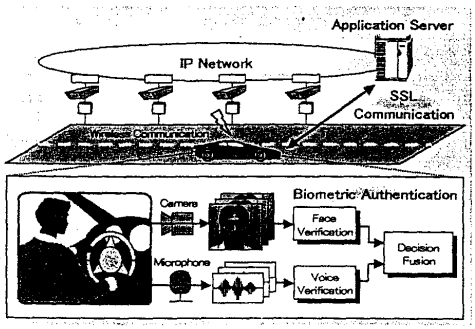


Cryptography

We conduct researches into the following technologies:

- Symmetric-key encryption realizing hardware-implemented high performance
- Public-key cryptosystems with the logically proved security
- Digital signature scheme
- Threshold signature scheme based on cryptographic secret-sharing

These technologies have been applied to network devices and crypt software libraries and are used to safeguard the data and the privacy.

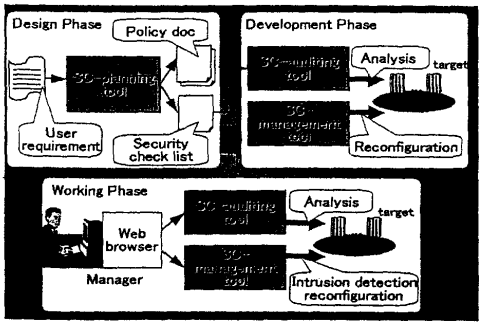


Biometric Authentication Technology

Secure and convenient user authentication is demanded for E-commerce and E-government. The authentication based on biometrics such as fingerprint has advantages on the security over smart cards and passwords. To improve the security and the convenience, we develop the multi-modal biometric authentication technology that combines multiple information on biometrics.

With our technology applied to ITS, we conduct researches into handsfree authentication systems for drivers.

ITS : Intelligent Transportation System
SSL : Secure Sockets Layer



Security Management/Evaluation

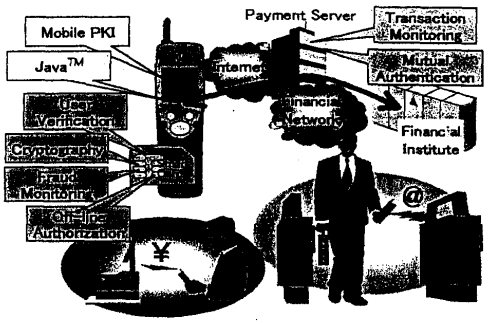
To provide users with efficient security management services, security tools need to be used in each phase of the security management cycle.

We conduct researches and development into the security management/evaluation technologies using security evaluation tools in conformity to CC/ISO17799 and apply them to security management tools.

SC : Secure Cycle
CC : Common Criteria
ISO : International Organization for Standardization

47

Application System

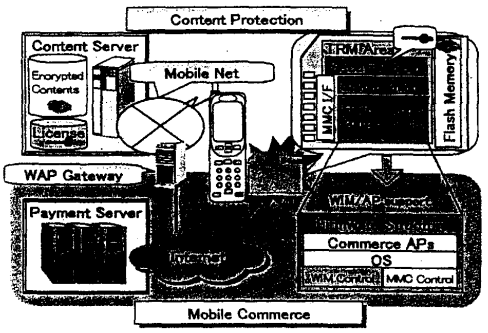


Secure Mobile Commerce Technology

Japan became the world's first country which introduced the commercial third generation, 3G, mobile services. The 3G mobile phones like GSM phones are equipped with smart cards which are capable of protecting security sensitive data and programs from fraud attacks.

We develop secure mobile payment technologies enabled by the smart cards such as off-line user verification, fraud transaction monitoring, and other secure transaction functions. Our technologies will enable you to buy anything at anytime and place.

PKI : Public Key Infrastructure
GSM : Global System for Mobile Communication

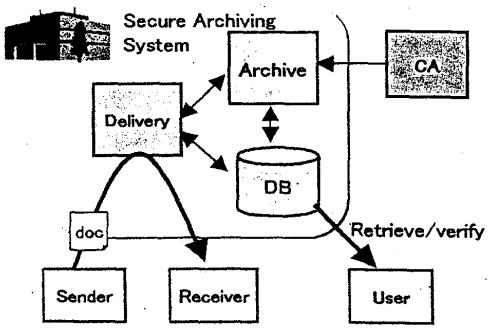


Secure MultiMediaCard

The newly developed MultiMediaCard, SecureMMC, for content protection is completely compatible with standard Flash memory MultiMediaCards. The SecureMMC corresponds to "Super Distribution" which enables encrypted contents and licenses used for the decryption to be distributed separately through different channels or at different times.

This technology has the security functionality based on the sophisticated Public Key Infrastructure, PKI, and is also usable for Electric Commerce applications.

PKI : Public Key Infrastructure
TRM : Tamper Resistant Module
WAP : Wireless Application Protocol
WIM : WAP Identity Module



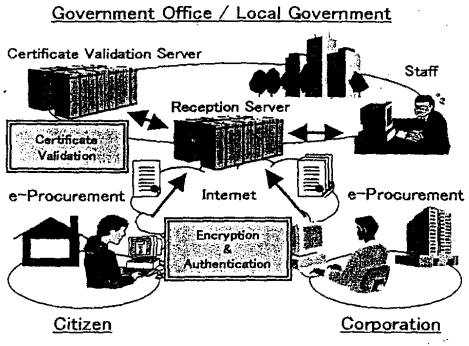
Secure Archiving System

We have developed the document archiving system that securely delivers and stores electronic documents through the Internet. The authenticity of the data will be assured by the notary function of this system. The system employs security technologies like electronic signatures to retain the genuineness and authenticity of electric files.

This system will be more effective for private companies like financial institutes and public offices which aim at the realization of electronic government.

CA : Certification Authority

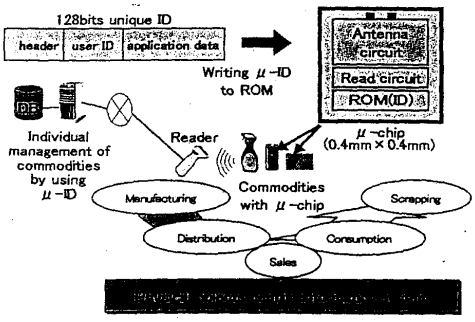
Security Solution



Electronic Government System

The system that enables government and other public offices to process application and registration electrically via Internet is further developed.

We conduct research and development into the infrastructure for secure administrative procedures by using cryptographic technologies.



Digital Tracking Information System using micro RFID

We develop the physical objects centric information system by using micro RFID which can be watermarked into paper. Tracking of any kind of commodities, from their manufacturing to the scrapping, makes it easy to control their quality, security and cost.

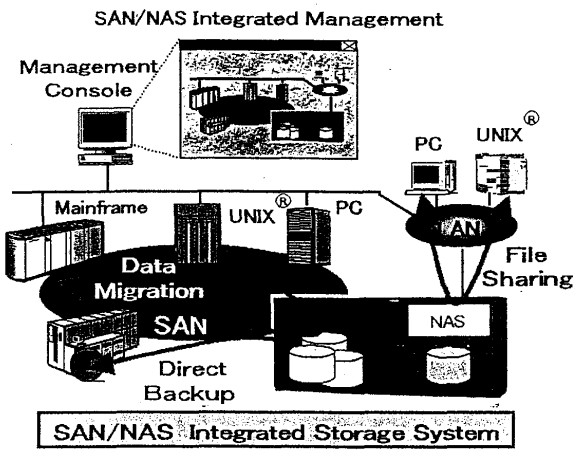
RFID : Radio Frequency Identification
ID : Identification
ROM : Read Only Memory

※ "μ-chip" is the trademark of HITACHI Ltd. in Japan and other countries.

Platform

Topics

SAN/NAS Integrated Storage System



SAN/NAS Integrated Storage System efficiently manage the explosive growth of the data size putting the all data in the Storage System.

Information Systems using Storage Area Network (SAN) have been rapidly deployed to manage the explosive growth of the data size. Consolidating the data to a very large centralized storage connected to servers via SAN can significantly simplify the system and thus reduce TCO.

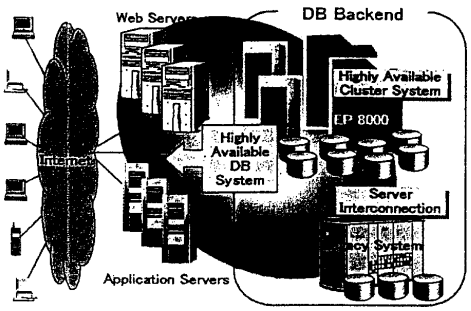
In the same context, for data sharing in LAN environment, Network Attached Storage (NAS) has become popular. Currently, we are under the development of SAN/NAS Integrated Storage System, which offers high speed backup and data migration on IP Networks.

SAN/NAS Integrated Storage System with the sophisticated management software will establish a basis of data-centric information systems in the Internet era.

SAN : Storage Area Network
NAS : Network Attached Storage
TCO : Total Cost of Ownership

※UNIX is a registered trademark in the U.S.A. and other countries, licensed exclusively through X/Open Company Limited.

Enterprise System

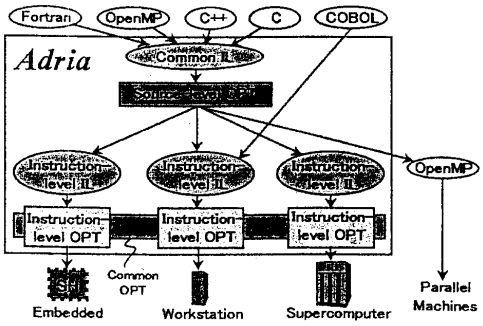


Enterprise Servers

The globalization of business activities drives the shift toward 24x7 business style and requires extremely reliable information systems.

