Wireless Game Engine

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TTPCom Danmark ApS

TTPCom's Wireless Game Engine (WGE) enables and accelerates the development of games for mobile phones.

inside wireless game engine
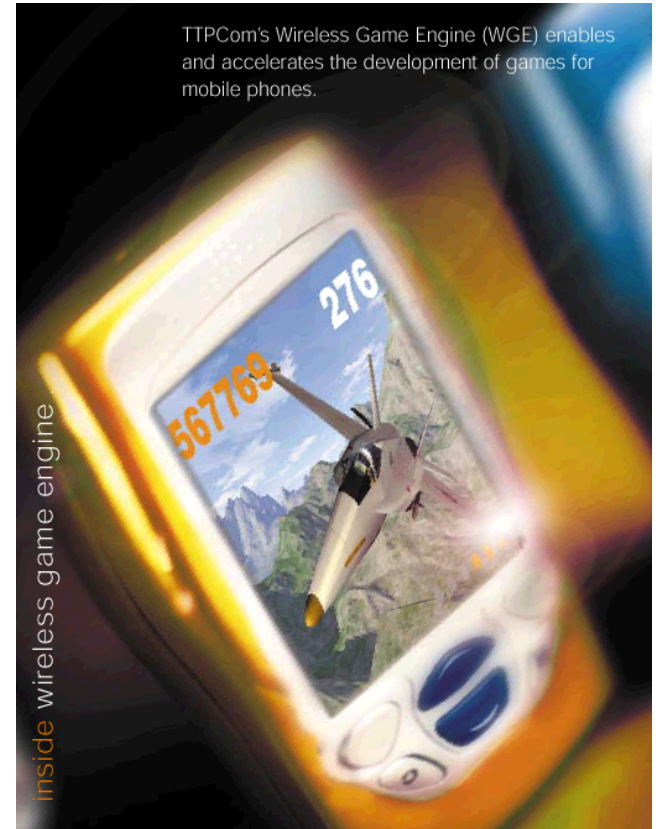
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Agenda

- TTPCOM short presentation
- The WGE concept
- Demonstration
- Technical challenges when developing games for mobile phones
- WGE or/and Java ?
- Wireless Game Engine - a real end to end solution
- Overview of the different games
- Towards mass market acceptance
- Summary and Questions

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TTPCOM at a glance

- Created in 1988, Floated in 2000 – Valued at €500,000,000
- 300 employees worldwide (UK, DK, USA, Japan, Singapore)
- Customers : ADI, Intel, ST, Toshiba, Hitachi, Samsung, RIM, Panasonic, Benq(Acer), Benefon, Maxon, Siemens ...

GSM GPRS EDGE 3GPP Bluetooth Applications

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Solutions

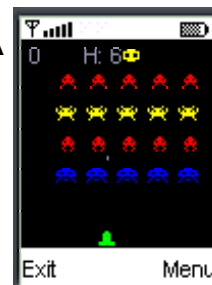Tuesday, 12 February 2002Presentation Title
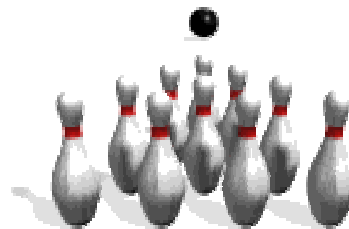Version Number   xxx
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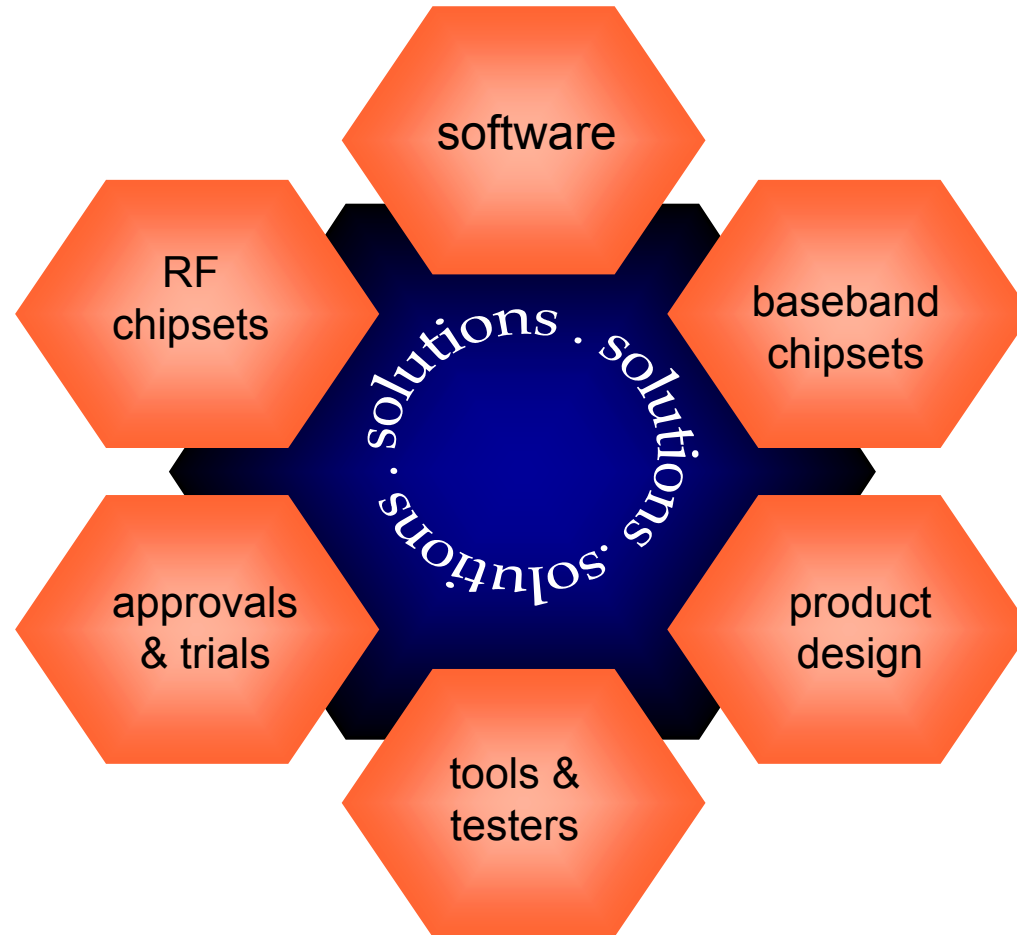
Let's play !

