CMER

Centre for Mobile Education and Research

BlackBerry Web Services

Week III

Overview

- Mobile Limitations
- Blackberry Solutions
- Blackberry MDS
- Blackberry Enterprise Server
- MDS Developer Tools

Mobile Limitations

- When implementing a web service, you assume:
  - Reasonable processing power available
  - A reliable connection
- A mobile phone over a cellular network does not meet these requirements
  - Hardware limitations
  - Unreliability of cellular network
- Interoperability issues
  - Different standards being used

BlackBerry Solution

- A complete application platform
- Composed of multiple components and services:
  - Wireless device
  - Real time delivery of email to device
  - Wireless connectivity to the enterprise and Internet
  - “Always on” push technology
  - Security, management, and application provisioning
  - Wireless application development platform

BlackBerry MDS

- Mobile Data System
- An application development framework for the BlackBerry Enterprise Solution
- Allows organizations to deliver corporate data wirelessly
- Leverages the BlackBerry push delivery model

BlackBerry MDS (Cont.)

- **Optimized for data transmission**
  - **Minimize network traffic and costs**
  - **Responsive application experience**
  - **Maximize battery life**
- **Small application footprint**
  - **Maximize device storage available for user data**

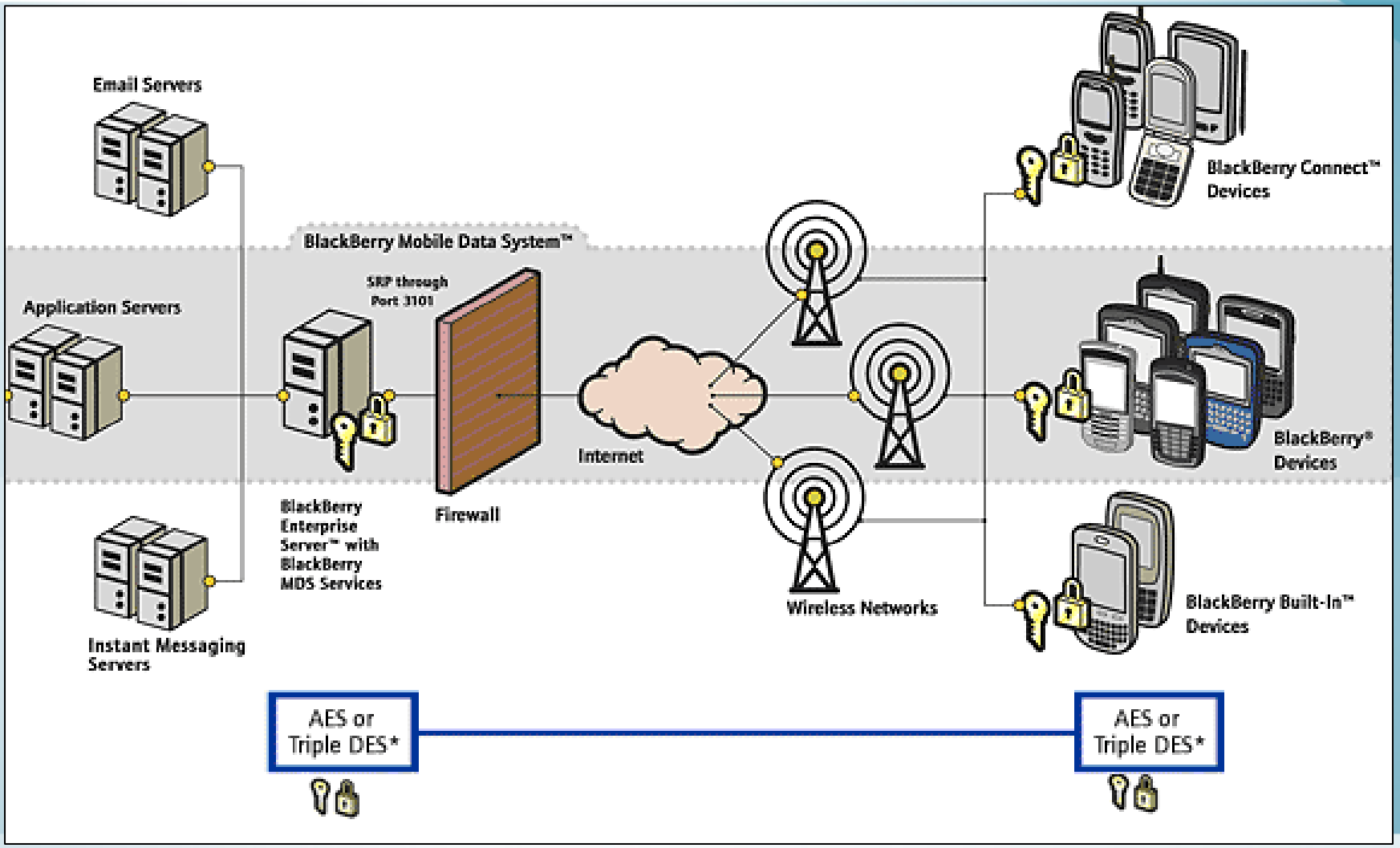
BlackBerry MDS (Cont.)