To provide the feasible IT solution to meet this demand, we focus on the research and development of the highly available DB system using multiple EP8000 high-performance enterprise servers.

DB : Database

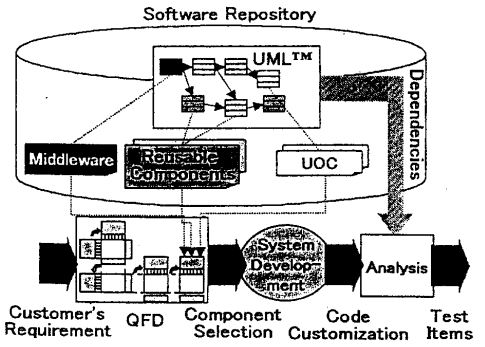


Compiler Technology

Compiler technology is a key to achieve maximum performance in modern computers. We conduct researches into various optimization techniques for Hitachi's multi-language/multi-platform common compiler framework, Adria.

Our researches range from the source-level optimization such as automatic parallelization and loop restriction to the instruction-level optimizations such as fine-level parallelism exploitation.

Adria : Advance Compiler for RISC Architecture
IL : Intermediate Language
OPT : Optimization



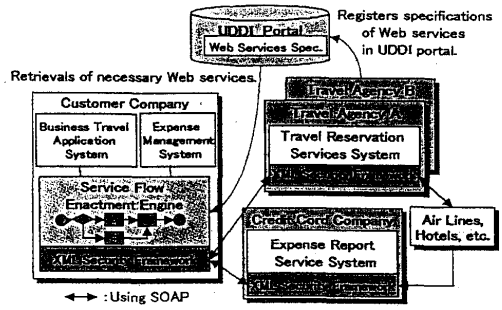
Software Engineering

Efficient and flexible software-development methodologies are inevitable to improve the system quality and to reduce the cost.

We have developed both development methodologies and environments to make software components reusable, such as source code change management and efficient software test process control.

QFD : Quality Function Deployment
UML : Unified Modeling Language
UOC : User Own Code

Middleware

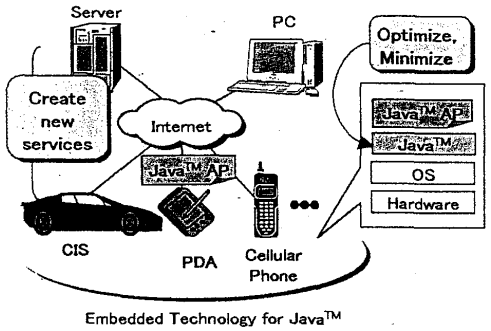


Web Services Platform Technologies

Web Services are computer software applications provided as services via the Internet.

To archive practical and reliable Web services such as electronic commerce, we develop Web services flow description tools and execution control engines, XML security application framework, and integration methods for Web services systems.

SOAP : Simple Object Access Protocol
XML : eXtensible Markup Language
UDDI : Universal Description, Discovery and Integration

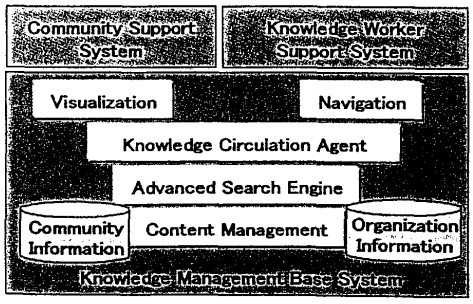


Java Technology for Embedded Systems

We conduct researches and development into new services that enable us to take full advantage of Java™ technology. Our JavaVM is optimized for embedded systems such as mobile phones, PDAs, and embedded controllers.

Our technologies achieve worlds top level performance especially on Hitachi's Super-H series microprocessors.

PDA : Personal Digital Assistant
AP : Application
OS : Operating System
CIS : Car Information System
PC : Personal Computer
JavaVM : Java Virtual Machine

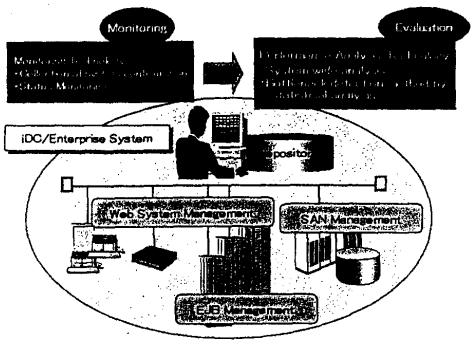


Knowledge Management System

We make researches in knowledge management systems such as knowledge distribution agents, intelligent search engines, sophisticated process navigation, and knowledge visualization.

Using these technologies, we have developed many practical knowledge-based applications that include community support systems and knowledge worker support systems.

System Management



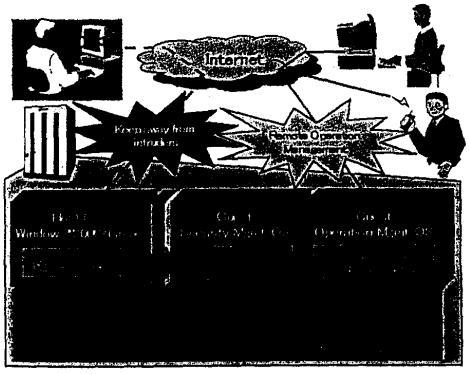
Integrated System Management

Service level management is the key technology for iDC, ASP, and especially for 'e-business' centric institutions.

We develop this technology to realize efficient maintenance of the proper service level such as the response time and the system availability. With this technology, we manage not only the information system itself but the service quality produced by the information system.

Our research field covers multiple layers of the management system. For example, we do researches into management infrastructures like 'Repository', unit/function management like 'Application Management' and 'SUN Management', and web system total management to develop software tools and consulting methods.

iDC : Internet Data Center
ASP : Application Service Provider
EJB : Enterprise Java™ Beans
SAN : Storage Area Network



Reliable and Highly Available DARMA Nanokernel

DARMA Nanokernel is the technology that enables multiple OS to run independently and concurrently on a single PC. It enhances the functionality of PC in many ways by adding a guest OS to an original host OS. The major enhancements are as follows:

1) It realizes higher reliability and enhance novel operation management functionality by adding a guest OS which can keep running even when the host OS crashes and stops.
2) It realizes higher security level by adding a guest OS which can be completely hidden from the host. This makes it difficult for intruders from the Internet to harm the host OS.

DARMA Nanokernel is our new software technology and plays a key role in the improvement in PC functionalities.

DARMA : Dependable Autonomous Real-time Management
Mgmt. : Management

六、富士通公司（FUJITSU）IPv6 應用研發簡介

FUJITSU

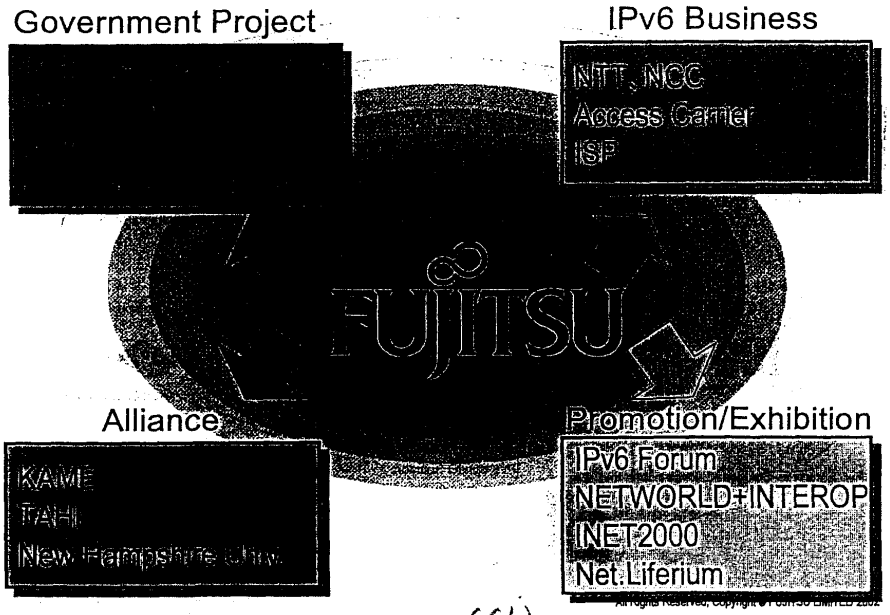
Fujitsu's IPv6 Activities

December 16, 2002

Fujitsu Limited

Fujitsu's IPv6 Activities (Summary)

FUJITSU



Brief History of Fujitsu's IPv6 activities

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Technology Development/Product Development

- Fujitsu started in 1996 (Proprietary technology)
- Has Joined KAME project (1998～)

Participation in the Interoperability test

- With Fujitsu router at the New Hampshire University (1996, 1997)
- With Fujitsu router with the TAHI project (1999, 2000,2002)
- Joined WIDE 6bone network (1997～)
- Built an internal experimental network for IPv6(1998～)
- Obtained IPv6 addresses (2000/6)