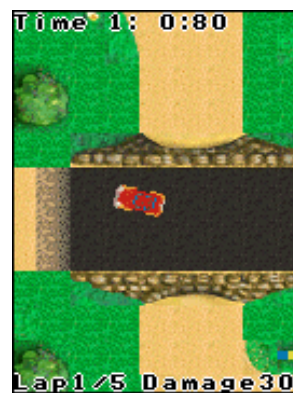- SMS (text based)

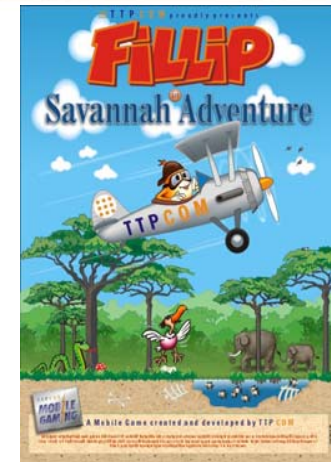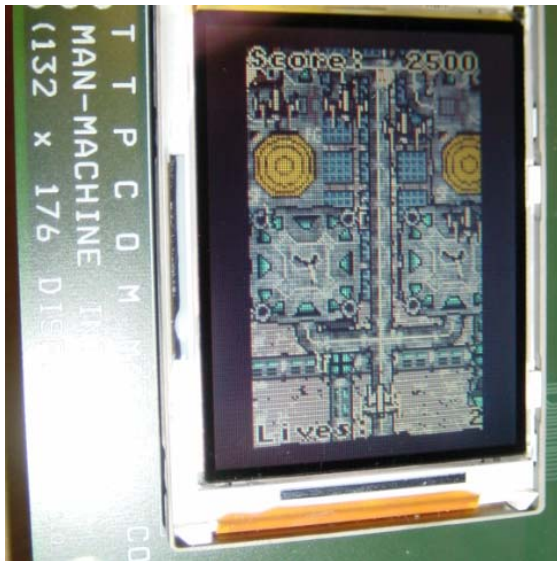- WAP

- Virtual Machines (VM) like JAVA

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Goal

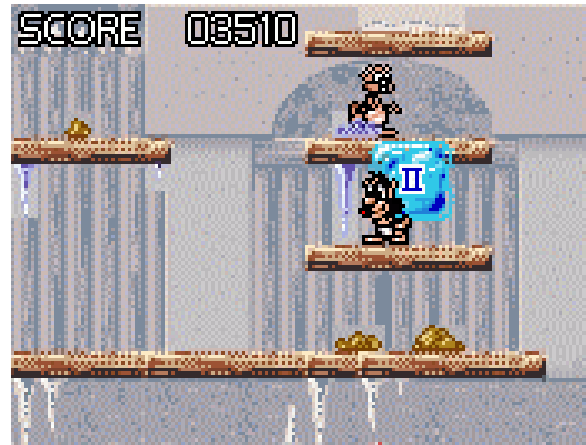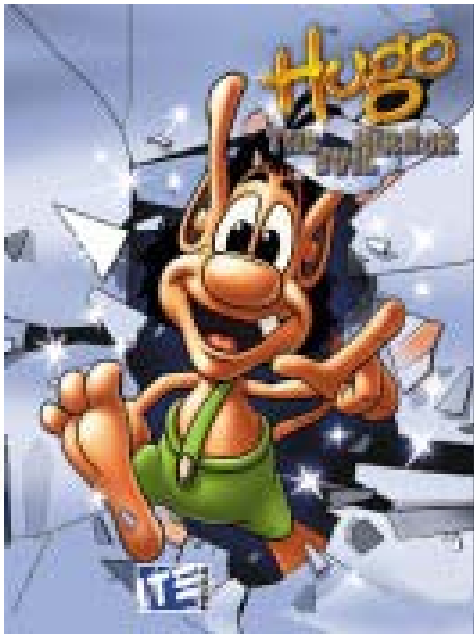- February 2001: "Our goal is to offer in 2002 a handheld console equivalent gaming experience on mass market mobiles phones while using standard hardware"

