BlackBerry Operating System

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Topic Outline

- Introduction
- History of BlackBerry OS
- BlackBerry OS Architecture
- Memory Management
- Interrupts
- Multi-Tasking
- Future of BlackBerry
- Conclusion

Introduction to BlackBerry

- The BlackBerry is a Smartphone device released by Research In Motion (RIM) in 1999
- Since it was released, its popularity soared due to following functions:
  - ability to send and receive internet e-mail using the "push" method of delivery
  - phone and texting functionality
  - supports Internet faxing and Web browsing
  - supports the viewing of Office applications
  - ability to support numerous other wireless information services

Introduction to BlackBerry

- Bonus's of BlackBerry:
  - good choice of carrier
  - choice of devices
  - multitasking features
  - multimedia Messaging feature
  - e-mail and corporate integration
  - memory card slot
  - removable battery

Introduction to BlackBerry

- The BlackBerry Operating System is a software platform developed by its manufacturer RIM
- Its OS provides multi-tasking that maximises use of the devices specialised platform including:
  - trackball, trackpad and touchscreen
- Updated versions of the BlackBerry OS are released regularly to support new BlackBerry Smartphones
  - latest OS version is OS 5.0
- The current version of the OS allows complete wireless activation and synchronization with Exchange's email, calendar and other features

The History of BlackBerry

[Video History of the BlackBerry]

The History of BlackBerry

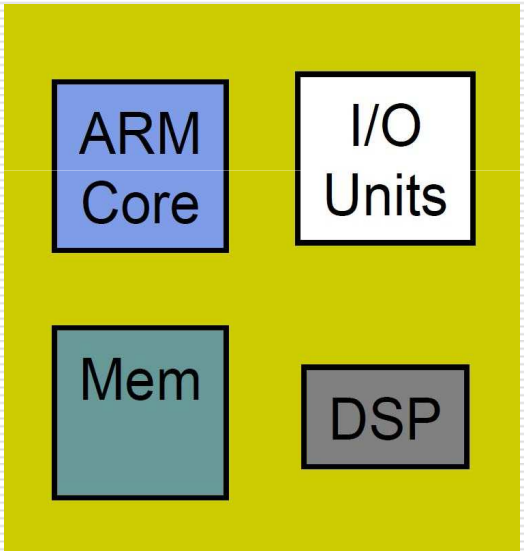
- Early versions of blackberry were simply two-way pagers, that were particularly popular in business for their focus on e-mail facilities, as well as providing wireless internet and calendar functions
- With the release of the 5000 and 6000 series, BlackBerry made the switch to mobile phones and introduced a Java-based kernel
- The 7000 series followed, and were the first to feature colour screens and Bluetooth capability
- The 8000 and the 9000 series were the first to be targeted at general consumers, incorporating more commercial features, such as built-in cameras, memory card slots and clearer screens

BlackBerry OS Architecture

- For the purposes of this presentation, we have chosen the BlackBerry 9000 series, which runs v5.0 of the BlackBerry OS
- This version of the BlackBerry OS has a Java based kernel, and utilizes an ARM architecture with an Intel XScale processor
- ARM is a Reduced Instruction Set Computer (RISC) type instruction set architecture
- It uses 16 x 32-bit registers, 1 processor status register and a load/store architecture

BlackBerry OS Architecture

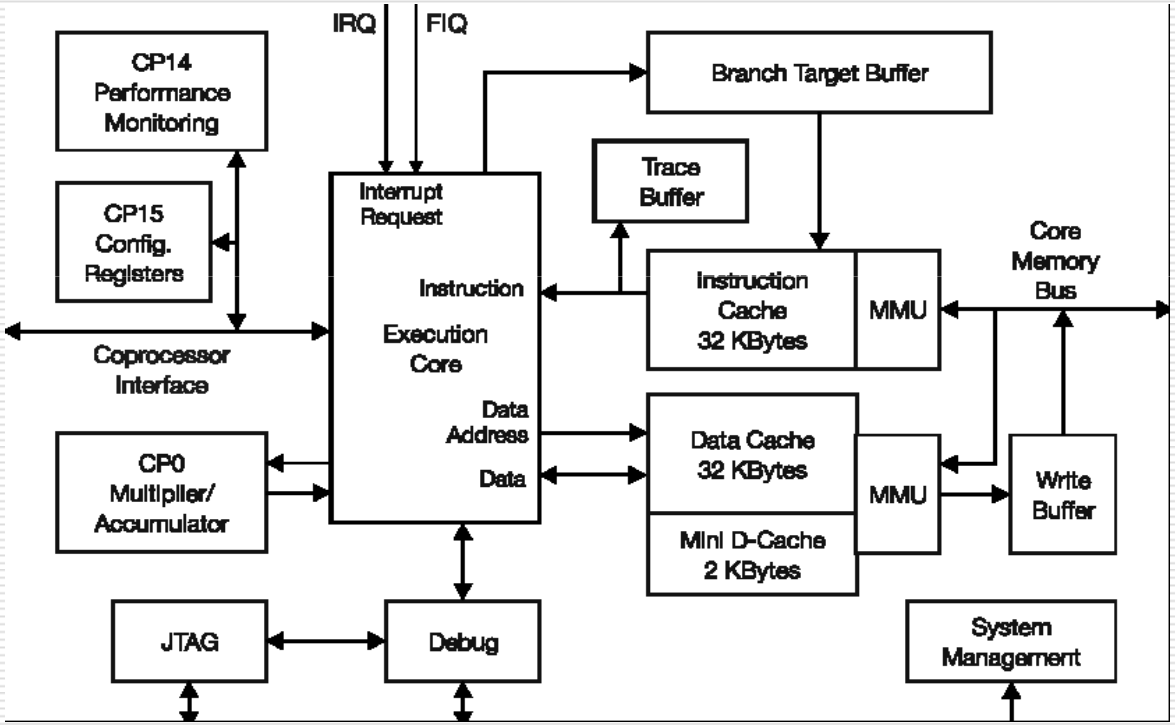
- ARM does not manufacture its own CPU chips, but licenses it to other manufacturers to integrate them into their own system
- The latest series of BlackBerry phones (the 9000 series) uses a XScale micro-processor core
- This processor utilizes an open source bootstrap firmware called RedBoot (Red Hat Embedded Debug and Bootstrap), designed for embedded systems