Exhibitions

- Router: NETWORLD+INTEROP Tokyo(1996/1997/2000～2002), INET20(

Other

- Member of IPv6 Forum

Fujitsu's IPv6 Network Solutions

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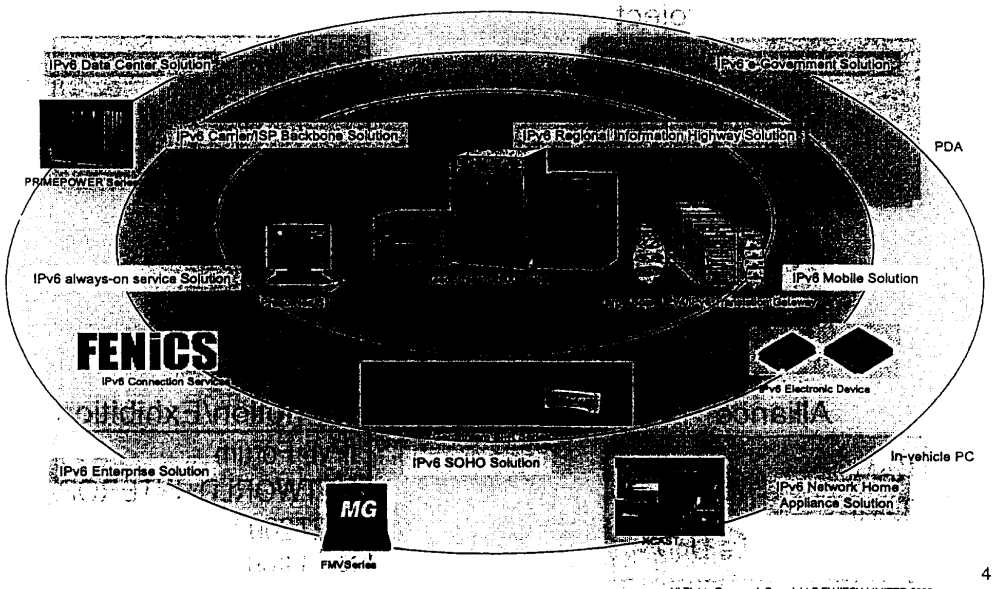

Fujitsu's IPv6 Products

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□:Supported, ◇:Planning

GeoStream R900 Series

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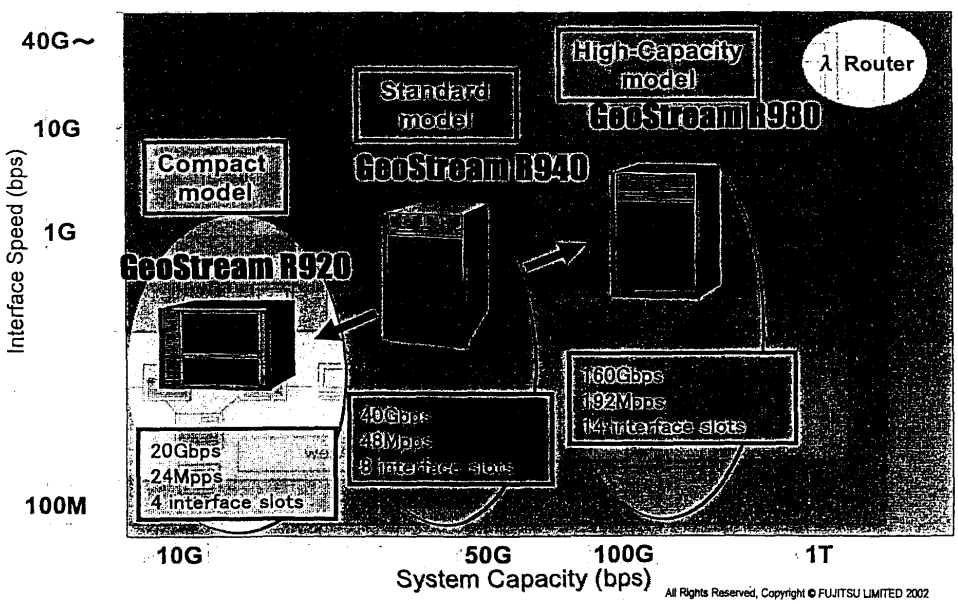

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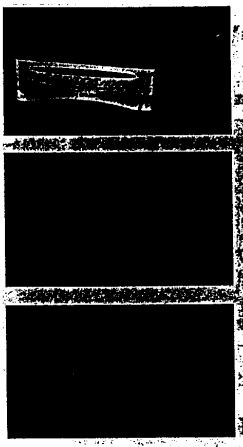
IPv6 Access Router **GeoStream** Si-R Series



■GeoStream Si-R300/330
- 100BASE-FX, ATM25, ISDN-PRI/BRI (2 slots option)
- 10/100BASE-TX 2 / 4 separate ports

■GeoStream Si-R150/170
- 10/100BASE-TX
- 10BASE-T with internal 4 ports HUB / 10/100BASE-TX

■GeoStream Si-R130
- ISDN BRI
- 10BASE-T with internal 4 ports HUB
- Internal DSU, Analog 2 ports

■IPv6 Functions
- IPv6 Packet Forwarding
- Plug & Play (Automatic Address Allocation)
- PPP/IPv6CP
- RIPng

- IPv6 over IPv4
- Packet Filtering
- PPPoE

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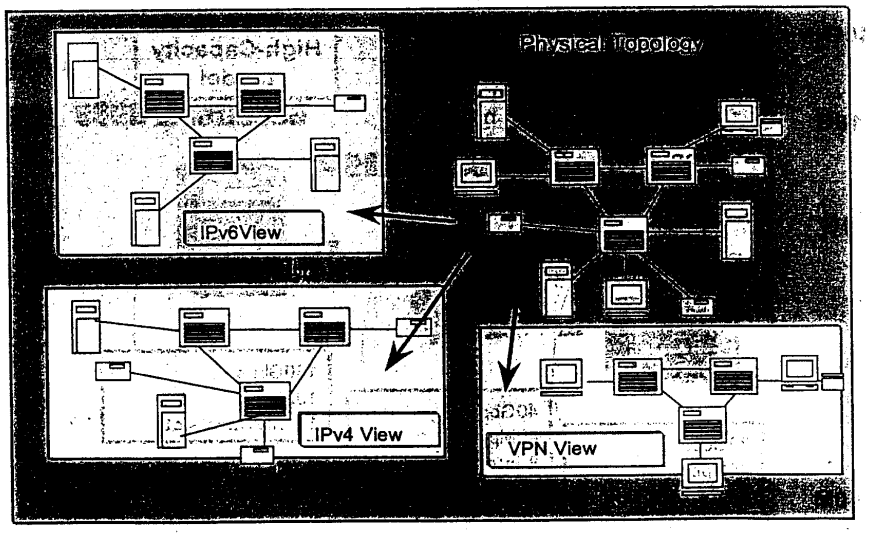
Service/Network Management System for IPv4/IPv6 mixed-traffic environments (Proactnes/SN)



Service overlay network management with multi-view

GeoServe Service Network

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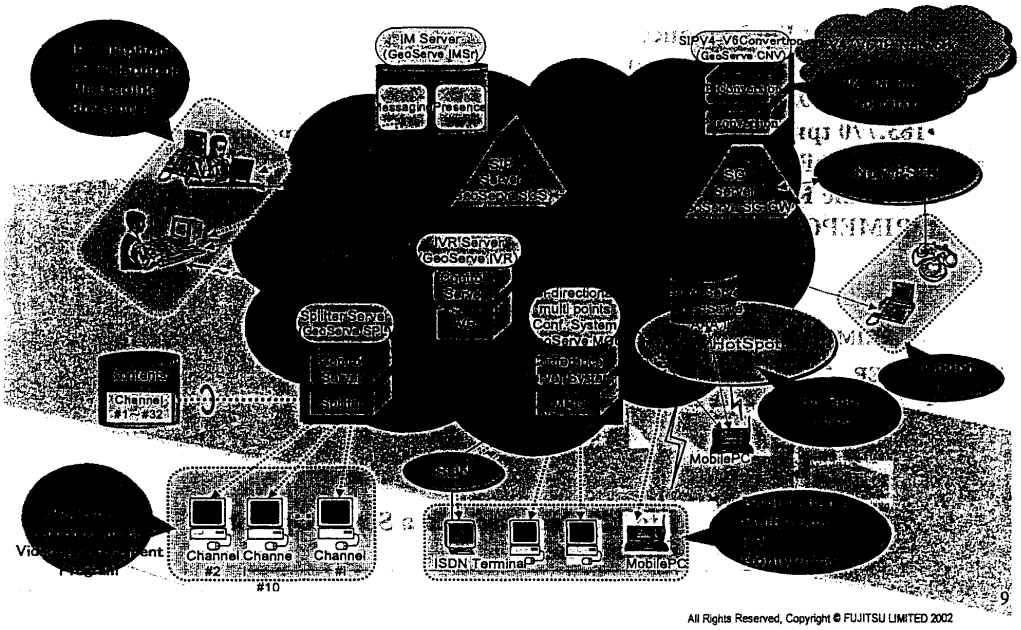