- November 2001 – Product released

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TTPCom games
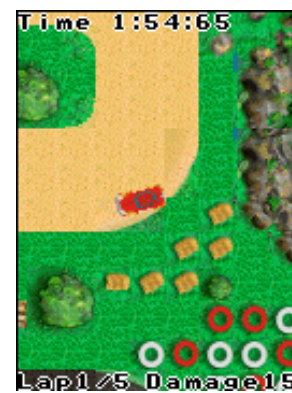
ITE Games (Direct port from GameBoy Advance)

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WGE Memory budget

	FLASH	Runtime RAM
WGE 2D,INPUT,SOUND,SYSTEM,NET	**42 kB**	**0,1 kB**
Secure Download Module WAP interface+crypto Can be reduced	**20 kB**	**7 kB**
Hurricane Space Fighters 4 Greyscale	**30kB**	**1kB**
Hurricane Space Fighters 256 colours palette for 16bit display	**75kB**	**1kB**

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The Business Concept

Premium price

High quality/
branded games

Revenue sharing

High quality
content

Handset Manufacturers.

Game Developers

Network Operator

End User

Royalty or
other model

High quality/
branded games

Loyalty &
increased ARPU

Attractive product
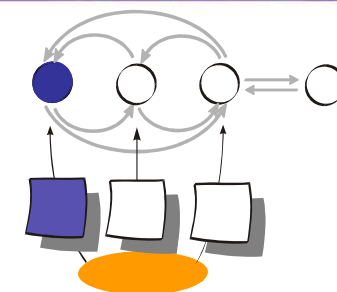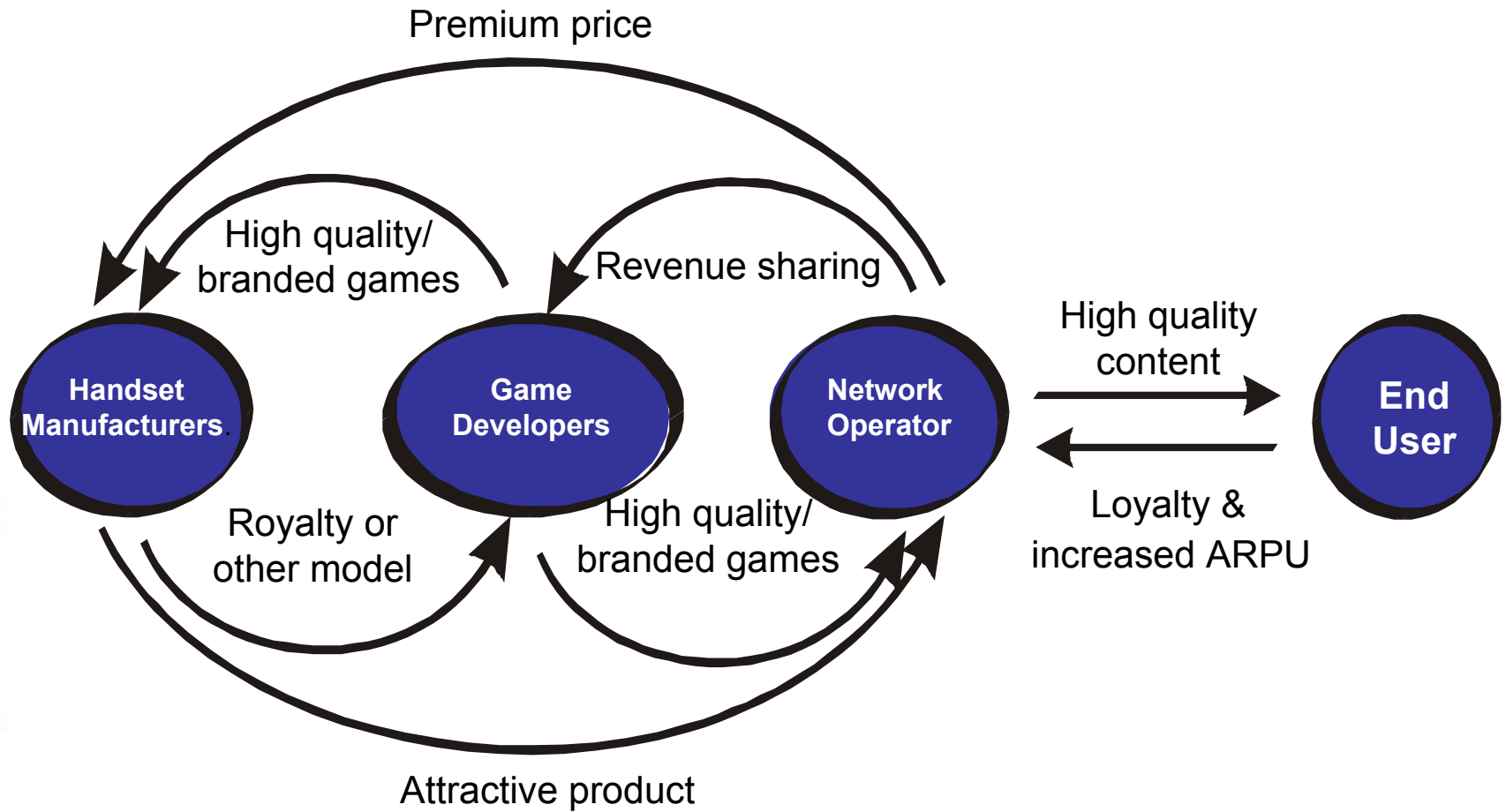
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TTPCom's End 2 End Solution

