Game Platforms for Mobile Devices

Johan Sanneblad

Future Applications Lab
Viktoria Institute, Sweden
New mobile services require new mobile software platforms
New mobile services require new mobile software platforms

- **Problem #1 - Mobile real-time interactive graphics**
  - Slow (GDI, Java)
  - Difficult (Direct access)
  - Hot topic (Siggraph 2002 panel - “Unsolved Problems in Mobile Computer Graphics and Interaction”)

- **Problem #2 - Mobile ad hoc network applications**
  - GPRS/UMTS did not deliver (>2s latency, low bandwidth etc)
  - Connecting devices ad hoc is now easy (using ZeroConf etc)
  - Creating ad hoc network apps is difficult (auto multicast, guaranteed UDP, congestion control, service discovery, ...)
  - Hot topic (CHI-, UbiComp-, and CSCW-workshops)
New mobile software platforms may lead to new mobile services
The plan

- In early 2000 I began to work on two software platforms:
  - One platform for real-time graphics
  - One platform for ad hoc network applications
- Estimated development time: 2 years part time
- Goal: To enable the creation of interactive and real time ad hoc networked services on mobile devices.

One of many popular Nokia games
Graphics platform 2002 : GapiDraw
Graphics platform: GapiDraw

- Graphics library for Stationary PCs, Pocket PCs and Smartphones (OSX, Linux soon)
  - Low level layer: hardware accelerated and DirectDraw compatible
  - High level layer: one student created an advanced Tetris clone in less than three hours (with real time zoom and animated blocks).
- DirectDraw superset - existing commercial games can be ported to handhelds in a few hours
- Supports hardware acceleration when available (applications can run in accelerated windowed or full screen mode on Stationary PCs)
- Really optimized (meta-programming, surfaces are stored in native display orientation, ASM analysis)
GapiDraw: Some features

- Supports most image formats (png, jpg, gif, etc)
- Bitmapped fonts (with kerning & tracking)
- Real-time rotation and zoom
- Real-time alpha blends
- Real-time color tints and colorizations
- First release: March 2002
- Current user base July 2002: More than 100 active developers, ~30 commercial games in 3 months
GapiDraw: Some games...
Ad hoc network platform 2002 : OpenTrek
Network platform: OpenTrek

- Designed to be used on Zero Configuration systems
- Works on Stationary PCs and Pocket PCs (Smartphone, OSX and Linux support is in development)
- Supports ad hoc networks:
  - “Communicate with people within my proximity”
  - Uses a custom-built network module with the exact same feature set as DirectPlay (auto multicast, reliable UDP, message fragmentation, congestion control, timeouts)
- Supports client/server networks:
  - “Communicate with people in the current chat room”
  - Uses DirectPlay for communication
- Supports IR networks:
  - “Communicate with the person next to me”
  - Uses a custom-built IR module
OpenTrek: In use

- 30 students created 12 advanced multiplayer games for handheld devices in less than 4 weeks
- All games used GapiDraw & OpenTrek platforms
- Shared game boards
Other uses

- GapiDraw & OpenTrek are today used in several industrial applications, including:
  - Medical Applications
  - Robot Control Systems
  - Flight Management Systems
  - ...
- And of course many research labs...
To summarize

- **GapiDraw** - mobile graphics platform
  - Free, downloadable from www.gapidraw.com
- **OpenTrek** - mobile ad hoc network platform
  - Free, downloadable from www.opentrek.com

- What you need:
  - Some (minor) knowledge of C++ or Java
  - A development tool (VC++ or the free EVC++)

- -> Live Demo <-

Johan Sanneblad
E-mail: johans@viktoria.se
Web: http://www.viktoria.se