Summary of Server Types

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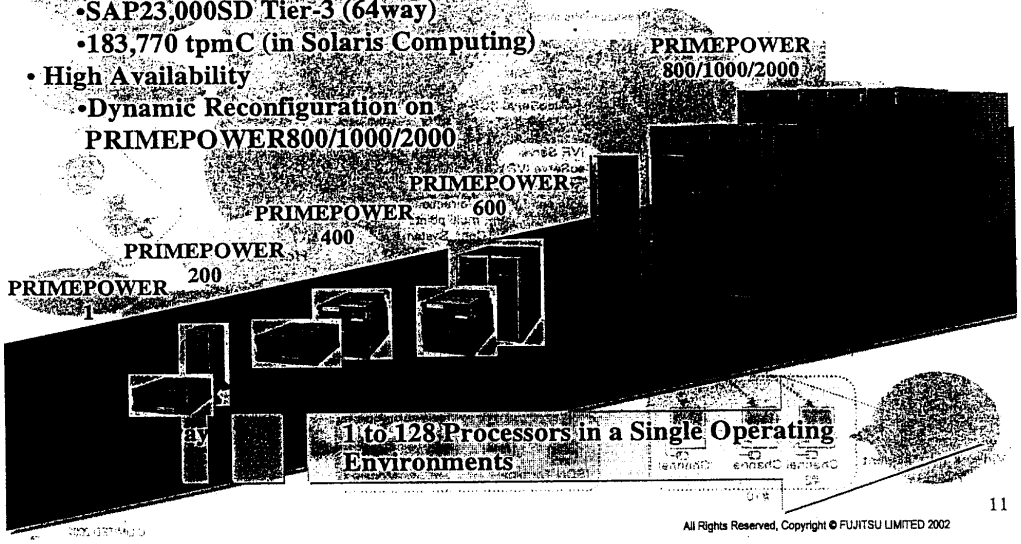
Server Type	Functionalities
GeoServe SCS(SIP Server)	SIP Proxy, Location Management, Core Server of VOIP Network with Call Control features. Support OPEN APIs (JAIN, Parlay) for easy application development and implements carrier grade maintenance features.
GeoServe SGS(SG-GW Server)	Gate way server that enables interoperations between Switched Circuit Switches and Voice. Supports No.7 Termination features, MG control Features (H.248), SIP server Interwork Features.
GeoServe IVR (IVR Server)	Voice Accumulation.Voice Answering Server. Possible to send Tone, Voice Messages, Variable length messages IP subscribers, Switched circuit Subscribers and also voice Interaction. Provides a SIP interface to be controlled via SG-GW server and SIP serer.
SIP V4/V6 Conversion Server	Server that enables to interoperate between V4 domain and V6 domain(SIP,UDP,TCP)
GeoServe IMS(IM Server)	Supply Messaging (1to 1Chat), Presence for Instant Messaging (IM) Service. Support Selected Acceptance and Rejection as a group feature.
GeoServe MCU (Multi Conference Unit)	Provides TV Phone and TV conferencing service. Support PC base 3 to4 person TV conferencing. Support over 10 virtual conference rooms(Server) to accommodate small group meetings easily.
GeoServe SPL (Splitter Sever)	For CDN(Content Delivery Network), provides high speed/multi layer data delivery for multiple clients by providing Unicast live streaming at hardware level (Use Intelligent NIC card that has IP process specific Comet processor)
GeoServe AAA(Authentic)	Supports MAC Authentication/ IEEE8.02x(EAP authentication) for users of Wireless LAN system users. Supports both Proxy Authentication & Home Authentication features.

PRIMEPOWER Line-up

FUJITSU

- World-Fastest Performance
  - •SAP430SD Tier-2 (8way)
  - •SAP23,000SD Tier-3 (64way)
  - •183,770 tpmC (in Solaris Computing)
- High Availability
  - •Dynamic Reconfiguration on PRIMEPOWER800/1000/2000



UniX. Server

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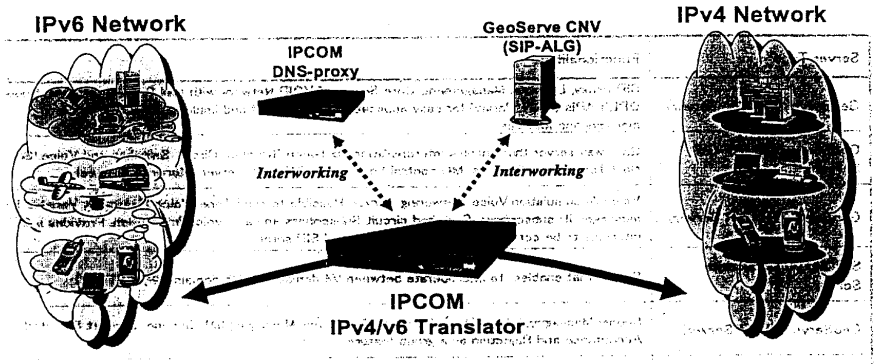
IPv4/v6 Translator & DNS-proxy (IPCOM series)



- **Bidirectional address translation between IPv4 and IPv6 network.**
  - ➢DNS-proxy interworking
    - => WWW, FTP, Telnet, E-mail, ...
  - ➢GeoServe CNV interworking
    - => VoIP (SIP)
- **Translation functions**
  - ➢NAT-PT, SIIT, TRT, ALG

- **High Reliability**
  - ➢Load balancing of Translator
  - ➢Hot-standby
  - ➢Redundant NIC (Dual port Gigabit NIC x 2)
- **Scalability**
  - ➢Non Stop adding to Translator group

Interstage Security Director (Firewall)

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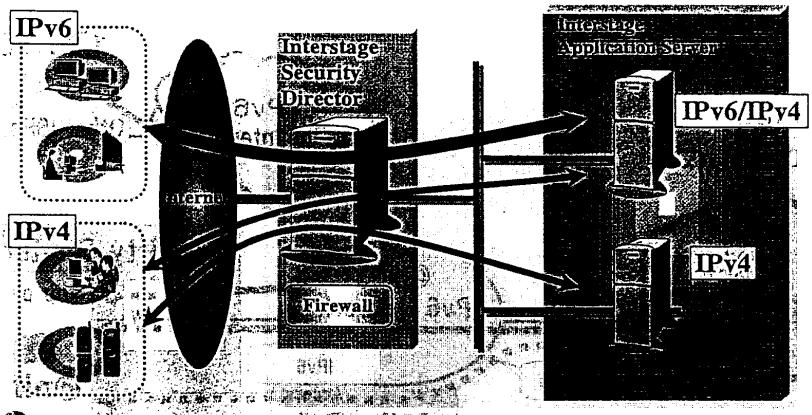
■ Enterprise systems can be constructed using IPv6 (IP Version 6)



Simultaneous communication with IPv6 clients and IPv4 clients

- ◆ Can be used in environments that contain a mixture of IPv6 and IPv4.
- ◆ Existing network assets can be used without alteration to connect to IPv6

Service/Network Management System for IPv4/IPv6 mixed-traffic environments (Systemwalker series)

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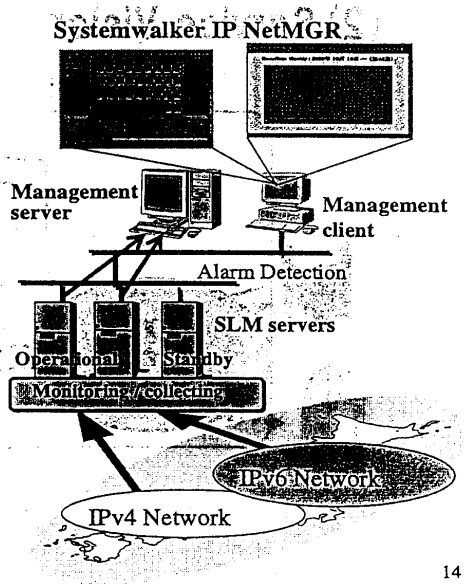
Systemwalker series
Leading management software products in the Japanese enterprise market

IPv4/IPv6 Service Level Mgt
Availability & response time monitoring are provided by Systemwalker IP NetMGR

Systemwalker IP NetMGR
Designed for IP service level management and has following features:
- SLA monitoring
- Flexibility and Scalability
- Non-stop monitoring
- Network operation status reporting



SLM : Service Level Management

service agreement

(64)

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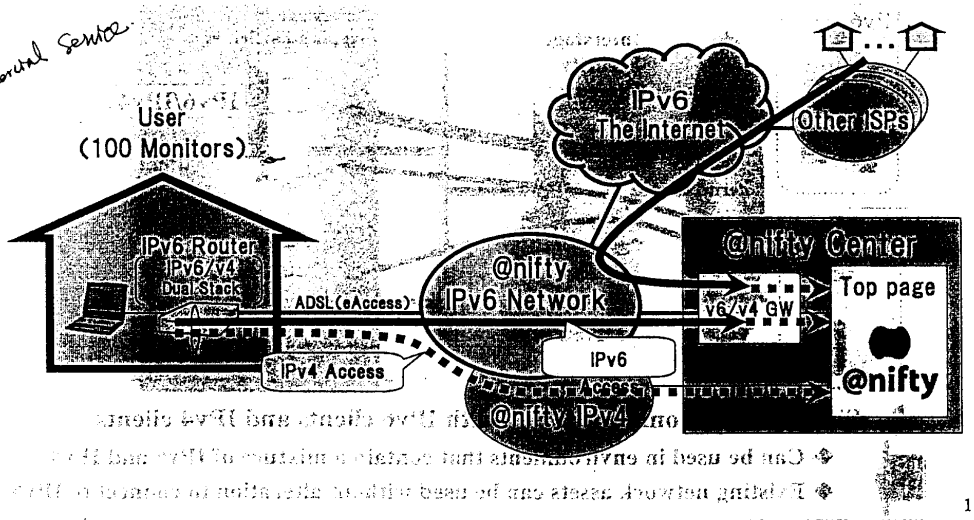
Activity on Network Services

(1) @nifty IPv6 Trial

2003, Commercial Service



free for customers.