NETWORK
OPERATORS AND WASPS

SERVER

END 2 END
SOLUTION

GAME
DEVELOPERS

SDK

CLIENT

HANDSET
MANUFACTURERS

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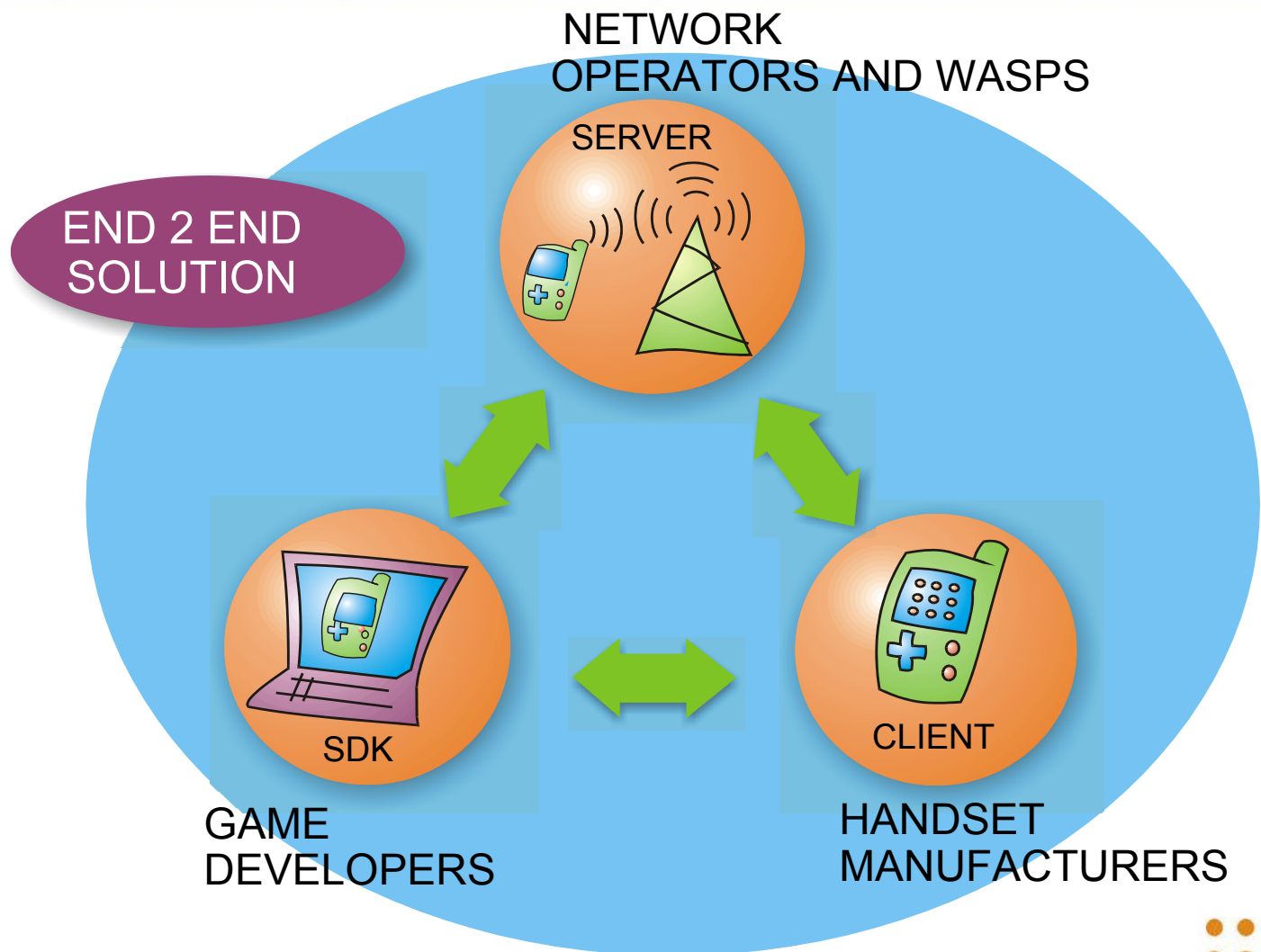
Operators business opportunities

- **Game sizes :**
  - **20kB in black and white**
  - **30kB in grey scales**
  - **70kb for 8bit and 16bit colour displays**

- **Customer acceptance**
  - **70 % to play with the bundled games**
  - **14 % will buy 1 game per year**
  - **10 % will buy 2 games per year**
  - **6 % will buy 3 games per year**

- **Price of the games**
  - **10€ per GameBoy like full game (GameBoy games cost 50€)**
  - **1€ per level**

- **Quick calculation:**
  - **5M handsets, airtime for NO, 50/50 deal NO / GameDev and 30% for 1 game per year**
  - **7,5 M€ / year revenue for the operator + 57 Gigabytes network traffic**

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Target Products

Segments	Subsegments	Mobile type	Market size	Driver	Application Interface
Data	Modules		1	Applications	AT
Data +Voice	Communicator		1	Business	Epoc,pJava,MIDP
	Smart Phone		1	OS	EPOC/Stinger
Voice +Data	High/Prestige		2	Technology	Java VM
	Professional		22	Features	Java VM
	Consumer		25	Design	None
	Entry		40	Price	None

Focus area

The Wireless Game Engine is targeting the mass market

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Java or WGE for games ?

