BlackBerry Operating System

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Topic Outline

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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.
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 microprocessor core.
- This processor utilizes an open source bootstrap firmware called RedBoot (Red Hat Embedded Debug and Bootstrap), designed for embedded systems.
BlackBerry OS Architecture

- The ARM v5TE Instruction Set

![Diagram of BlackBerry OS Architecture](image)
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
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
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 its multitasking features and ability to support wireless devices!
References

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