- **Support for offline operation**
  - **Local data storage and local processing capabilities**
- **Support for push delivery of application data**
  - **All the great characteristics of BlackBerry available to custom enterprise applications**
- **Support for Web services as of 2005**

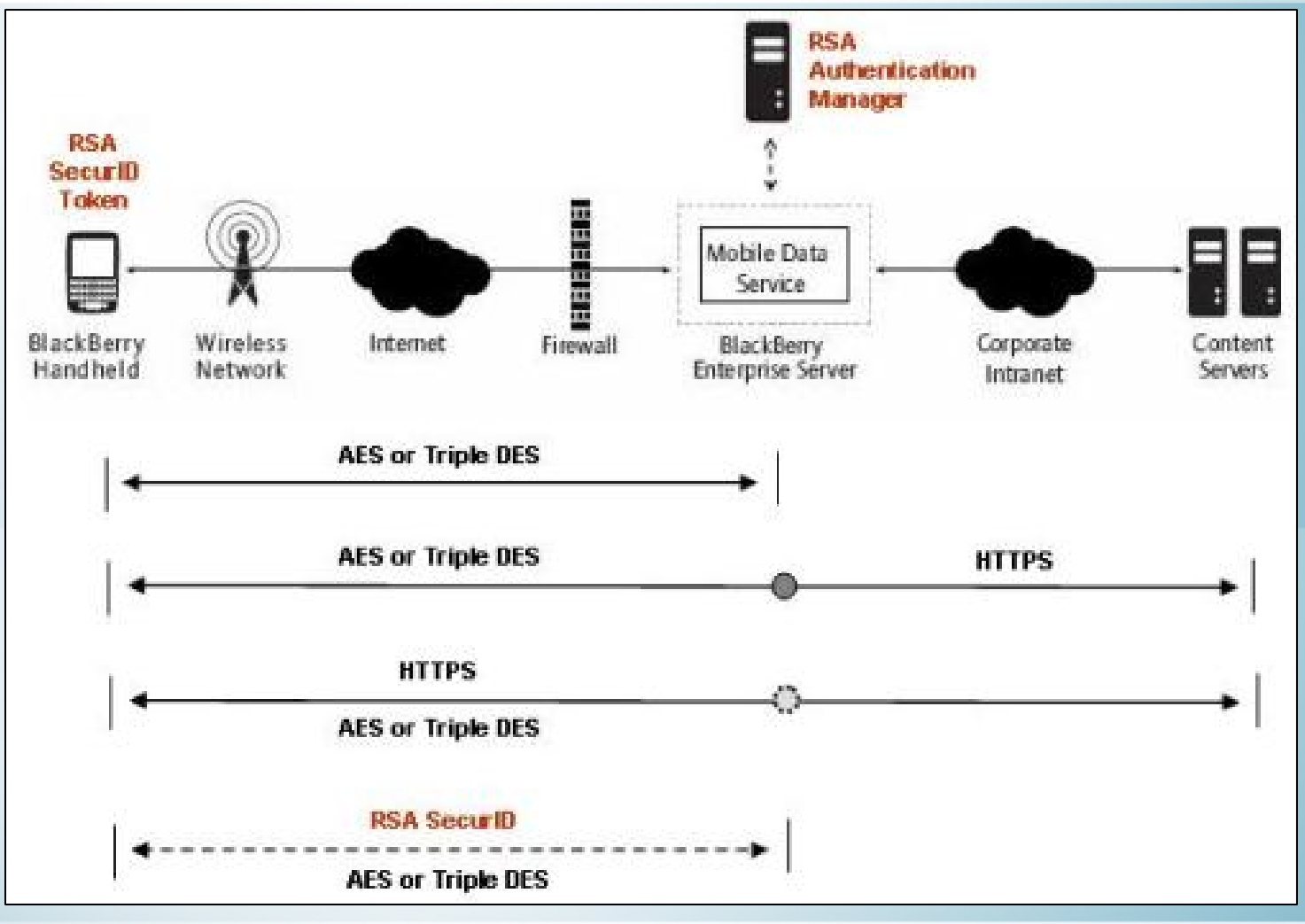
WBXML

- Wireless Application Protocol Binary XML
- SOAP and XML are not the most efficient over wireless networks
- Communication overhead usually associated with XML
- BlackBerry to MDS communications use a proprietary, compressed version of WBXML