137 kBytes

170 kBytes

30 kBytes

185 kBytes
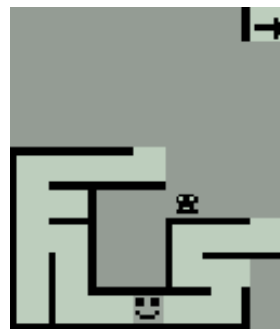
57 kBytes

JAVA Games (1 sprite layer)

http://www.wirelessgamingreview.com/previews/nextelgames010302.php
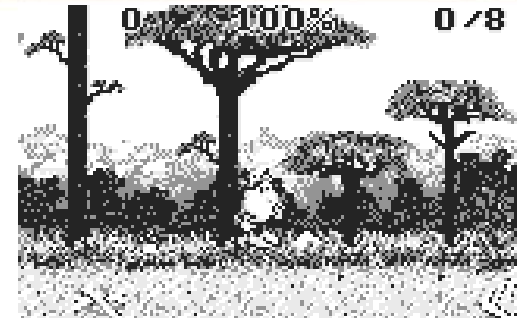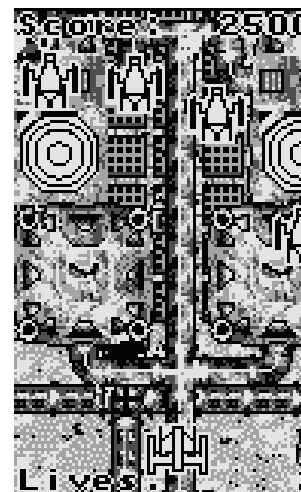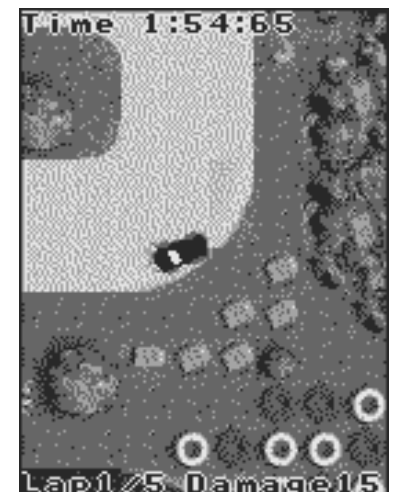
30 kBytes

30 kBytes

WGE Games (1 sprite layer +2 or 3 gr layers)

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Both : WGE and Java !

- Combining the best of two worlds :
  - **"Enabling Java for WGE performances"**

- Java
  - Existing provisioning platforms
  - Easy to write code
  - Java is a recognised standard
  - Easy marketing towards operators

- WGE
  - Small footprint
  - High performances

Common provisioning mechanism
Common MMI

Native WGE Games

Java Games

Standard Java API

JVM

JAVA

WGE C++ API

JNI towards WGE

WGE core 40kB

Hardware

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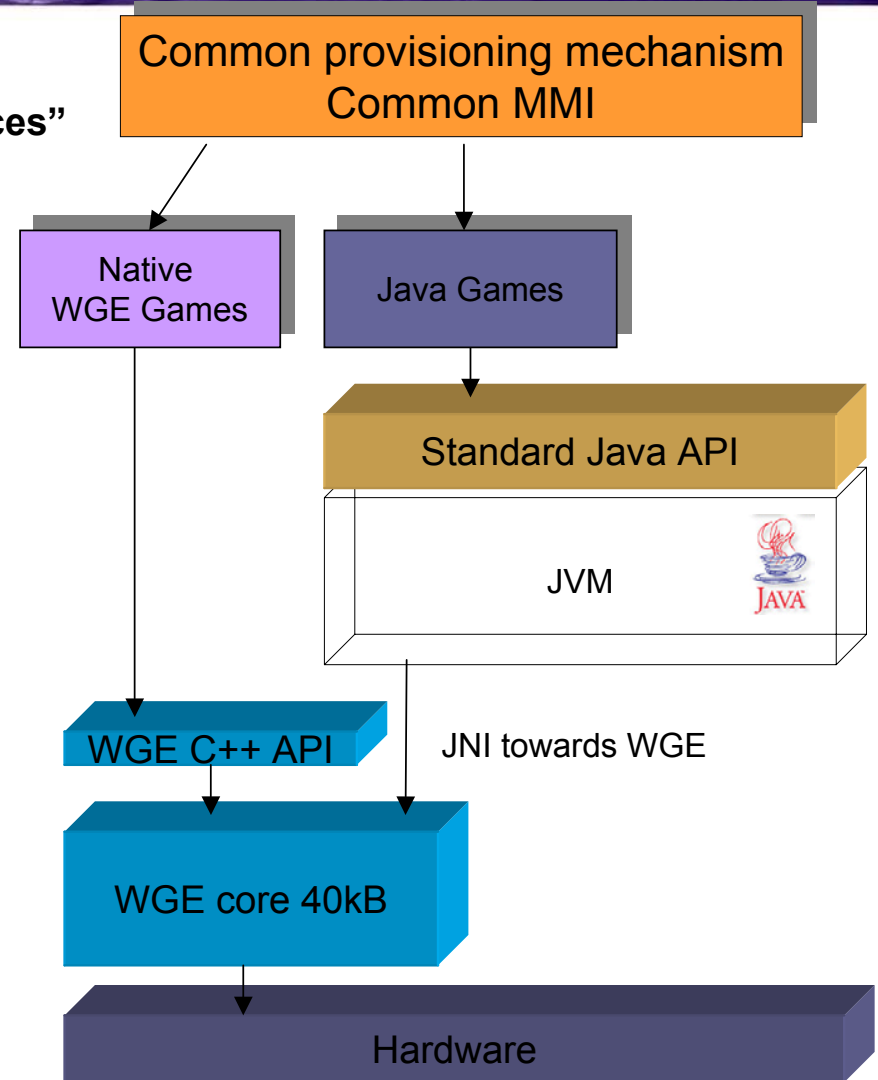
Technology overview