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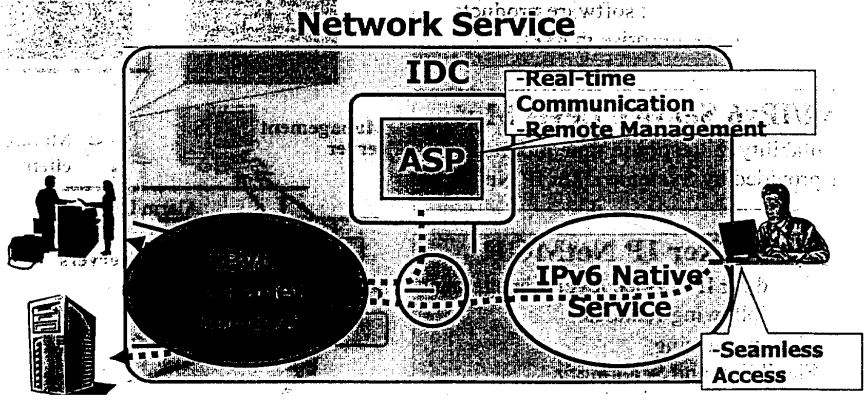
(2) Service Vision for Enterprise



IPv6 Home Network Strategy

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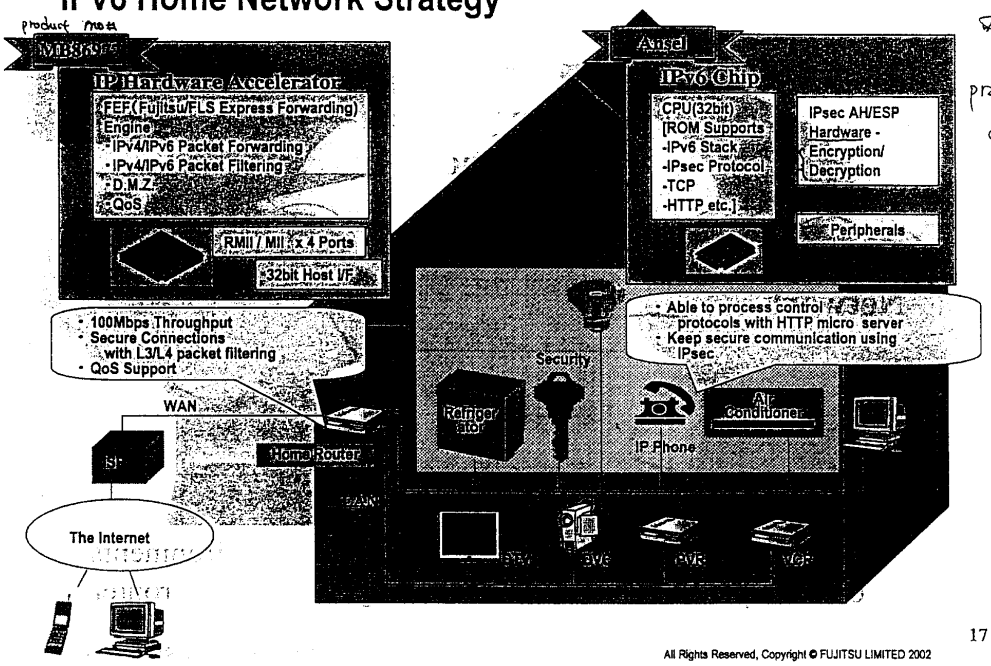
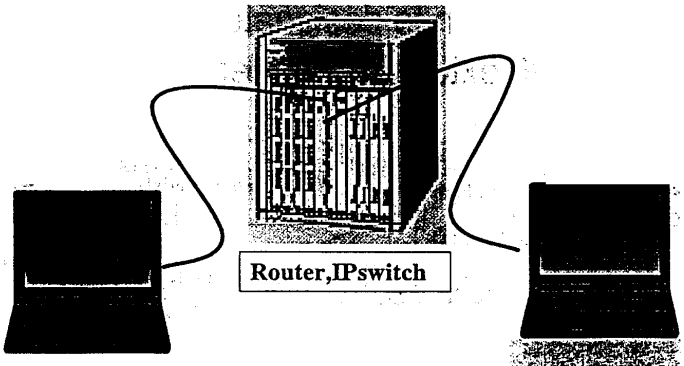


Ulexa-NET : IPv4/IPv6 routing test solution

FUJITSU



The Ulexa-NET is a router test software which offers test conditions, network configuration, and monitoring of routing protocol and performance.

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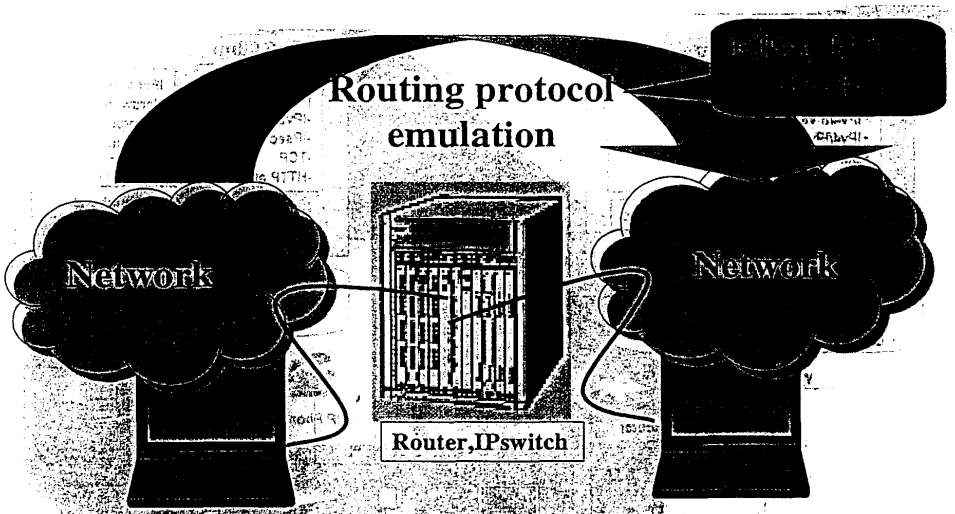

Ulexa-NET creates a test oriented network environments on a couple of PC, to do stress testing on the target router with simulated large scale networking.

XCAST

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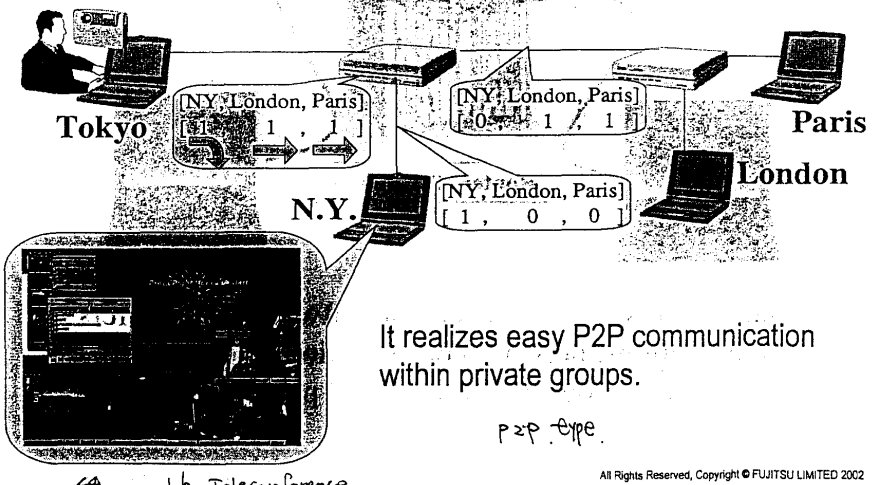
New multicast function to designate all destination addresses in IPv6 extension header.



It realizes easy P2P communication within private groups.

P2P type.

64. 16. Teleconference

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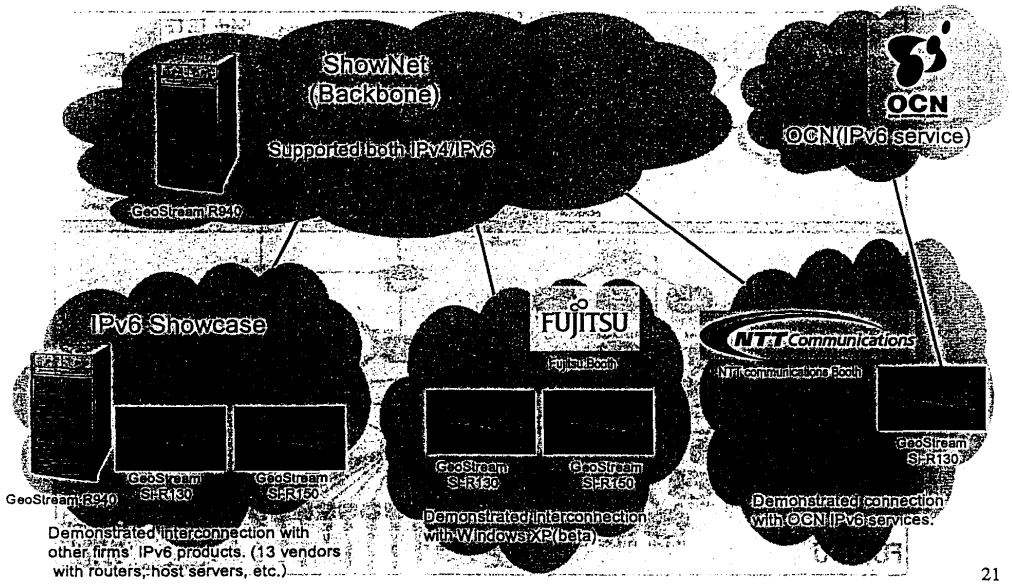
IPv6 Demonstration at the NETWORLD+INTEROP 2000 Tokyo



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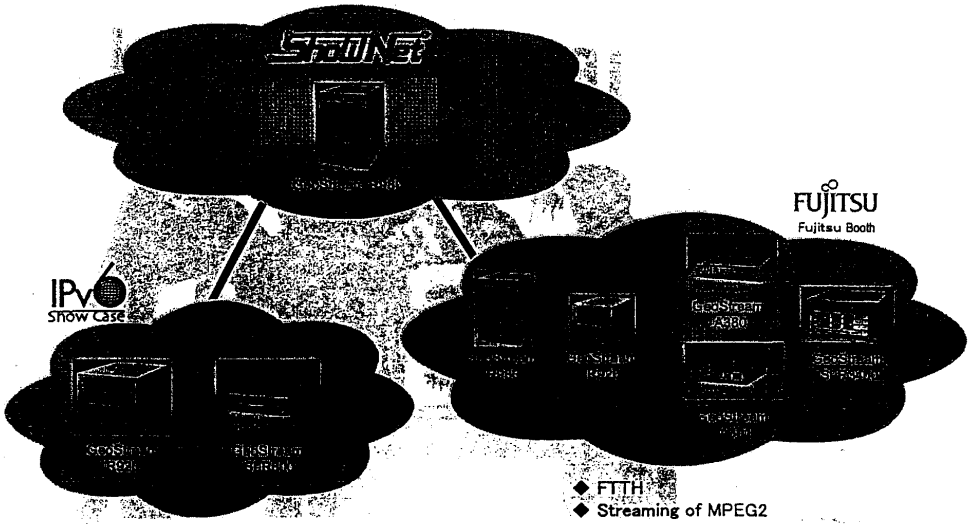
IPv6 Demonstration at the NETWORLD+INTEROP 2002 Tokyo



Demonstrated interconnection with other firms' IPv6 products.

