



Talk on NPIC, Oct, 11, 2005



數位內容於行動化社會 之趨勢與挑戰

Trend & Challenges to Digital Contents in Future Mobile Life



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We are witnessing the early, turbulent days of a revolution as significant as any other in human history. A new medium of human communication is emerging – one that may surpass the printing press, telephone, and television in its impact on our economic and social lives. Interactive multimedia and the information highway are creating a new economy based on the networking of human intelligence.

-- Donald Tapscott
The Digital Economy



Paradigm Shift – Mobile Life





Background



- Today's lifestyle
 - People are extremely **busy**
 - People want to **access, control & communicate** information whilst **on the move**
 - Computing is becoming more **available** – more **ubiquitous**
 - Extending ICT towards **ubiquitous computing** is an obvious next step
- 手機的高滲透率，將對人們的生活與工作產生影響
- 由於行動設備發展普及化，行動生活與行動工作成為新一代生活模式與工作型態。

行動生活：以手機為載具所發生的應用與服務



Static life v.s. Mobile life

Static life

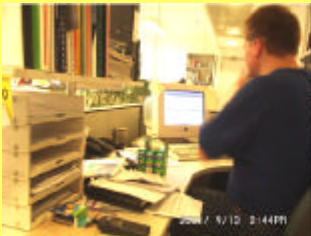
Restricted area

Heavily instrumented environment

Well-defined tasks

Location stabile

Less movement



Interruptions disrupting

Work-related goals

Mobile life

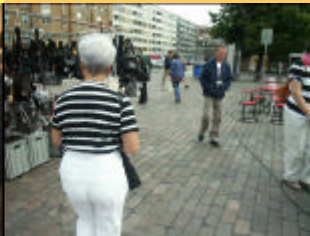
Unrestricted area

Uninstrumented environment

Loosely defined tasks

Location dynamic

More movement



Interruptions positive

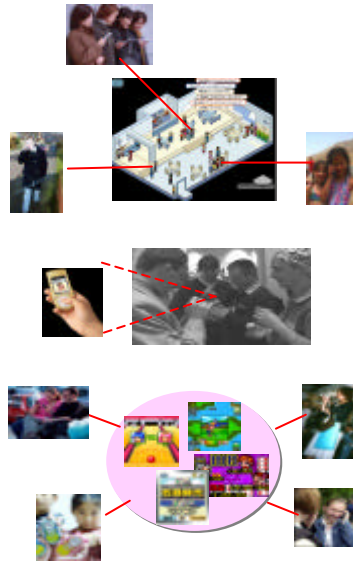
Leisure-oriented goals

Source: Mobile HCI 2003



Social Trends for Mobiles

- 行動族群以手機進行主要連絡與訊息交換
 - *lightweight, casual, and interrupt-driven*
 - *Contents centered around exchanging info*
- 行動族群透過手機聯繫，成為特定社會族群
 - Stay in touch with others within *private social groups* via cellular-phones
- 行動族群喜好透過手機進行內容分享與討論
 - mobile users expect to *create & share content*
- 行動族群（尤其年輕族群）不斷地利用手機尋求另類、高互動性與輕鬆享樂的經驗
 - *Communication IS entertainment.*
- 使用者樂於與夥伴們分享個人現況，同時企望透過服務，獲取周遭相關資訊與資源。
 - Users can *share current personal status* with their buddies
 - Service will send an alert when *buddy or required resource* is nearby



產業趨勢

- 整體行動與資訊市場趨勢
 - 2008年全球手機銷量將達11億部 (EETaiwan, 25/01/05)
 - 全球寬頻用戶超過1.5億 (DMEurope, 04/03/05)
 - 全球SkypeOut用戶達到100萬 (Telecom.paper, 15/03/05)
 - 2008年全球IPTV用戶將達到2530萬 (DMEurope, 14/03/05)
 - 全球超過1100萬人使用VoIP (iTHome電腦報, 11/07/05)
 - 富士通：2010年無線寬頻將無所不在 (EETaiwan, 23/08/05)
 - IEK：可攜式娛樂裝置漸成數位生活主軸之一 (科技日報, 30/09/05)
- 行動裝置結合content之應用蓬勃發展
 - 2010年將有1.2億人用手機看電視 (IMS Research, 11/05/04)
 - KDDI推出手機遠端影像監控服務 (科技日報, 29/06/04)
 - LG手機可收T-DMR節目，全球首款 (DMEurope, 16/11/04)
 - NTT DoCoMo推出具有環場音效的3G手機 (Reuters, 19/11/04)
 - 用手勢輸入號碼 三星手機支援立體動作識別 (日經BP, 17/01/05)
 - 利用GPS信號的虛擬巴士導遊在日本問世 (日經BP, 25/01/05)
 - 手機讀條碼，上網手續更便利 (iTHome電腦報, 28/02/05)
 - 2009年全球行動音樂下載市場達93億美元 (Telecom.paper, 03/03/05)
 - “識別率達99%” KDDI手機樂曲名檢索服務 (日經BP, 25/05/05)





產業趨勢（續）

■ 異質通訊／網路與手機結合出現契機，其發展潛力將不可限量

- 全日空11月起在成田-上海航線提供網路服務 (日經BP, 27/09/04)
- 陽慶與飛思卡爾攜手，手持設備將添UWB無線傳輸功能 (經濟部無線推動辦公室, 30/09/04)
- 全球首款Wi-Fi/GPRS雙網手機DoPod 700下周上市 (iTHome電腦報, 12/10/04)
- 美國UT斯達康將在北美量產個人無線LAN手機 (日經BP, 07/01/05)
- 東芝推出以手機遙控PC的新技術 (DigiTimes, 20/01/05)
- “船上也可接收”德國西門子演示HSDPA傳輸 (日經BP, 16/02/05)
- 手機機隨！加速度感測器實現更多手機功能 (技術在線, 15/03/05)
- 手機配備無線標籤讀卡器 KDDI開始驗證實驗 (日經BP, 28/03/05)
- 計程車也e化，臺北市e-Taxi衛星車隊上路 (iTHome電腦報, 27/04/05)
- M台灣計畫 未來靠手機就能搭捷運 (工商時報, 06/05/05)
- 日立開發可測量脈搏與動作的手錶型無線通信終端 (日經BP, 27/05/05)



產業趨勢（續）

■ 行動網路與電子商務密切結合

- NTT DoCoMo測試用手機買車票 (JapanTimes, 23/02/05)
- 手機讀條碼，上網手續更便利 (iTHome電腦報, 28/02/05)
- 美國駕照於2008年將加入RFID應用 (iTHome電腦報, 02/03/05)
- NTT注資信用卡公司，發展信用卡手機 (Telecom.paper, 02/05/05)
- 3G加入手機錢包、行動票務功能 (科技日報, 18/07/05)

■ 通訊與資料傳輸安全等應用，已逐漸受到重視

- MIC：網路安全市場規模明年將突破100億元 (iTHome電腦報, 28/12/04)
- Wal-Mart掀起RFID的蓋頭來 (iTHome電腦報, 10/01/05)
- 美國駕照於2008年將加入RFID應用 (iTHome電腦報, 02/03/05)
- 日本補習班利用RFID紀錄學生上下學時間 (iTHome電腦報, 11/03/05)
- 美國滑雪場應用RFID掌握遊客位置 (iTHome電腦報, 29/04/05)
- 日本富士通RFID應用於肉品衛生監測 (科技日報, 02/05/05)
- RFID監控性侵害犯，8月5日上路 (iTHome電腦報, 24/06/05)
- 日本富士通推出UBWALL多功能牆壁 (科技日報, 16/09/05)
- 富士通於成田機場啟用RFID行李辨識系統 (科技日報, 26/09/05)



Applications – Payment and Location Based Service

手機搭車消費 不是夢



行動商務服務:自販機購買可樂,持手機就可搭捷運和公車,購買電影票或到超商購物

通勤族 手機付帳搭車



(NTT DoCoMo) 和Sony手機當內嵌電腦晶片的智慧卡使用,只要在車站門口貼近特製的裝置,即可支付搭車費用,省去攜帶硬幣的麻煩。

Location Based AP



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Applications – Multimedia and Entertainment

諾基亞新手機支援歐洲地面波標準“DVB-H”



諾基亞7710

TI“好萊塢”計劃 單晶片實現手機電視接收



日經BP網

配備“好萊塢”、具備微波數字電視接收功能的手機模型

Gaming



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Applications – Home Control

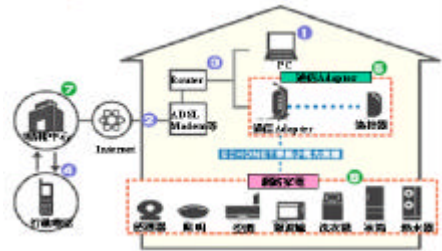
- Handset-centric approach: NTT Docomo Foma
 - 手機是未來控制與管理 indoor & outdoor 各個聯網裝置(如: TV, 音響, Media Gateway) 的主要控制器 → 一隻手機控制所有家電
 - 遠程操作家中的家電, 欣賞通過AV輸入端子相連的DVD錄影機或電視機的節目
 - 通過人體感測器感知入侵者, 自動與出門在外的用戶所攜帶的FOMA手機聯繫的功能
 - 手機拍攝到的動態圖像時時地保存到家中的DVD錄影機或電腦上