Handheld Gaming

Nintendo Handhelds 1980

Matrix LCD

Nintendo GameBoy 1990-2001

8 bit Z80
160*140
Bw

32 bit ARM7
240*160
Colour

Wireless Mobile Gaming

Proprietary Games Since 1993

C code
Single
Layer
BW
Low fps
Compact

ML Games 1999
Single layer
Low fps
Multiplayer

VM Games 2000
Single layer
Low fps
Sprites
BW/Colors
Power consuming

Footprint :
150->400kB
J2ME

WGE 2001

Multiple layer
High fps
Transparency
Tiles/Sprites
BW/Colors
Compact
C++ code
Mutliplayer
Footprint :
40kB

WGE 2002-2003

3D
C++ AND Java Interface
MGIF Compliance

Basic 2D gaming

Highly Interactive 2D/3D Gaming

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SAFE DOWNLOAD SYSTEM

Handset

Server

Wap request for game → Info send: Mobile model, Language and phone number →

Info send: Url location for game and size ← WGC file (encrypted descriptor file) + session key used for encrypting session data ←

Wap connection to Url verifying with session id →

WGA file (Game file) encrypted with session key ←

Billing verification – Game Installed OK →

Billing verification – billing Ok. Release game for playing. ←

Server Public key

Phone Private key

Data

Phone Public key

Server Private key

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Porting

- **WGE works out of the box on 72% of the handsets**

- WGE is developed for the ARM 7, ARM 9 architectures

- WGE can also be compiled to other MCU (Hitachi, Intel, Infineon)