- FTTH
- Streaming of MPEG2
- Movie Deliver in wide area Ethernet network
- IPv6 performance
- Broadband Network Management

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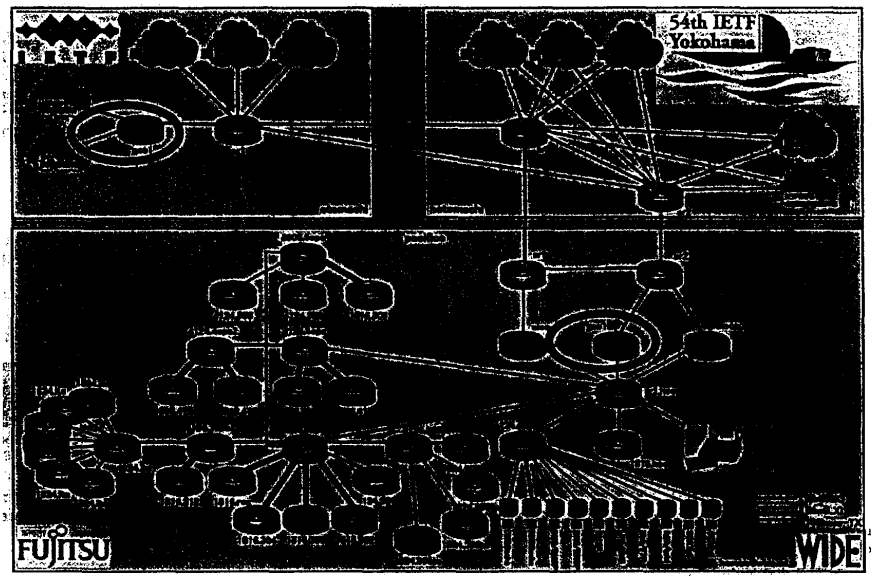
54th IETF Yokohama



54th IETF Yokohama (14-19 Jul 2002)

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Host: WIDE project, Sponsor: Fujitsu Limited

Construction of Gigabit Network for IPv6 Testbed Project
Japan Gigabit Network(JGN)

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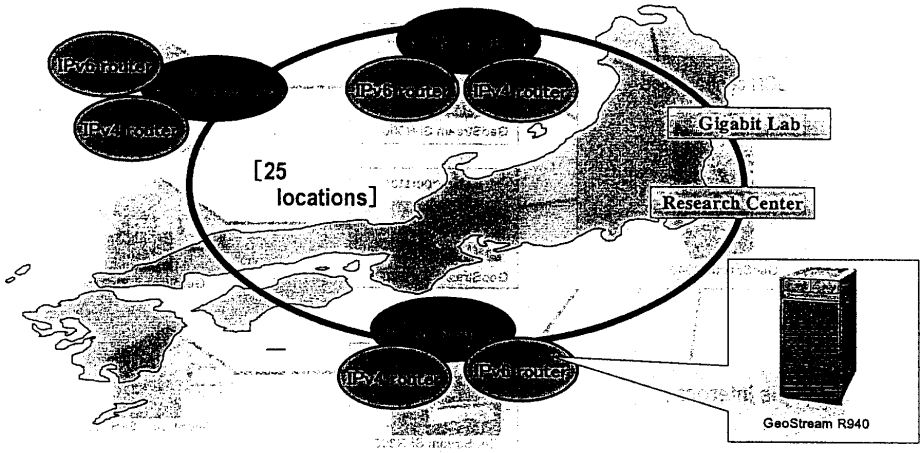
The project is budgeted 4.7 billion yens, with is revised from the FY2000 budget of the Ministry of Public Management, Home Affairs, Posts and Telecommunications (executed in 2001)



25

Research & Development of Internet Appliances
(IPv6 Information Appliances Project)

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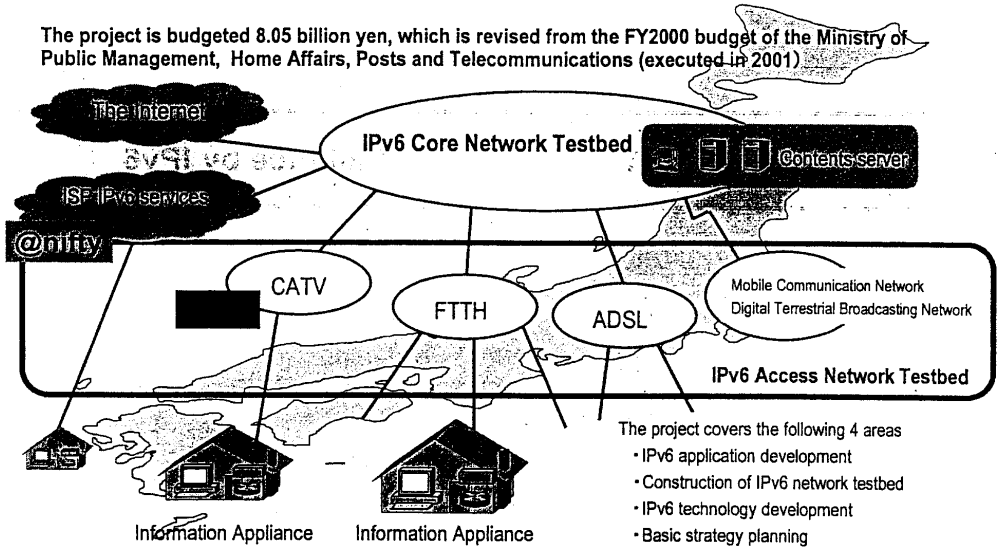
The project is budgeted 8.05 billion yen, which is revised from the FY2000 budget of the Ministry of Public Management, Home Affairs, Posts and Telecommunications (executed in 2001)



The project covers the following 4 areas
- IPv6 application development
- Construction of IPv6 network testbed
- IPv6 technology development
- Basic strategy planning

9 proposal were selected, one from Fujitsu

26

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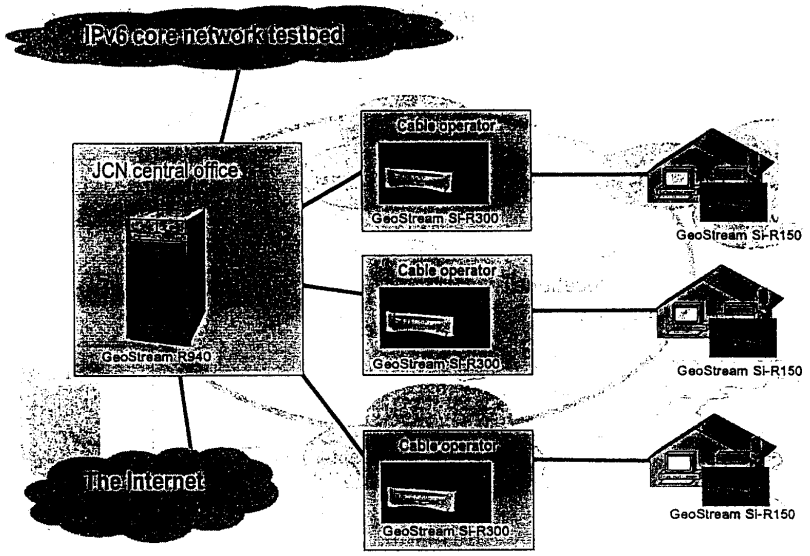
IPv6 Testbed in the JCN(Japan Cablenet)



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[Appendix-1] A new business instance by IPv6

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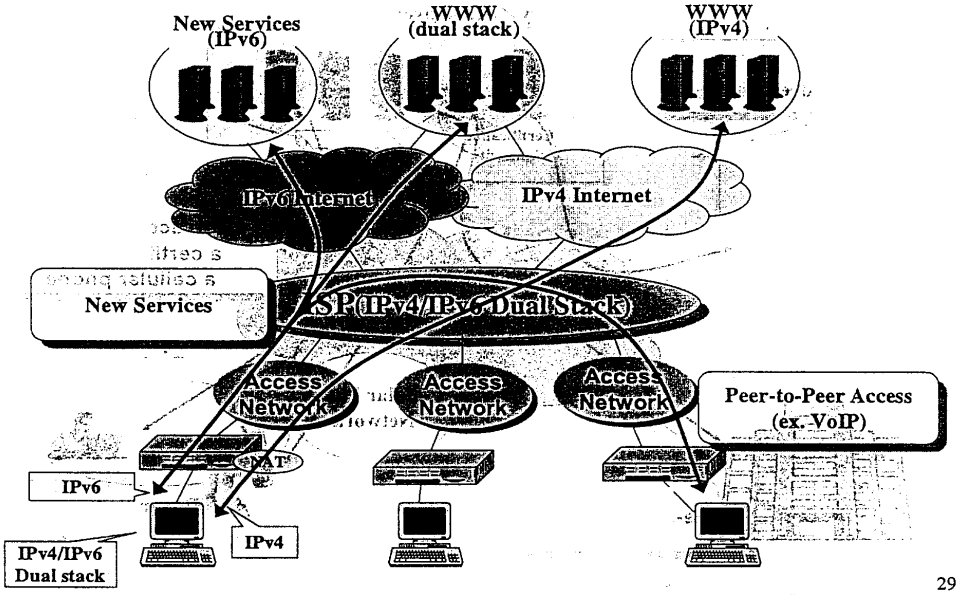
About IPv6 usage