Data source: Panasonic (生活網路)



Data source: Toshiba (Feminity)



Data source: Hitachi (Home & life)

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台灣在行動生活科技之優勢

- Mobile life provides opportunities for industry
 - Advanced technologies in **networks**, **devices** & **contents** – tightly coupled with digital contents & embedded infrastructure
 - Digital contents: service-oriented multimedia (TV/movies, music, Ads., Courses, Shopping, ...)
 - Embedded infrastructure: Mobile terminals, network devices, sensors, displays, ...
 - Integration of social/human experts, content providers & cross-domain technologies
- Taiwan's opportunities on promoting mobile life
 - Taiwan offers ideal testbed for mobile life because of advanced high technology development, open and liberal society, people curiosity to new products.
 - Possible approach: **Networks, sensors, displays, contents**
 - With leading **LCDs**, **wireless networks** & **mobile devices**, Taiwan offers an ideal test bed.
 - Penetration rate of cellular phones in Taiwan: over **118%** (world no. 1)
 - Japan: about 64% penetration
 - Taiwan WLAN output share in worldwide market: over **90%** (world no. 1)
 - LCD industry in Taiwan: estimated 2004/2003 year growth – **49% (large-size)**, **53% (S/M-size)**
 - Taiwan experience in mobile life leads to **culture export**
 - Export digital contents, new services & business models to international market

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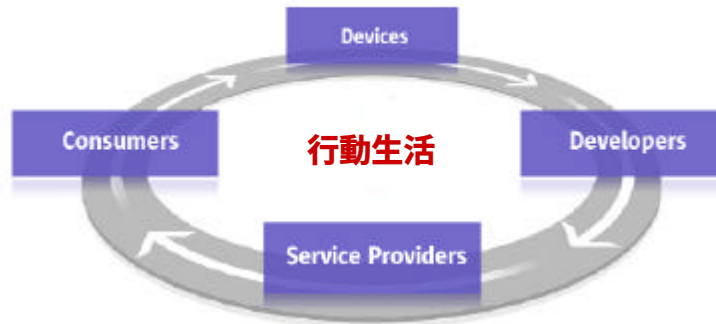
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行動生活的Ecosystem

•日本行動服務的成功經驗：

- 傳輸速度並非造就數據服務蓬勃發展最重要的因素
- 多元服務及內容, 合理定價及殺手及應用的配合才是誘發消費者使用最重要的因素



Communication Infrastructure + Mobile Device + Content

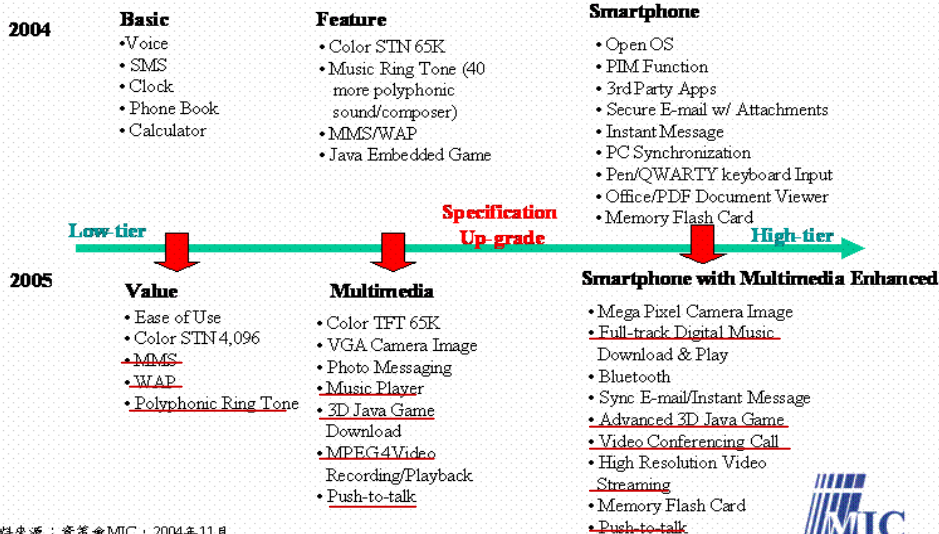


Briefings on Related Technologies for Mobile Contents





2005年行動電話產品功能



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行動電話朝多媒體功能發展

	2003	2004	2005
Video (Capture/Play)	ASF/Motion JPEG/MPEG 4; 7.5-15 fps QCIF; VTC 10 fps	MPEG 4/ H.263; 15-20 fps QVGA/QCIF/CIF; VTC CIF 15fps	MPEG 4/H.263/H.264; 15-30 fps CIF; 15fps QVGA
Graphic	JPEG/JIF/BMP; 2D Graphic/J2ME (MIDP 1.0.3)	2D/3D; Drawing 50-100k Triangles/J2ME (MIDP 2.0)	2D/3D Drawing 100-400k Triangles/J2ME (MIDP 2.0)/ Enhanced Java API
Image	CIF-QVGA Pixels with Digital Zoom	QVGA-VGA Pixels with Digital/Optical Zoom & Auto Focus	VGA > Pixels with Digital Zoom/Optical Zoom & Auto Focus
Music	Music Ring Tone (Polyphonic Sound)	Music Ring Tone (WAV/AAC/MP3 Fragment)	Mobile Digital Music -Full Track (WAV/MP3/MPEG 4-AAC+)
	2003	2004	2005

資料來源：資策會MIC，2004年11月

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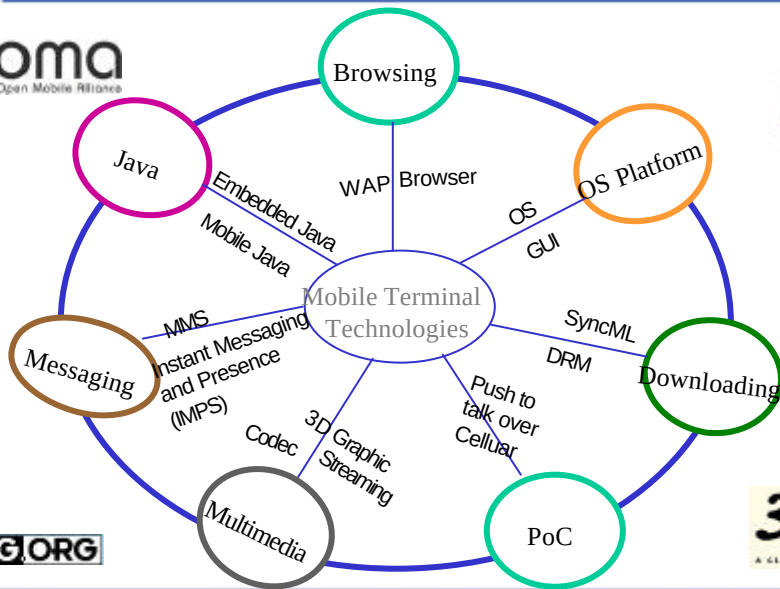


Mobile Technologies



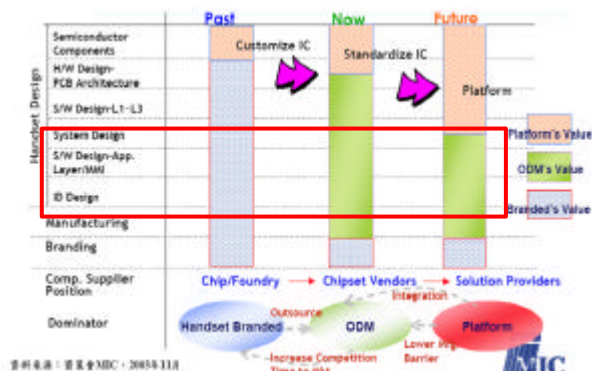
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國內行動平台軟體市場需求分析

- 國外大廠不斷推出整合型handheld device開發平臺解決方案, 逐漸擠壓國內ODM廠的價值
 - 未來 ODM 廠商的價值剩下應用軟體以及人機介面之開發
- 自有品牌以及 ODM 廠商必須靠加值應用與造型設計來與競爭對手的產品有所區隔
 - 造型設計包含產品外部機構造型與內在的人機介面
 - 加值應用在於與service/content provider之整合
- Niche/Potential Apps
 - Messaging
 - Video streaming
 - Entertainment – Mobile game
 - Content Protection -- DRM



資料來源：資訊工業策進會, 2005/8/11日

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Mobile Messaging演進

- 隨著手機與網路設備的提昇,訊息由簡訊演進到圖文並茂,聲光十足的多媒體簡訊時代!