MDS Architecture



MDS Security



MDS Security (Cont.)

- **End-to-End Wireless Encryption**
  - **Between BES and handheld:**
    - **Advanced Encryption Standard (AES) or Triple Data Encryption Standard (Triple DES)**
    - **Optionally enables HTTPS connections to application servers**
    - **Data remains encrypted in transit and is never decrypted outside of the corporate firewall.**
- **Authentication**
  - **Data sent to device is encrypted by BES using the private key from user's mailbox**
  - **Data sent from device is encrypted with secret key on device**

MDS Components

1. BlackBerry Enterprise Server
2. MDS Services
3. MDS Developer Tools
4. MDS Runtime

BlackBerry Enterprise Server

- Abbreviated as BES
- Push-based access to email; calendar, contacts, tasks and notes; instant messaging; web-based applications services and enterprise applications.
- A wireless platform that can extend your current messaging and collaboration environments:
  - **Microsoft Exchange**
  - **Lotus Domino**
  - **Novell GroupWise**

MDS Services

- Part of the BlackBerry Enterprise Server
- Manages the interactions and requests between BlackBerry smartphones and enterprise applications

MDS Services (Cont.)

- **How do they work?**
  - **The BES handles requests from BlackBerry MDS client applications and interacts with corporate applications**
  - **The actual web service request initiates from behind the corporate firewall**
  - **The BlackBerry uses a form of Wireless Application Protocol Binary XML (WBXML) to send and receive compressed XML messages to reduce communication overhead**

MDS Developer Tools

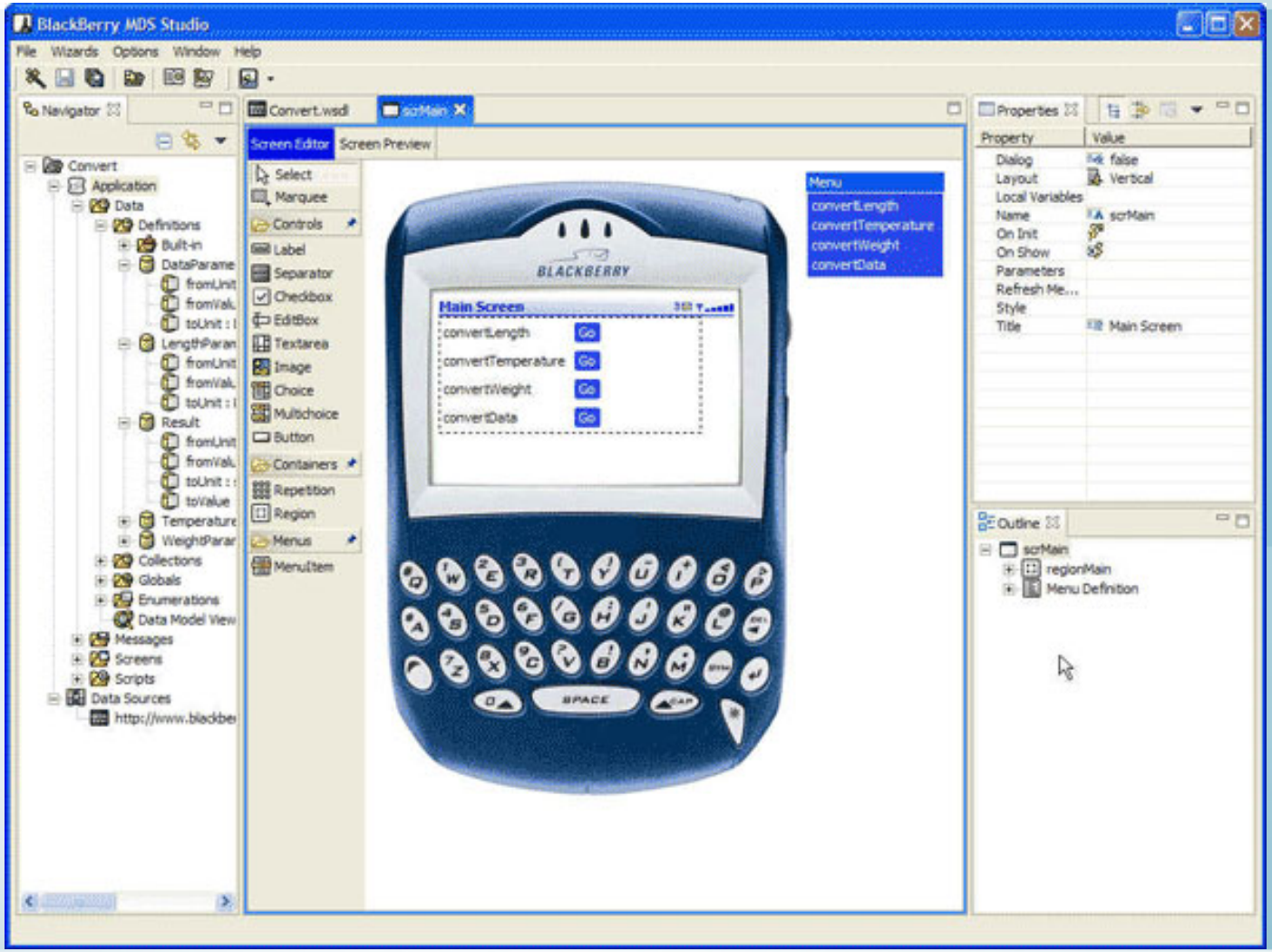
- Free to download
- Two options:

1. BlackBerry MDS Studio
2. BlackBerry Plug-in for Microsoft Visual Studio

MDS Studio

- A visual drag-and-drop developer platform used to design BlackBerry applications
  - Takes care of generating the underlying “plumbing” code to access invoke the Web service
- Centered around making web services available to BlackBerry users
  - Developers can browse to any WSDL file, find the available Web services that they would like to access and simply drag and drop them into their application
- Provides an environment to create, test, and publish BlackBerry applications

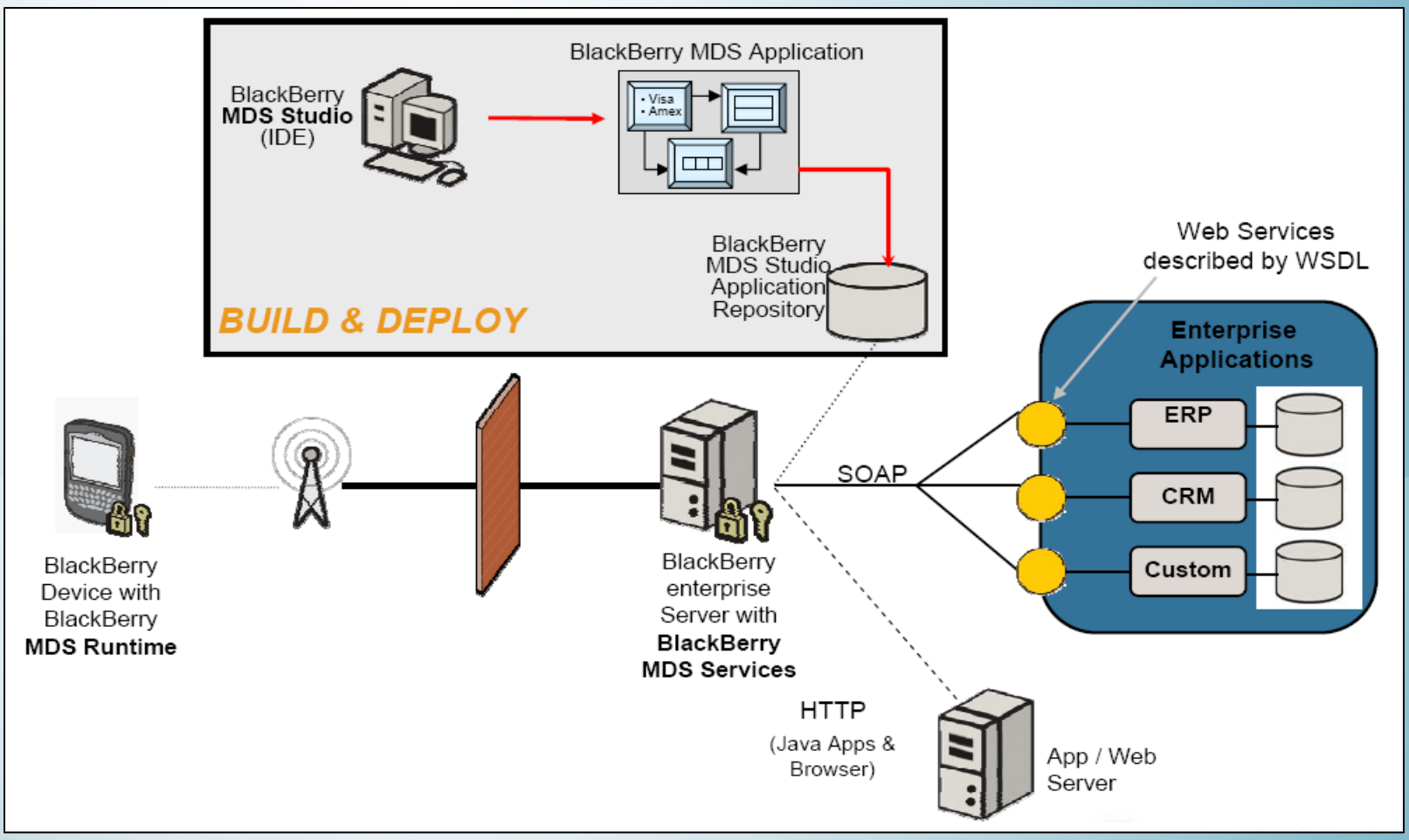
MDS Studio Screenshot



MDS Studio Architecture

- Create Web services that can access enterprise applications and data
- Develop and build BlackBerry MDS application
- Publish MDS applications to repository
- MDS applications download to client and run on MDS runtime
- MDS applications invoke Web services to access enterprise applications through BlackBerry wireless platform

MDS Studio Architecture (Cont.)



MDS Studio Approaches

1. Quick Start
2. Top-Down
3. Bottom-Up

Quick Start Approach

- A fully-automated approach
- Select a WSDL file and BlackBerry MDS Studio will generate the application screen, data, and message components

Bottom-Up Approach

- A semi-automated approach
- Select a WSDL file and BlackBerry MDS Studio will generate the data, message components, and one initial main screen
- Does not generate the entire client as like the “Quick Start” approach

Top-Down Approach

- A manual approach
- Starts from the front-end
- Developer creates screens, data, message components
- Then select a data source to manually bind application operations

MDS Studio Video Walkthrough (Click to watch video)