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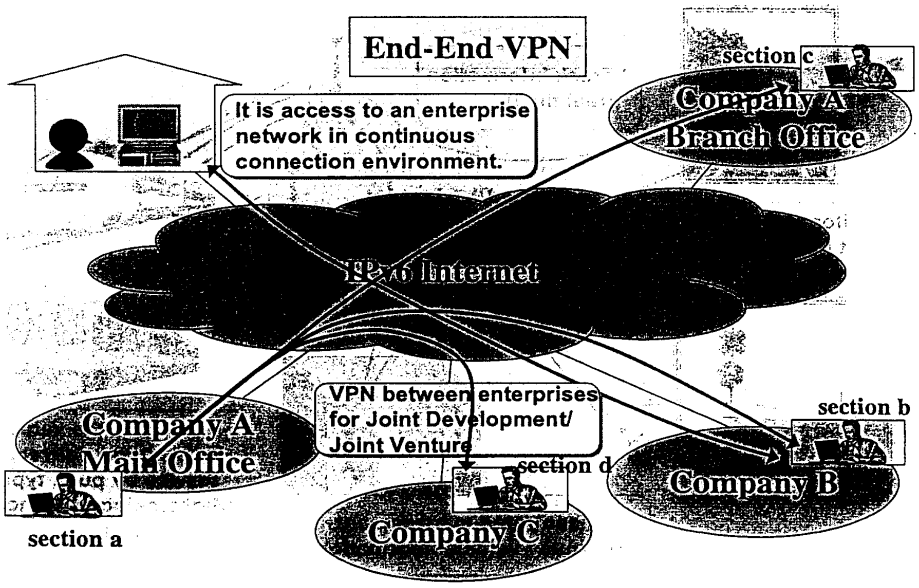
Example 1 : IPsec VPN



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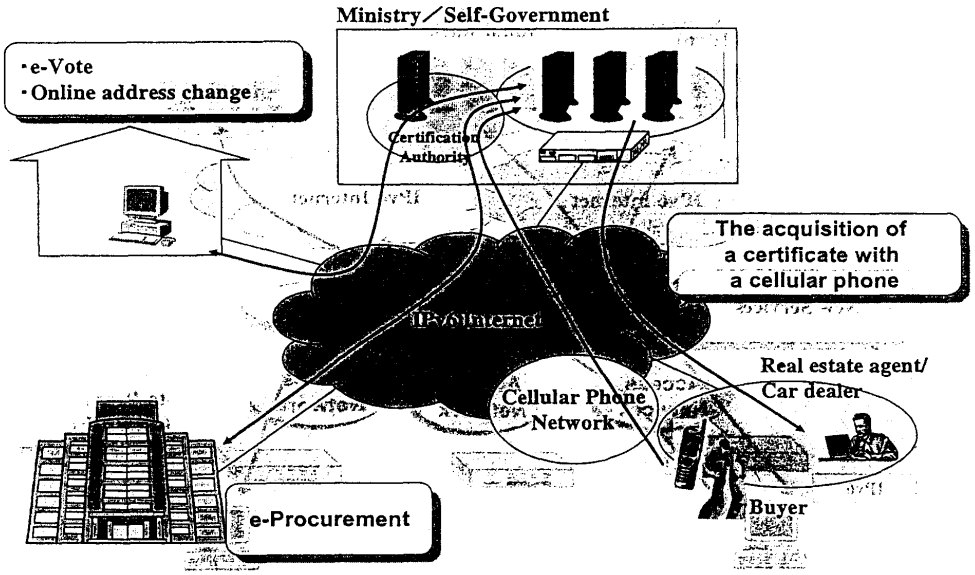
Example 2 : E-Government



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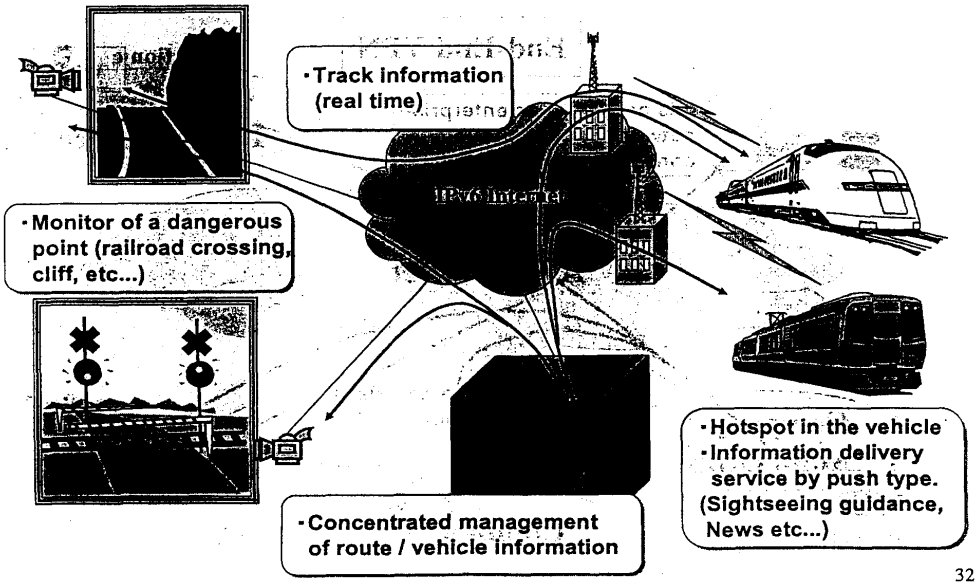
Example 3 : Train System



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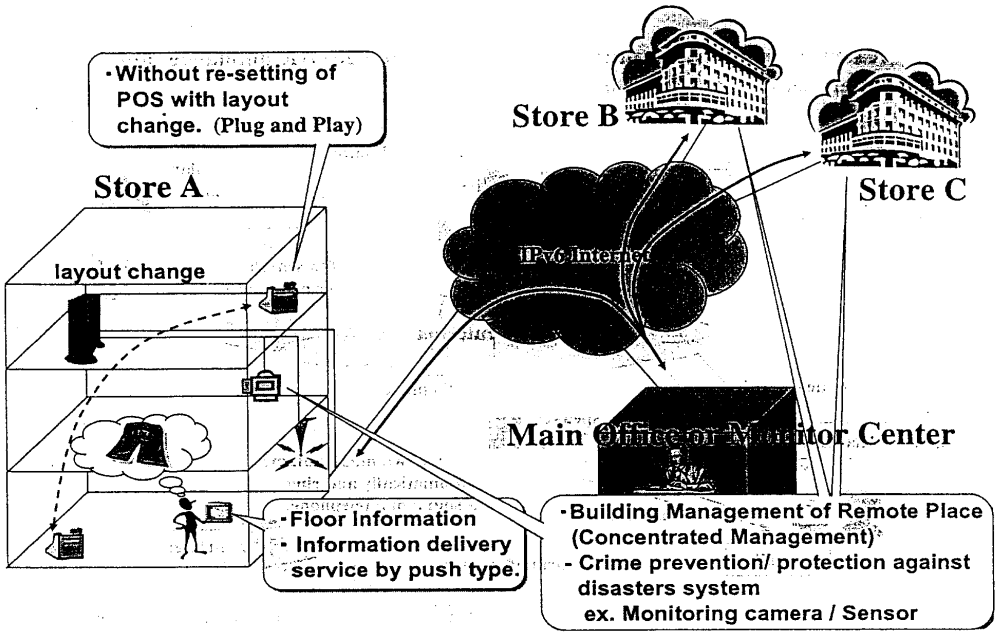
Example 4: Department Store



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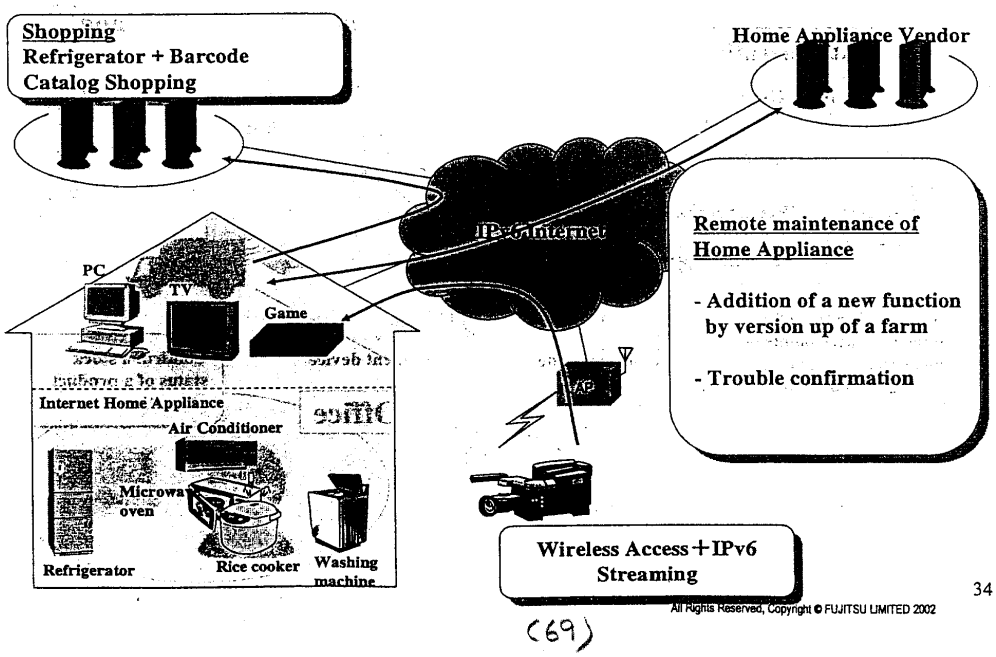
Example 5: Home Appliance



Example 6: Network Kingdom

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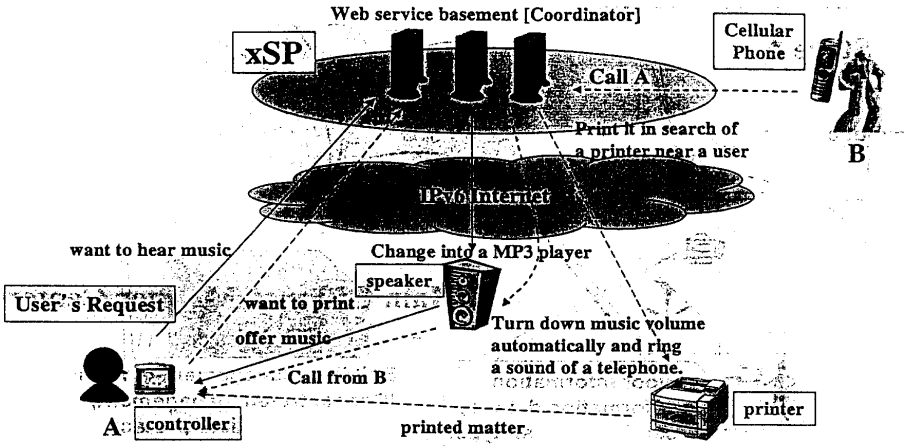
A server cooperates in plural Internet household electric appliances and offers service to a status of a user.