SMS



- Plain text, maximum 160 characters, black only
- Uses the SS7 signalling channel
- Supported by (nearly) all GSM phones in current use

EMS



- Plain text, simple graphics & sound, upper limit on message size
- Uses the SS7 signalling channel

EMS will have limited significance

MMS

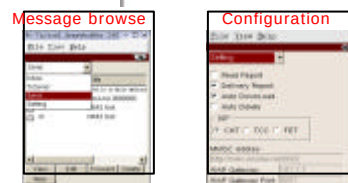
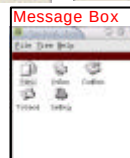
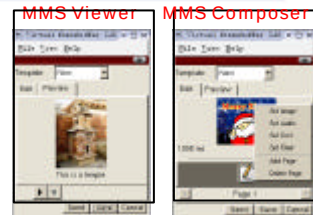


- Freeform text, colour, graphics, photos, audio and video
- Unlimited message size
- Uses IP standards



Mobile Messaging Features

- Message Composer：提供MMS訊息編輯，可透過新增或樣本方式；訊息編輯後可即時預覽。
 - 支援媒體格式：(符合3GPP MMS media & codec)
 - Text
 - Speech/Audio: AMR, MPEG4 AAC-LC, MIDI
 - Image: JPEG, GIF87a, GIF89a, PNG
 - Video Clip: H.263, MPEG4 Simple Profile
 - File Format : 3GP, MP4
 - Synchronization: 3GPP MMS SMIL
- Message Viewer：提供MMS訊息之呈現，支援MMS SMIL語法，能以最佳化方式呈現接收於手機上編輯的MMS檔案。
- Message Box: InBox, OutBox, ToSend, ...
- Configuration Setting: 提供User Agent選項之進階設定。
- MM1 Protocol stack Library：MMS Client與MMS Center溝通之必須遵守的互連機制。
 - 符合WAP MMS Encapsulation Protoco規範





Mobile Messaging Applications

- P2P apps: 個人化影音訊息互傳,...
 - 個人通訊, 如: 相片傳輸, 年節賀卡
 - 電信業者最先推出的服務
- M2P apps: 即時影音監控系統, 即時資訊,...
 - 資訊傳遞, 如: 新聞, 股市行情
 - 廣告行銷, 如: 折價券
- P2M apps: 交友配對系統,...
 - 應用範圍如: 投票, 猜謎, 交友配對



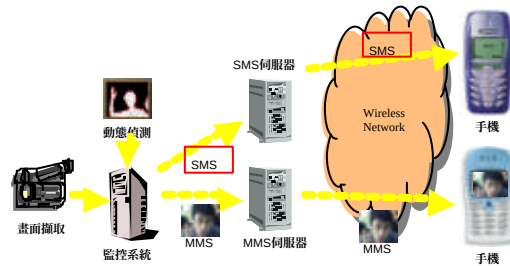
與手機互傳
Message



行動電子報



行動交友



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Mobile media streaming系統架構

101x90 pixels
256 color, No
video support



160x120 pixels
4096 color video:
10 fps



320x240 pixels
65536 color
video: 30 fps



1. 訊息通知

Suitable Content

3. 串流請求

SDP resolution

RTSP/RTP
UDP/IP

6. 內容傳輸

2G or 3G Mobile
Network

MMS

UA Name,
UAProf Diff

4. 展現能力偵測

UAProf, UID

5. 內容調適

0. 內容強化

Session Description Protocol
(SDP)

Message Store

2. 內容複製

MMS

MMSC

Profile Agency

Remote Profile Repository

Media Store

Profile Database

Transcoding Server

Streaming Server

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Media Streaming for mobile devices (cont.)

- Media transmission on handset: Streaming
 - 受限於手機記憶體限制, 視訊檔案無法完整下載到手機才播放
 - Streaming: 可指定任何片段即時傳輸, 播放
- Media Encoder, Player and Streaming on handsets
 - Supports current & future CPU/DSP. E.g.: StrongARM, Xscale, MIPS, SHC, OMAP, ...
 - Image Compression / Browser : BMP, JPEG, JPEG2000, ...
 - MPEG-4 Video QCIF (or even more)
 - MPEG-4 AAC LC Stereo/Mono
 - Support of WMV, H.264, ...
 - Support streaming through wireless LAN



Mobile Media Streaming Apps. -- Surveillance

工廠/辦公室監控



交通資訊



幼兒監看



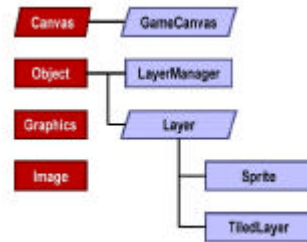
Media Streaming System





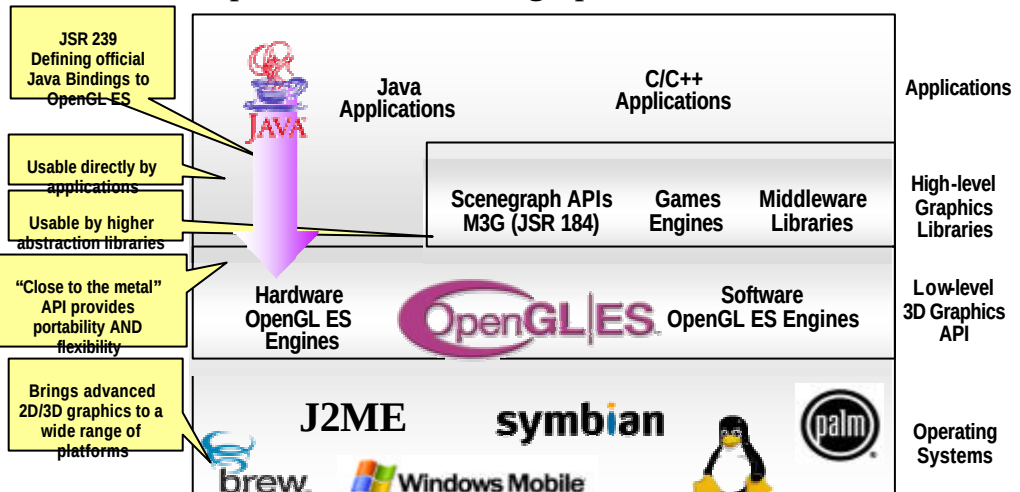
Mobile 3D Graphics related standards

- **MIDP** v2.0 – Game API (JSR 118)
- **MGIF** (Mobile Game Interoperability Forum) – Game Server API
- **Java** Technologies for Wireless Industry (JSR 185)
- **Mobile 3D Graphics API** for J2ME (JSR 184)
- **OpenGL ES** – Proposed Graphics API for embedded systems



Mobile 3D Platform Approach

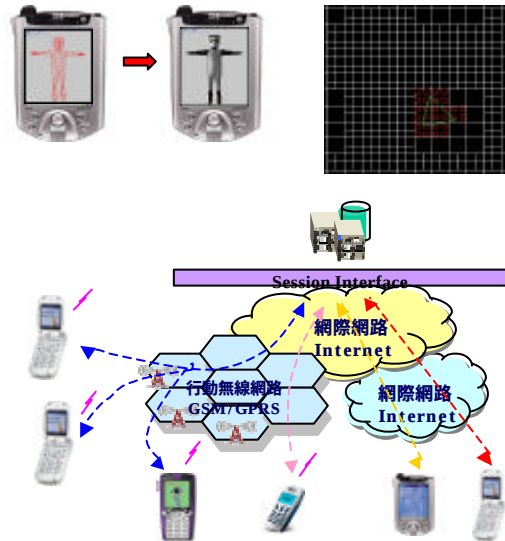
- Cross platform, low-level graphics API standard





S/W Architecture & functions

- 行動終端平台 3D 場景漸進載入技術
- 行動終端平台 3D 物件場景管理技術
- 行動終端平台 自動貼圖資源管理技術
- 行動網路環境 3D 內容下載技術
- 行動網路環境 線上多互動 SESSION 管理技術
- 行動終端平台 3D 引擎狀態管理技術
- 行動終端展現引擎事件觸發處理介面技術