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Easy Porting

MMI

WAP 1.2.1 Solution

WGE MMI Driver

WGE Wap Driver

Pointer to display-area/Buffer Low level acces

WGE Display Driver

WGE Core Library
2D,Input, Output, System, Download

WGE Audio Codec Driver

GSM Wave

RTTTL

Trembler

MP3

WGE System Driver

WGE Input Driver

File System

Memory Alloc

Keypad Driver

WGE CORE

WGE drivers

Platform SW

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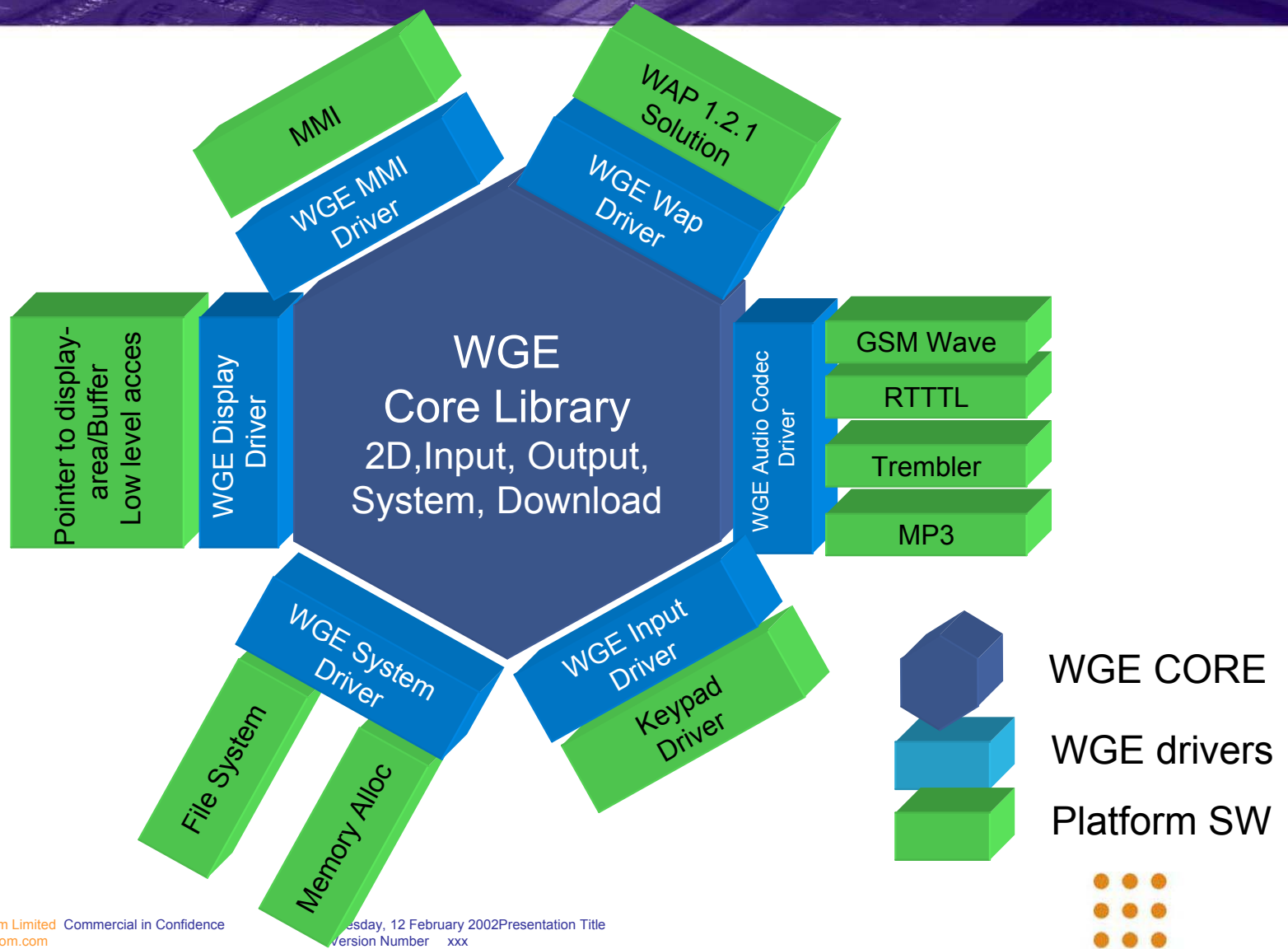
Porting Details - Deliverables

- Compatibility
  - Straight forward port to ALL ARM enabled handset (72% of the handsets)
  - Also possible with other technologies (SH, Infineon...) but requries more porting time

- WGE Core
  - ARM7/ARM9 Core library compiled for SDT or ADS ARM compilers
  - WGI API provided as h files

- WGE Drivers
  - Sample code provided as c/c++/h files

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Game studios

More information

www.9dots.net
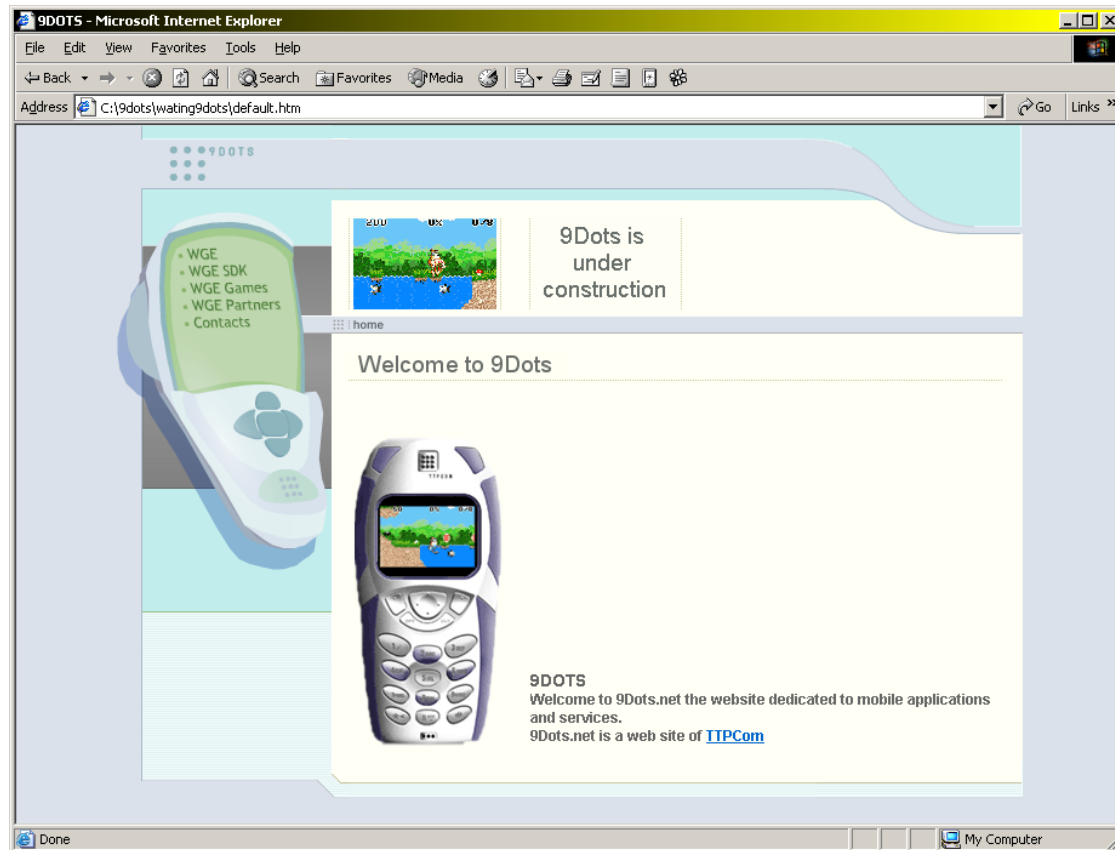
The road for Mass Market Adpotion of WGE