Example 7: Product circulation management

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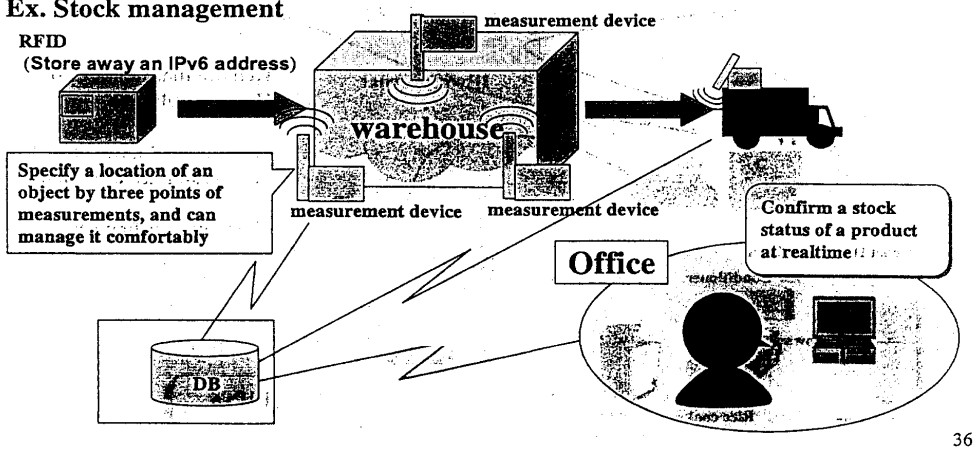
Combination of RFID (Radio Frequency Identification) system and next generation barcode system

Next Generation Barcode → IPv6 Address

(A regulation of a conversion rule to an IPv6 address)

Ex. Stock management



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[Appendix 2] A new business opportunity by IPv6

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IPv6 Business Category

(1) Communications Infrastructures
- —Connection service for Personal, Enterprise
- —Connection service for ISP, Datacenter
- —IX connection service

(2) Network Products
- —Router, Switch
- —Gateway

(3) Terminal Device
- —PC, PDA
- —Cellular Phone
- —Information Home Appliance, AV Devices
- —IPv6 chip

(4) Applications, Contents

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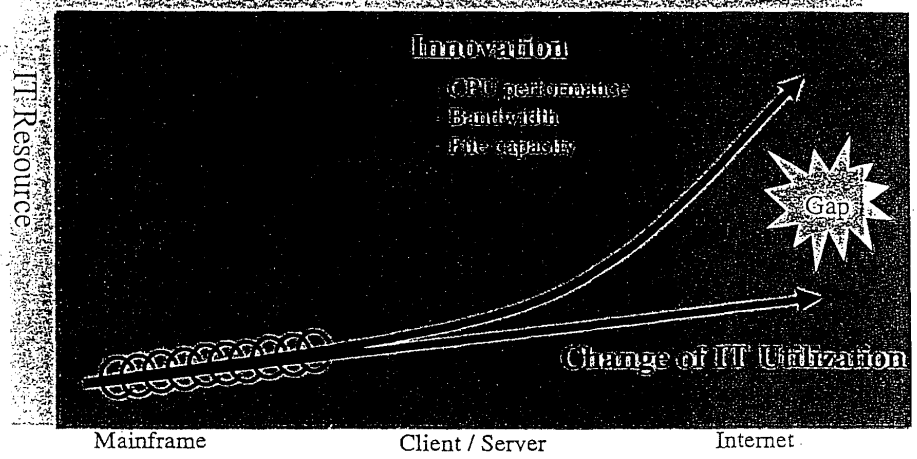
Problem of IT Utilization

A gap of innovation and the utilization



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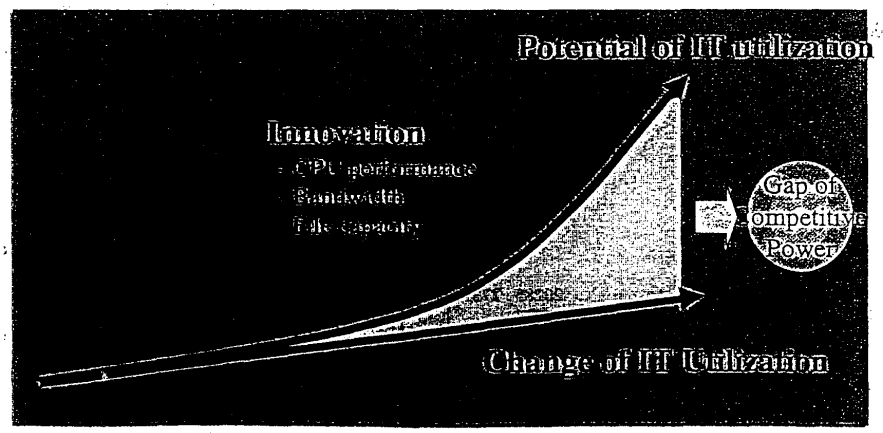
Advanced IT Utilization

Competition reinforcement by maximum IT utilization



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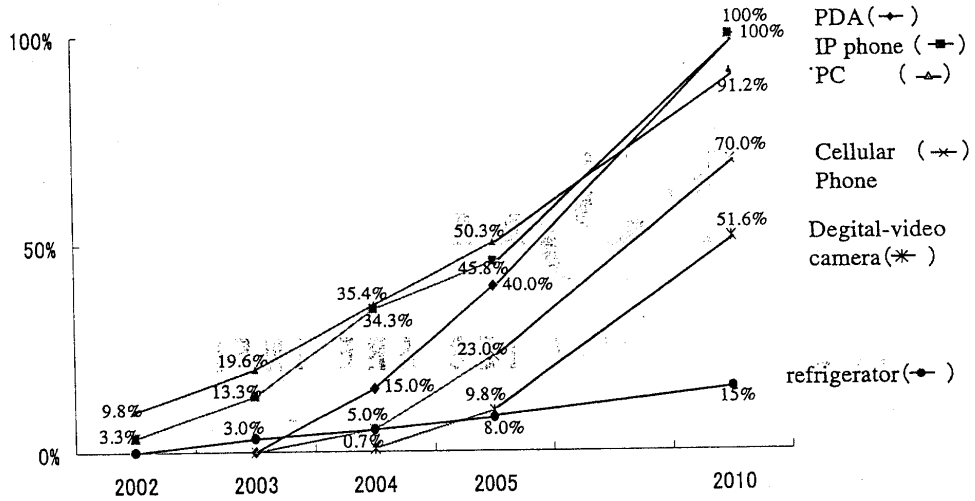
IPv6 supported product rate



[Source: Fuji-keizai, May 2002]

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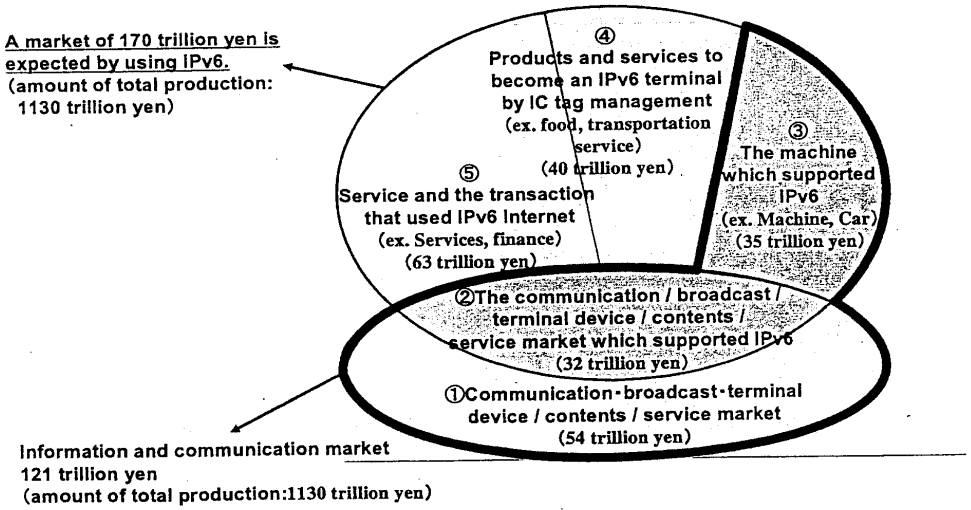
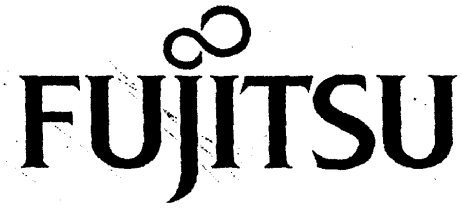
A fortune / service scale to use IPv6



[Source: Ministry of Public Management, Home Affairs, Posts and Telecommunications, Aug 2002]



THE POSSIBILITIES ARE INFINITE