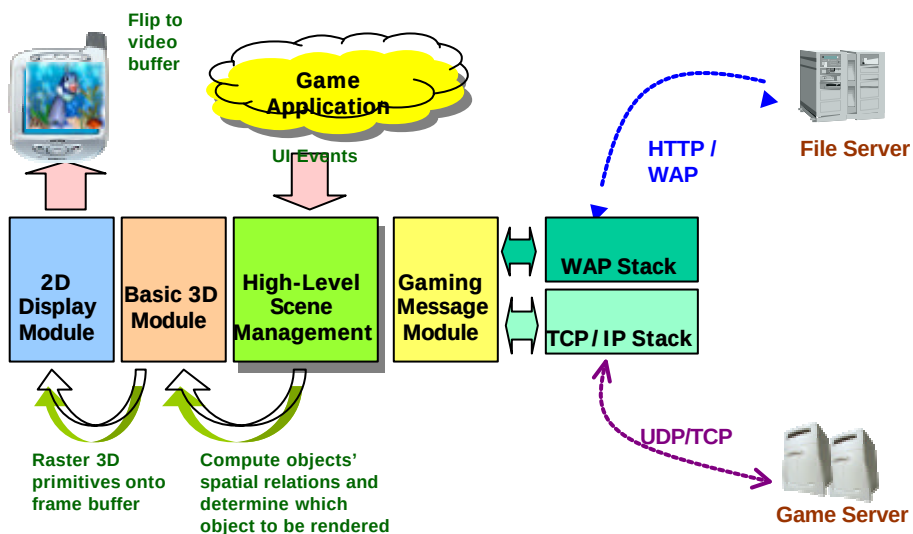


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Mobile 3D apps – 3D online games



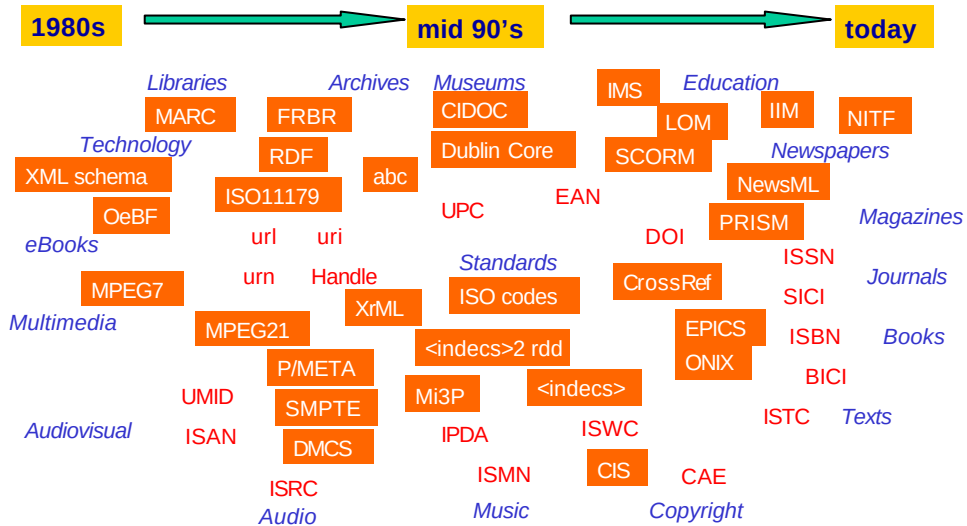
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Content protection – DRM

Evolution of DRM standards



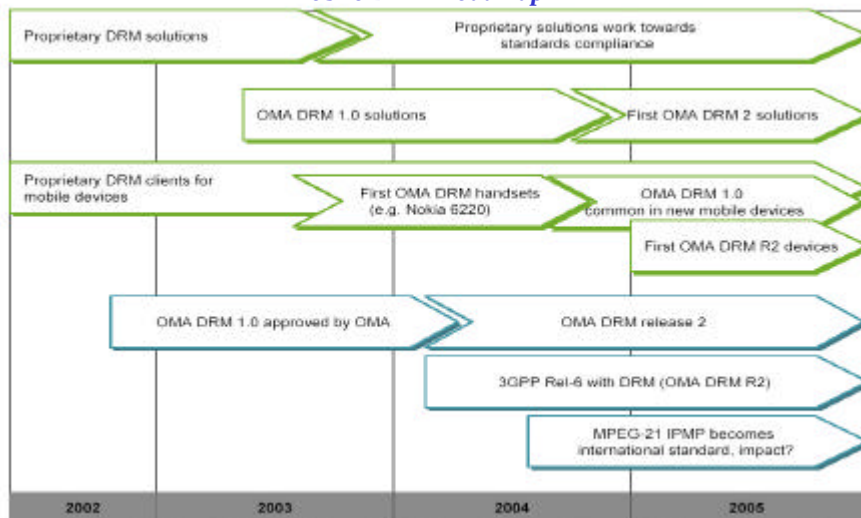
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Content protection – DRM (cont.)

Mobile DRM Roadmap



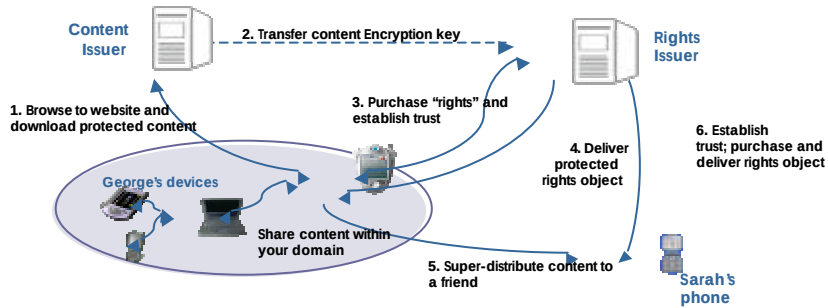
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Content protection – DRM (cont.)

- Integrated with DRM – OMA outlines
 - OMA (Open Mobile Alliance) – the application layer standards body for the whole mobile industry – <http://www.openmobilealliance.org/>
 - Formed from the WAP Forum and related bodies, e.g. SyncML, Wireless Village
 - A mobile industry consortium which consists of over 300 member companies such as Nokia, Sony, DoCoMo, Vodafone, Motorola, SonyEricsson, RealNetworks, Time Warner, Openwave, Siemens, Disney, Samsung, IBM, Microsoft and T-Mobile
 - Based upon open specifications jointly developed by industry players to avoid industry fragmentation
 - The Scope of OMA DRM includes the ability to preview media objects and to prevent downloaded DRM content from being illegally forwarded(copied) to other users.



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What's Next? Ubiquitous !!!

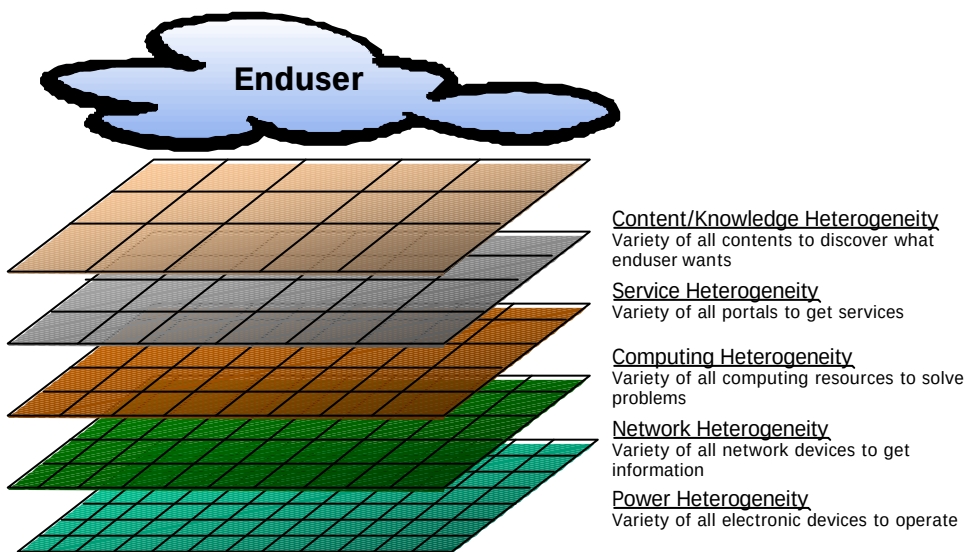


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Ubiquity – We are facing a world of heterogeneity