ARM Core

BlackBerry OS Architecture

- The ARM v5TE Instruction Set



Memory Management

- Memory is divided into three sections:
  - Application Memory (~128MB)
    - a dedicated memory space for application storage and overhead
  - Device Memory (~850MB)
    - for storing files and other media
  - Memory Card (optional)
    - an optional method of file storage

Memory Management

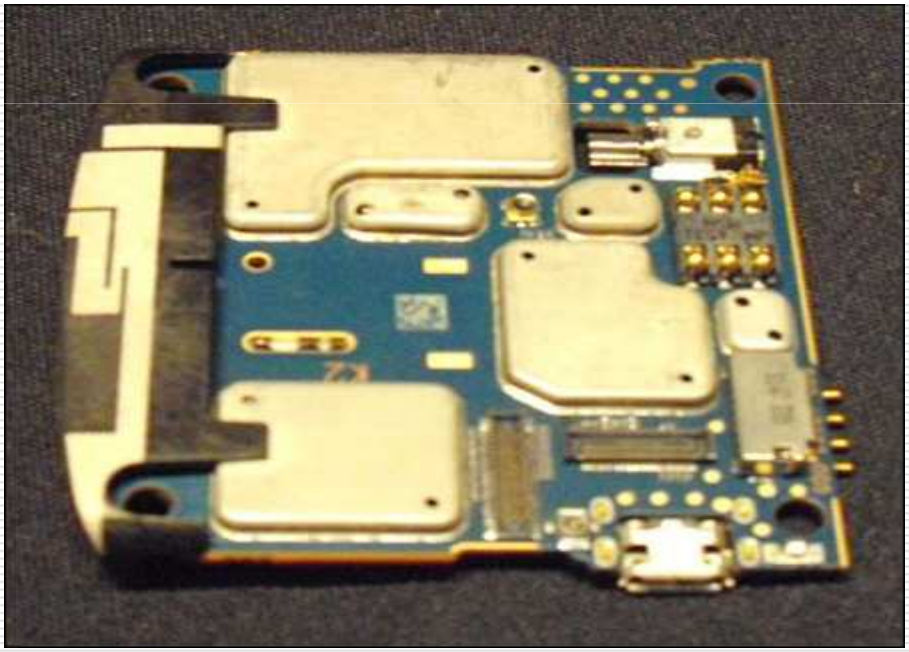
- A common criticism of the BlackBerry is that Device Memory cannot be allocated to supplement Application Memory
  - this is especially inconvenient as Application Memory handles all the overhead for running apps. If the device also has memory card storage, this makes the Device Memory redundant
- Also, the memory manager does not release memory after applications are closed, which can lead to a considerable slowdown of the device over time or prolonged use
  - this is a major drawback for a device that is primarily marketed at those in business

Interrupts

- A feature of the ARM architecture is to allow designers to make the decision between performance vs. latency tradeoffs
- For example:
  - instructions that would normally run to completion can be made interruptible where low latency is a priority
- This is particularly useful in the case of mobile phones or other telecommunication devices, which run on embedded systems that require low latency to perform adequately

Sample CPU board

- Blackberry Storm: CPU board
  - Contains a Qualcomm chipset with a 528 Mhz processor and both EV-DO and HSDPA modems



Multi-Tasking

- The BlackBerry supports multitasking
- It can thus run more than one application at a time
- For example:
  - while making a call, you can switch to the calendar or contacts application
- These applications run in the background while carrying out current task
- However, the more applications that are running, the more memory used by device

Future of Blackberry

- The future of blackberry is looking very upbeat.
- RIM has plans to release new improved models in the coming year with the following features:
  - Improvement of browser with full Flash and Microsoft Silverlight support
  - Upgrading of speed with LTE devices that can achieve speeds of up to 10 Mbps
  - Upgrading of operating system to OS 6.0 in next few months
- The new OS will feature kinetic scrolling and should further enhance its popularity in industry

Conclusion

- The blackberry OS is the software platform within the device
- Each new OS version, in turn leads to better browsing facilities and larger memory
- The blackberry is on par with the iPhone as a smartphone leader
- It may even surpass it due to it’s multitasking features and ability to support wireless devices!

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