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Terminal manufactures

- Built on an Industry Standard (ARM) and easily portable to 72% of the handsets
- Very low footprint very low RAM usage
- Justifies by itself the move to colour display
- Minimal cost
- Strong differentiator from existing gaming solutions
- Technology showcase with high graphics performances
- Co exists with JAVA
- Transparent technology for the user who sees WGE and Java apps in the same menus
- Safe execution environment

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Network operators and WASP

- Functioning on existing network infrastructures (WAP)
- Flexible and Open software
- Revenue sharing = risk sharing
- User Transparent Technology
- PKI mechanism for optimal Digital Rights Management
- Airtime machine

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Game developers

- Easy to use SDK integrated into standards IDE (Borland, Microsoft)

- C++ as most of the code they produce (IDC estimates : 2.6M C++ developers, world most used programing language)

- Can be developed on PC

- Performance driven

- Can port existing games (GameBoy, GameGear, classics...)
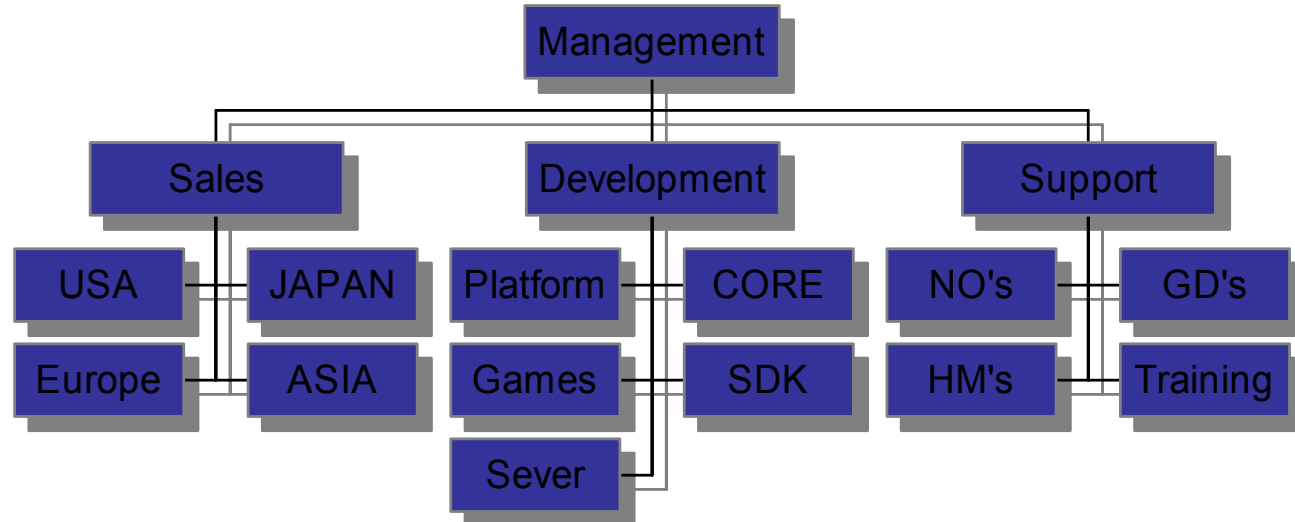
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The end user

- Best possible gaming experience on mobile phone 10 times better than Java and clones
- Playability, interactivity, colorfull ...
- Mutliplayer
- Cheaper games than GameBoy games
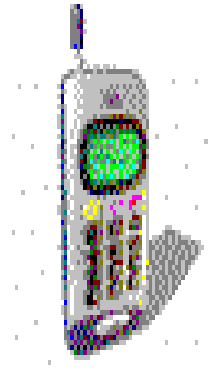- Easy download mechanism

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Roadmap

- The gap between WGE and Java will remain constant (even when JAVA becomes hardware accelerated)

- Java can always take advantage of WGE

- Following the wired gaming history

- WGE 2002 : FAST 2D Graphics on ARM7, Basic 3D on ARM7
- JAVA 2002 : Basic 2D on ARM7

- WGE 2003 : FAST 2D Graphics on ARM7/9, FAST 3D on ARM9
- JAVA 2003 : Better API but slow 2D graphics on ARM7 (NG)

- WGE 2004 : FAST 2D/3D with texture mapping on ARM9
- JAVA 2004 : FAST 2D Graphics on ARM9 Jazzelle (NG)

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Organized for growth

- TTPCOM are focussing on Wireless Gaming and have established an organisation, supporting rapid growth

```
                        Management

        Sales           Development          Support

    USA     JAPAN    Platform    CORE      NO's      GD's

  Europe    ASIA     Games       SDK       HM's     Training

                     Sever
```

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Thank you
Questions?

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