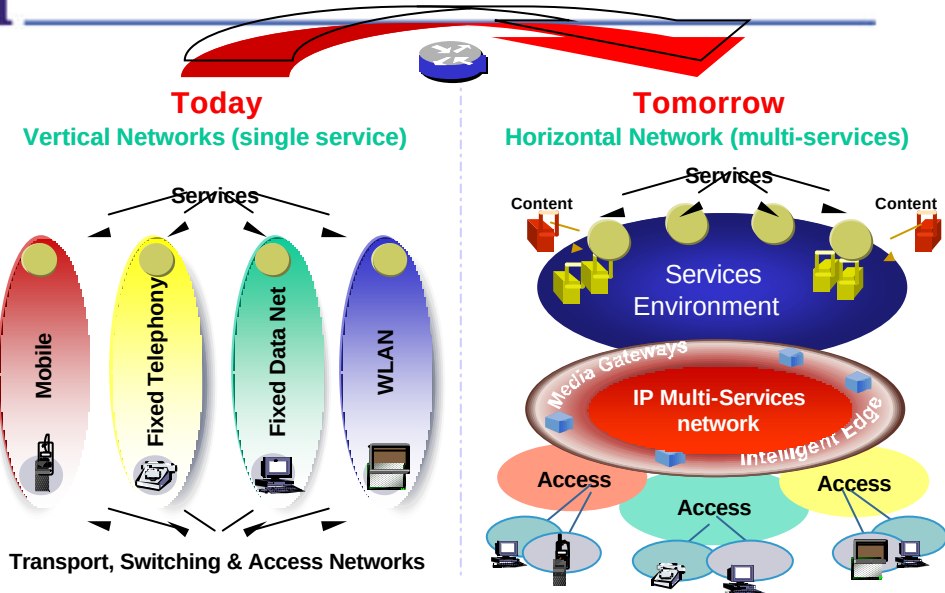


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Trends – Towards IP multi-service network

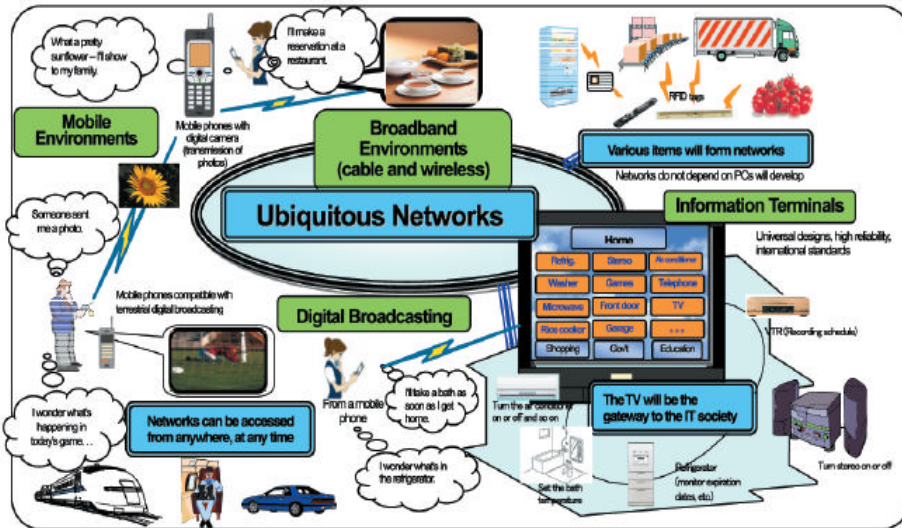


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Global Trend – Ubiquitous Society



資料來源：Information and communications in Japan 2004

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Application/Services in Ubiquitous Society

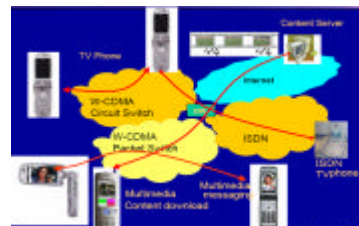


Content browsing through barcode-reading

Mobile TV with intelligent EPG service



E-cash payment using handset



Content downloading/streaming across different networks

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Example 1: u-Japan 願景

u-Japan (Ubiquitous-net Japan)

- A society where everyone/everything is easily connected to the network anytime, anywhere
- A completely new Japan of the future where people receiving pensions and nursing care become taxpayers by means of activities utilizing ICT

Currently, e-Japan goals are being met but before u-Japan can become a reality many issues must be tackled.

Ubiquitous Network Society

2010 Realization of u-Japan



資料來源: "Towards the Realization of Towards the Realization of a Ubiquitous Network Society a Ubiquitous Network Society - Present Status and Future Perspective of ICT in Japan", Minister for Public Management, Home Affairs, Posts and Telecommunications, 21 June, 2004

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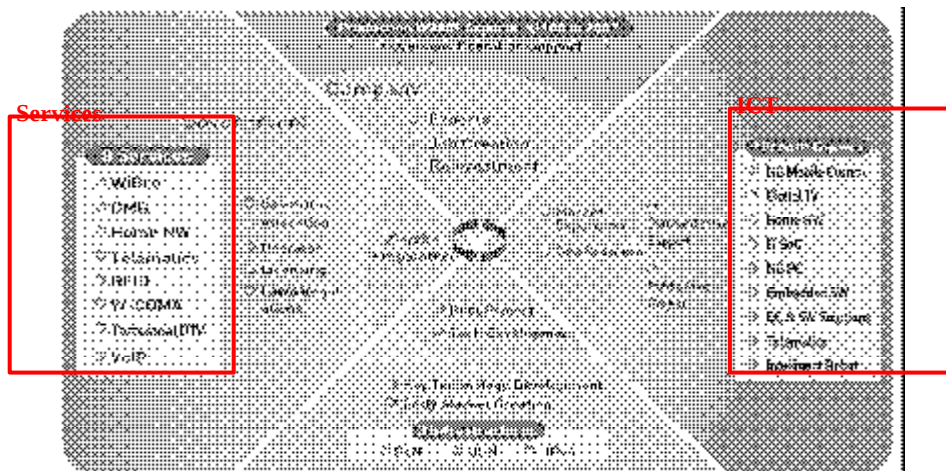
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Example 2: u-Korea/IT839

IT839策略

u-Korea(2007~)



資料來源: "IT839 strategy", MIC, www.mic.go.kr

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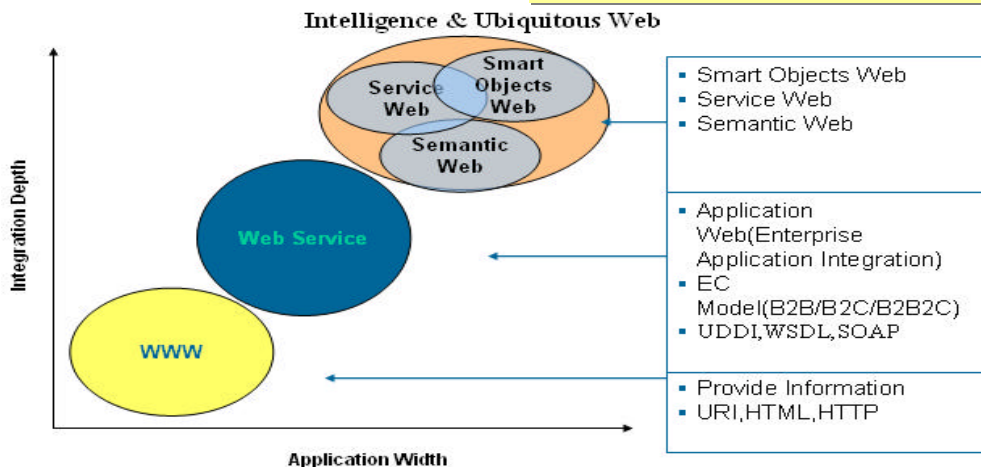
Tech. Trends towards Ubiquitous Society – ICT

- Everyone/everything connected: New sensors/devices empower **content sharing**
 - Apple iPod, Net Camera/IP-Camera
 - Sensor devices for monitoring
- Easily connected to network: Toward **IP based heterogeneous networks** including fixed and mobile convergence
 - IMS (IP-based multimedia system)
 - Korea's WiBro (WiMax), cellular, WLAN & BCN integration
- Convenience & intelligent: Multi-processor platforms drive new H/W design for **powerful & efficient** smart devices
 - Wintel based architecture is becoming commodity
 - NEC's Univerge (ARM Processor + Comm Processor)
 - Advantech's IPC (Intel x86 + TI OMAP Processor)



Tech. Trends towards Ubiquitous Society – Service

- 朝智慧化與自動化發展
- One-stop Service蔚為風行
- 以使用者為中心之服務整合-服務網絡(Service Web)將是下一代網路應用之發展重點。





New business/applications



Source: III/MIC

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Challenges

- Challenges to future life: 5W's need to achieve
 - Who: To identify or recognize who is the current user
 - Which: To adjust the quality of service, according to which device user operates.
 - Where: To establish communication channel, according to where the user is.
 - What: To provide service, by knowing what user's intention is.
 - HoW: How intelligent can the associated man-machine interface be?
- Key concepts
 - Connected/always-on
 - Location-based
 - User-aware/user-centric

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What I see and plan to do in ubiquitous contents

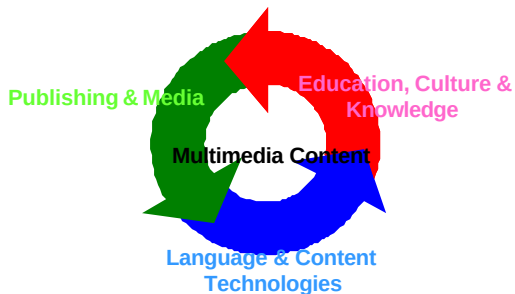


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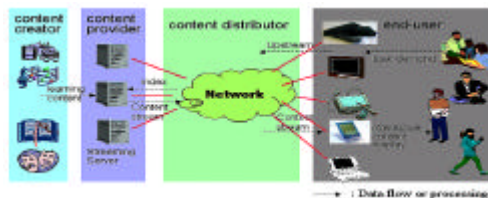
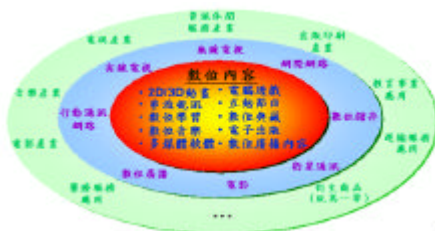


Multimedia Content



Contents in Information Era

- 多元化(新聞, 娛樂, Game.....)
- 取得容易(隨時, 隨地)
- 高品質(顯示, 儲存, 傳送)
- 無所不在(隨時, 隨地)
- 雙向溝通, 介面人性化。

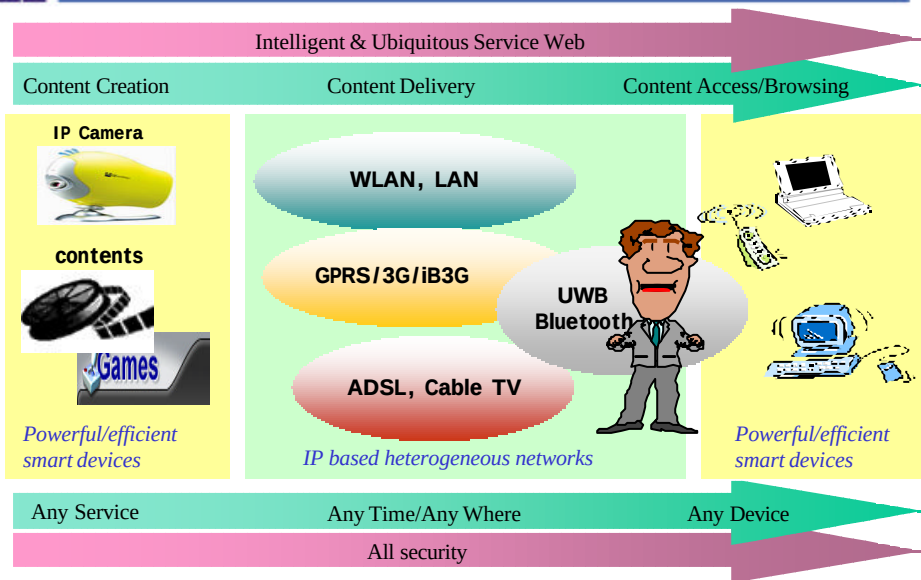


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Ubiquitous Content Sharing & Services



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Factors to Achieve Ubiquitous Content Sharing

- **內容匯流** for various functions
- **載具匯流** for various devices
- **系統匯流** for various services



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Challenges for ubiquitous contents

- Need to connect different networks
 - GSM/GPRS
 - 3G/iB3G/4G/...
 - WLAN/Bluetooth/...
 - Internet/Intranet
 - DVB/DAB/...
- Need to Support All Devices
 - 人機介面(User interaction): Screen size, color, peripherals, ...
 - 硬體資源(Device capability): CPU, memory, battery life, ...
- Need to Support Various Apps
 - Customized, Personalized,...
 - User attention
 - Secure Cash Flow/Transactions
 - ...

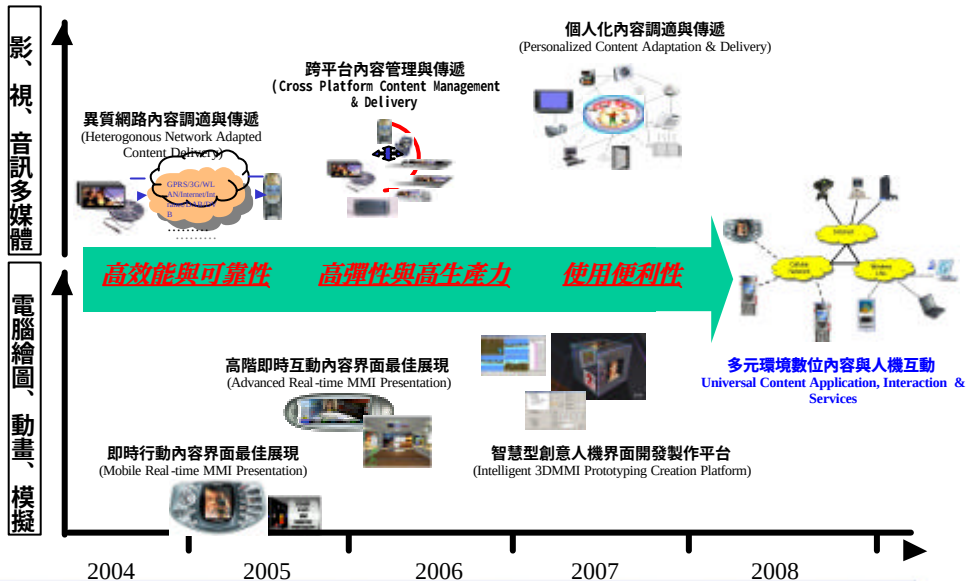
如何克服多元網路限制，
達到即時媒體傳輸？

如何因應多元硬體環境，
加以調適展現品質？

如何搭配快速的製作開發環境，
提供個人化的管理與服務機制？

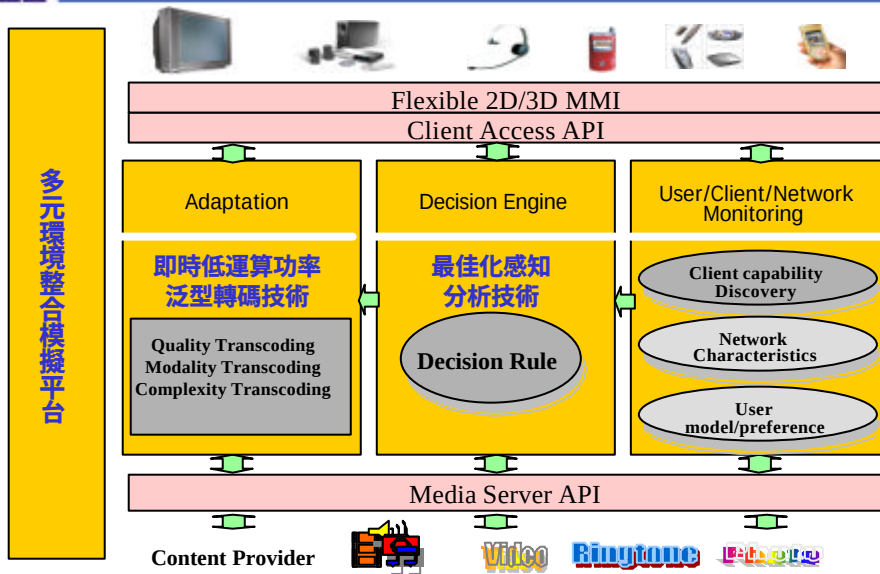


III Roadmap on Ubiquitous Contents Sharing





Overall System Architecture



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Technology Approaches for Content Sharing

- **數位內容調適技術(Content adaptation)以及智慧型人機介面(Intelligent UIs)**
 - For 使用者 – 無論身處何方、使用何種展現平台，均能透過內容的調適以及最先進的視覺化人機介面，獲得最適當的數位內容服務。
 - For vendor/manufacturer – 完整的編輯與整合測試模擬環境，縮短開發時間與人力成本，提昇國內相關內容業者、研發製造業者在數位內容傳遞與關鍵人機介面軟體元件的研發能力。

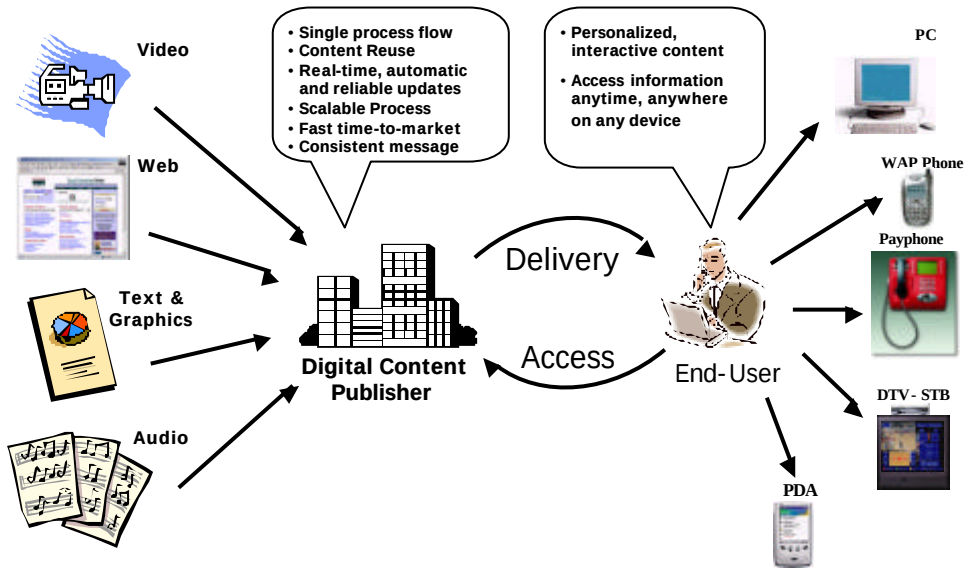


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Content adaptation – Workflow



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Content adaptation – Challenges

■ 問題

- Diversity of devices
 - PC、PDA、cellular phone、NB、DTV、...
- Heterogeneous networks
 - Internet、ATM、WLAN、GPRS/B3G、Bluetooth、Cable、DAB/DVB、....
- Special user needs and preferences
 - Behavior、Age、Purpose、.....

■ 挑戰

- What is the optimized content presentation for Content Provider & End User

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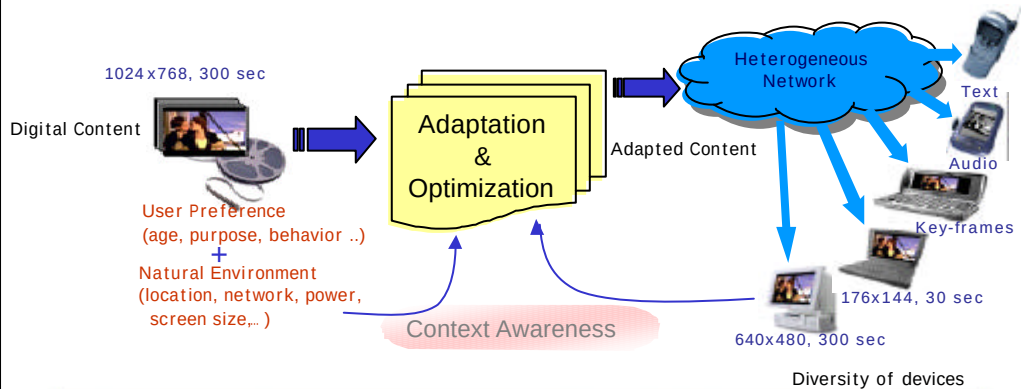
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Content adaptation – Goals

▪ Pervasive Content Access

未來的網路多媒體技術有逐步走向數位聚合的趨勢，無論使用者身處何方、使用何種展現平台，一個統整型的內容均能透過自我的調適，以**最佳的品質與展現方式**提供使用者最適當的多媒體服務。



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Content Adaptation – Related Technologies

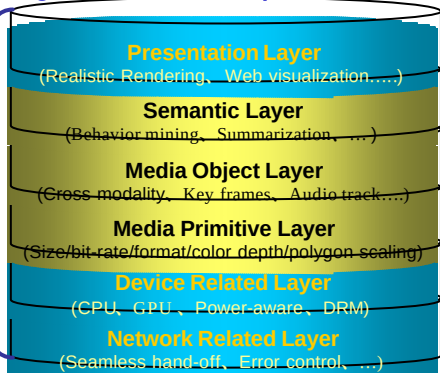
- Client capability, bandwidth discovery and behavior mining
 - CC/PP、UAProfile、DIA、...etc
- Content adaptation tools
 - Transcoding、cross modality、skimming
- Decision Engine for when and how to adapt content
 - Perceptual Maximization
 - Behavior Mining
 - Summarization
 - User Attention

Adaptation & Optimization



Example of framed region selection and adaptation

Digital Content Conceptual Model



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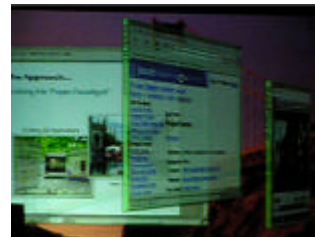
Intelligent UIs – Trends

- **現象／問題描述:** too many devices to control, too much data to manage, technology still too hard to use
 - 有許多應用的普及都是因使用者介面的改變, 讓應用的操作變得容易
 - WWW v.s telnet/gopher/FTP
 - GUI v.s DOS commands
 - 手機是未來消費者進行商業交易的主要介面
 - 不同的交易／服務需要不同的操作介面, but handset screen size is too small
 - 每個消費者習慣的操作介面都不一樣, should be adjustable
 - 界面必須要能夠個人化、程式化, 更重要的是使用上的高度親和性。
 - 在未來, 更多的裝置將透過有線或無線網路串連在一起, 消費者勢必更加抱怨: they can't figure out how to get two devices to talk to each other (SRI 2004)
 - Exchange/connection protocol among devices
 - Friendly management of tasks/data: ease of interoperability
 - Flexible layout presentation of tasks/data



Intelligent UIs – Related Research

- 3D GUI
 - Microsoft's Longhorn (next-generation OS)
 - 能根據硬體的運算能力之不同, 展現不一樣的效果
 - Windows can tilt, so that on edge of a series windows appears to draw away from user
 - Windows can be transparent
 - When one window is superimposed on another, the active window can cast a shadow on the inactive one
 - Sun Microsystems – an open source project: Project Looking Glass
 - Target platform: Linux, Solaris
 - 當使用者把視窗旋轉到背面時, 可以看到 notes
 - 視窗具有厚度 (thickness), 因此當視窗被 deactivate 時將會秀出具有名字的“厚邊”, 以方便使用者尋找
 - Users can arrange windows any way they like
 - 但由其目前的 demo 看來, 使用者似乎不能任意的瀏覽 virtual space. 而是讓使用者能以類似 Quicktime VR 的方式 360 度旋轉視角





Intelligent UIs – Related Research (cont.)

- Zooming User Interface
 - Apple's OS X enables users to zoom out to see a virtual desktop that's much larger than the conventional desktop
 - “The Humane Environment” (THE) software project led by Jef Raskin
 - Document with level-of –details
- Metadata-based customization
 - Annotation-based, feature extraction.
OS 自己根據檔案內容給予分類
- See-through Windows
 - Transparent Video Interface: Facetop project developed by UNC



Intelligent UIs – Related R&D Issues

- Intelligent UIs – Device-agnostic
 - Friendly management of tasks/data: ease of interoperability
 - Flexible layout presentation of tasks/data
- Related R&D issues
 - Flexible Desktop System for embedded system with constrained capabilities
 - 3D/2D layout adjustment (evaluation criteria: screen size, color depth, H/W acceleration, ...)
 - Support for various screen capabilities (dual-screen, see-through screen, ...)
 - Zooming User Interface for Mobile devices
 - A high performance vector font/graphics engine
 - Tools for authoring zoomable user interface
 - 以Digital Home為中心之控制界面系統
 - Software architecture for changeable user interface
 - User preference management
 - A novel presentation interface for media files within digital home network
 - 直覺化行動裝置data-sharing介面 across networks
 - 以合乎人類直覺控制的方式
 - 進行資訊分享前, 使用者只需輸入一兩個簡單的控制命令



Application Scenario – Augmented Reality



Location specific
military
factory quality
street signs

Object specific

equipment repair
healthcare
service check-in



Person specific

name reminder
hotel/airport check-in

Telepresence

healthcare
commerce
community



Power of the Web at point of decision

Merging of the physical and digital worlds

Virtual objects in the real world
(games, coupons).

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Application Scenario – Display Everywhere

- Demands for **Display Everywhere** will become popular.
 - Artificial canvas is not always available!
 - If arbitrary existing surface can be used as a canvas.
 - Interaction application for entertainment
 - Demand for mobile projection scenario

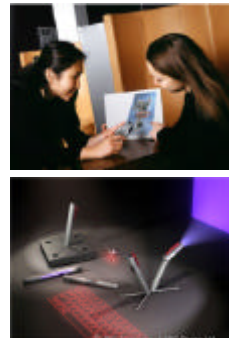
Arbitrary Surface



Interactive Entertainment



Mobile Projection



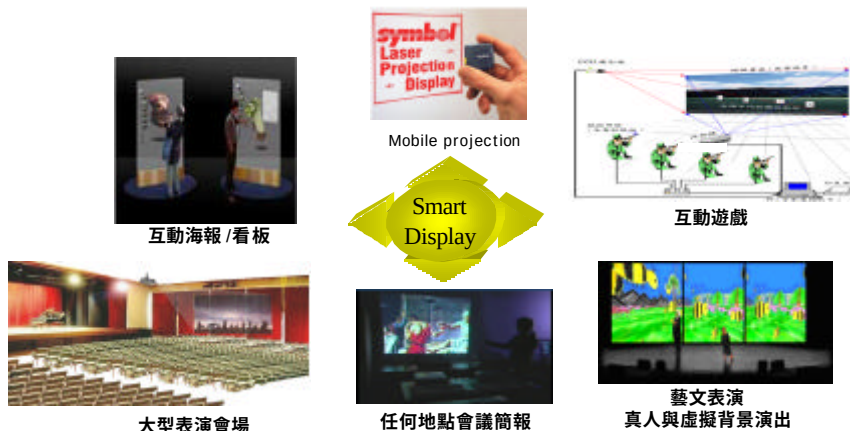
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Application Scenario – Display Everywhere (cont.)

- Smart Display 的應用相當廣泛，從資訊設備升級(Projector, Camera, Smart Phone)，到新形式的生活應用(Interactive Entertainment, Interactive Museum/Exhibition/Show)，Smart Display 技術都能大幅提升其產品/服務的價值以及競爭力。

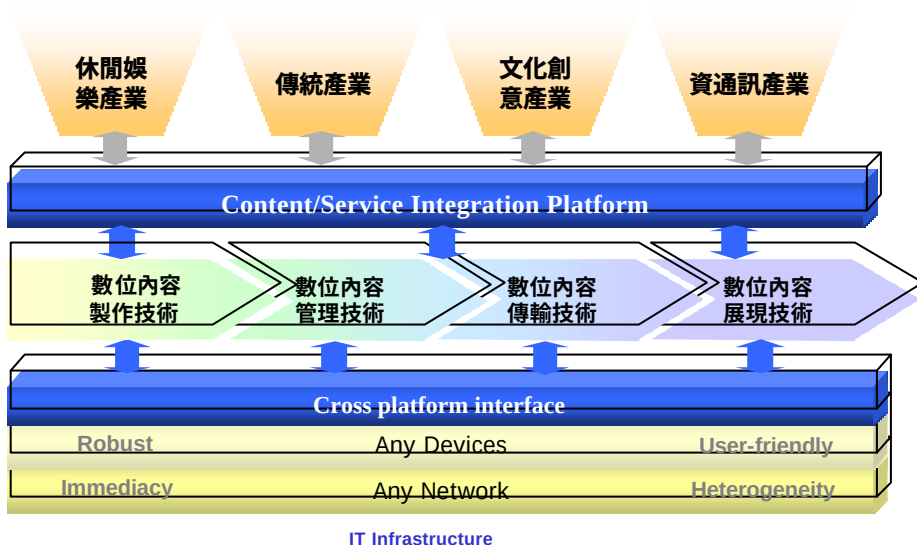


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Application/Service Infrastructure



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Conclusions



What's Happening Around Us?



Communication
+
Computation



Cooperation
+
Ubiquity



Social Revolution





m-Taiwan

應用無線，行動台灣，創造服務新紀元!!

行動生活

行動服務



資料來源:
經濟部通訊產業發展推動小組

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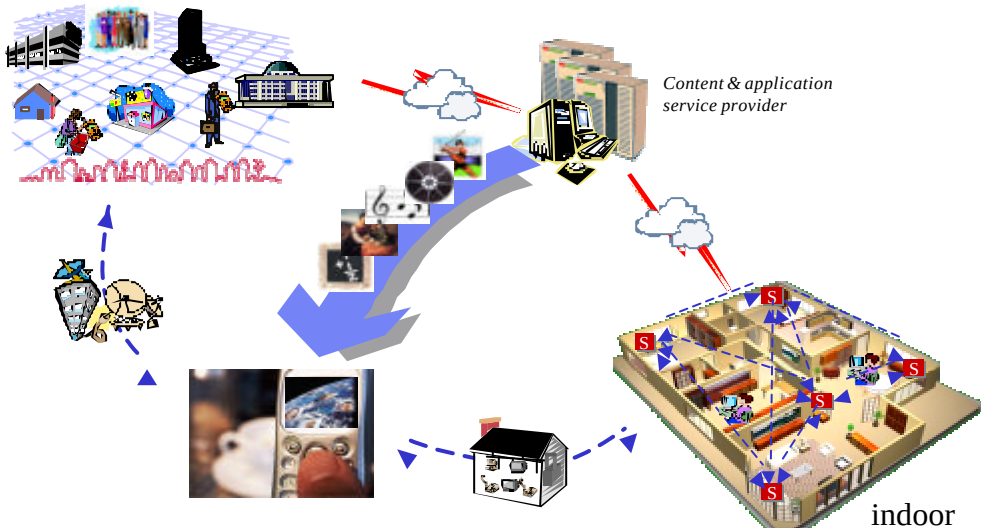
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願景 - 建立行動智慧生活環境

outdoor

These can all be incorporated into a collaborative lifestyle



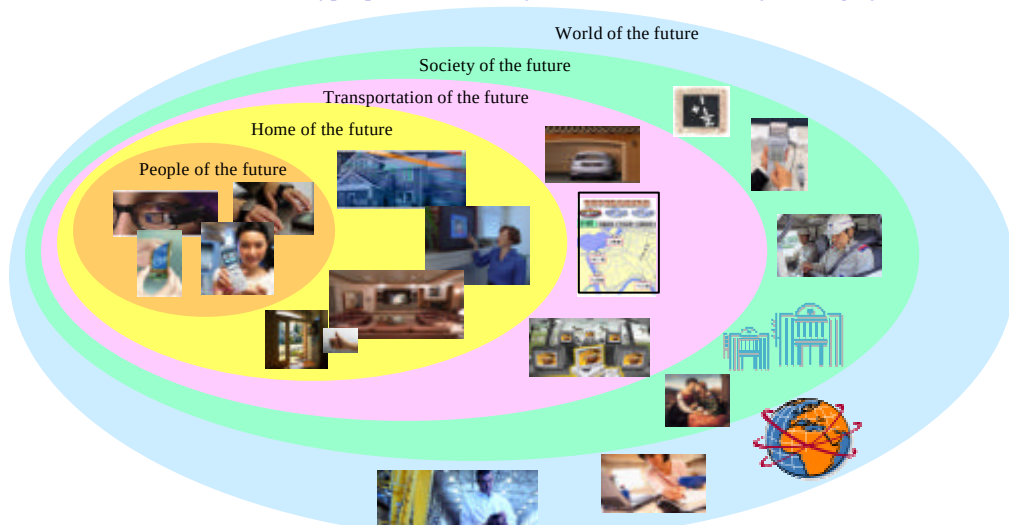
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願景 - 建立行動智慧生活環境（續）

The connection of people, home, society and world with mobility & ubiquity

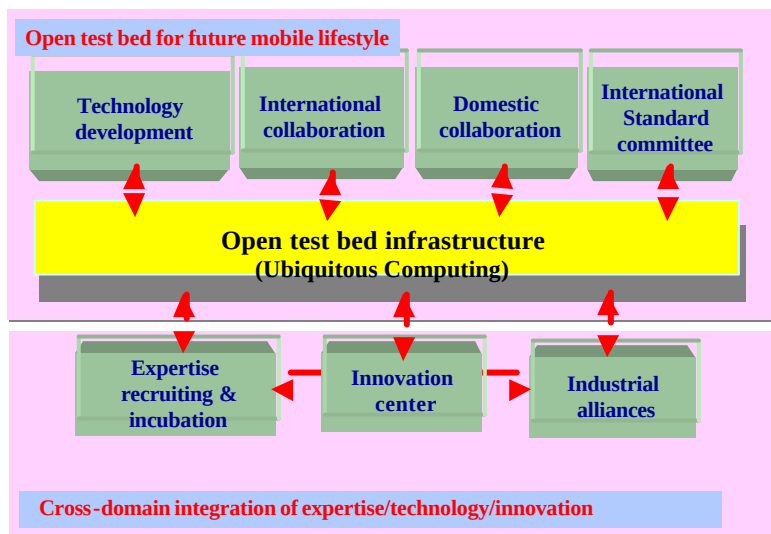


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願景 - 建立行動智慧生活環境（續）



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Conclusions

- Future handset will be more & more powerful, becoming the centric of future mobile life/ubiquitous society
 - Remote control & DECT at home
 - Portable media player for entertainment & education, ...
 - Media communication over any available channel with best quality & interaction
 - Can be plugged with any ICT facilities
- S/W and contents play important roles (both in client and service side)
 - Integrated with embedded H/W & OS for efficient media processing
 - Adaptive for different applications for flexibility
 - Adaptive for user behavior (intention, attention, ...)
- **科技始終來自人性**
 - 貼近人性化設計之產品才有賺頭!!!
- **修身、齊家、治國、平天下**
 - 修身：協助improve個人生活品質
 - 齊家：一統管理家用設備
 - 治國：society之行動服務將有well-managed體系
 - 平天下：建立global connected環境



Thanks for your attention !!!

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