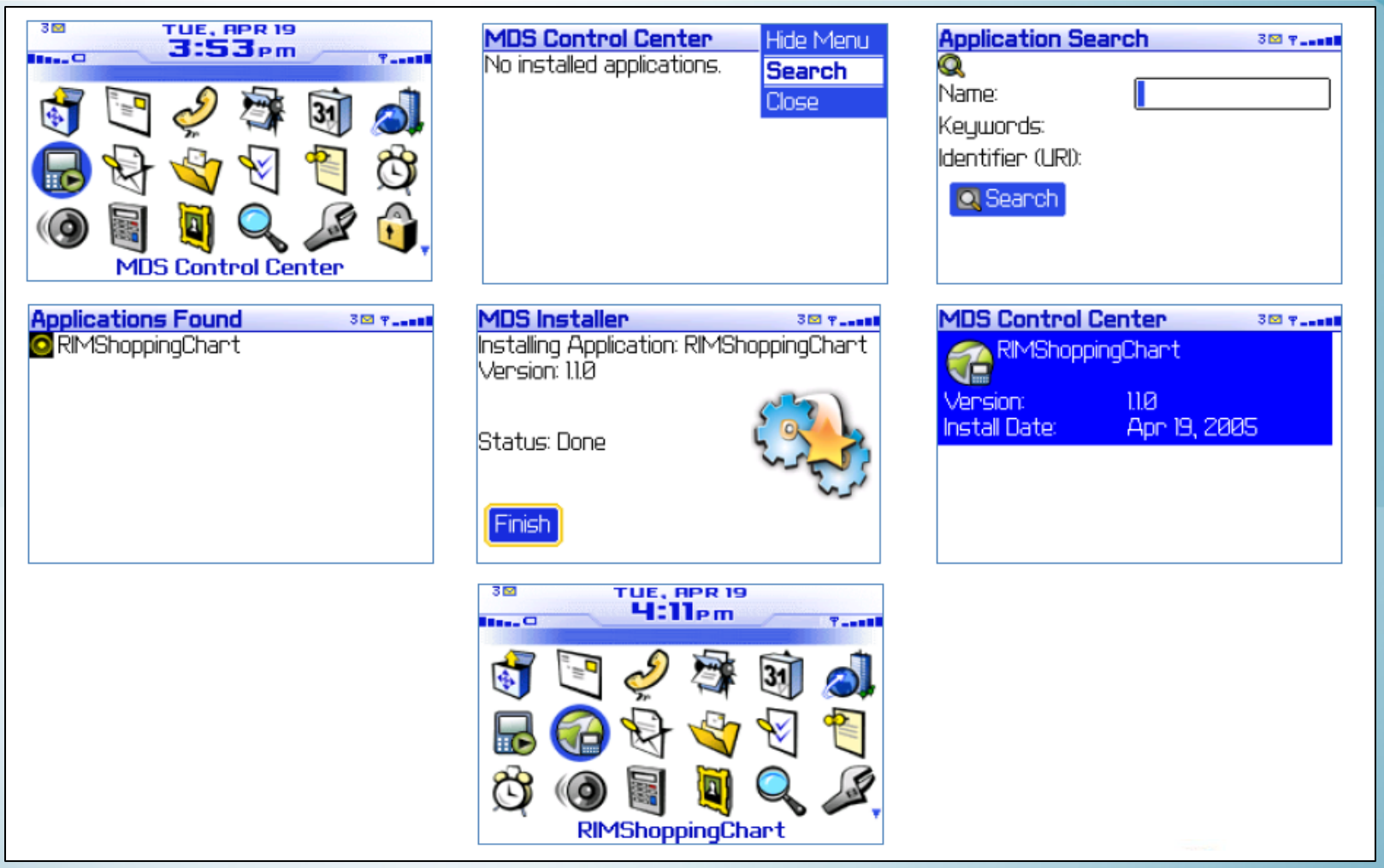
BlackBerry Plug-in for Microsoft Visual Studio

- **Allows enterprise developers to leverage existing Microsoft based developer tools to:**
  - **Wirelessly enable applications for BlackBerry smartphones**
  - **Lets developers working within a .NET programming environment use their development tool of choice, while still taking advantage of the benefits of the BlackBerry Mobile Data System.**

MDS Runtime

- BlackBerry MDS Device Software allows applications built with BlackBerry MDS Developer Tools to run on BlackBerry smartphones
- The MDS Runtime allows applications created with BlackBerry MDS Studio or the BlackBerry Plug-in for Microsoft® Visual Studio to run on BlackBerry smartphones

MDS Runtime


TUE, APR 19
3:53 pm
MDS Control Center
MDS Control Center
Hide Menu
No installed applications.
Search
Close
Application Search
Name:
Keywords:
Identifier (URI):
Search
Applications Found
RIMShoppingChart
MDS Installer
Installing Application: RIMShoppingChart
Version: 1.1.0
Status: Done
Finish
MDS Control Center
RIMShoppingChart
Version: 1.1.0
Install Date: Apr 19, 2005
TUE, APR 19
4:11 pm
RIMShoppingChart

MDS Application Components

1. Screens
2. Data
3. Messages

MDS Application Screens

- Use screen components to allow the user to interface with the Web service
- Create screen components to allow users to navigate and utilize web services.
- Screens arrange user interface elements:
  - Labels
  - Buttons
  - Drop-down menus
  - Text boxes

MDS Application Data

- Use data components to manage information received from the user interface or web service
- Intermediary layer between screens and messages
- Data components are classified as either keyed or keyless:
  - **Keyed data components exist in a data collection and are each identified by a unique primary field of the same type such as an ID number.**
  - **Keyless data components cannot be managed in a data collection and must exist within a keyed data component, a message, a screen parameter, or a variable.**

MDS Application Data (Cont.)

- **Data is stored in local variables, global variables, or screen parameters.**
  - **Use local variables to temporarily store information on the current screen**
  - **Use global variables to store information that is available throughout the application.**
  - **Use screen parameters to pass information to other screens or scripts.**

MDS Application Messages

- Use message components to relay information across the wireless network
- Create messages to transport data to and from the web service
- Outbound messages send data to the web service
- Inbound messages send data to the application
- To interact with the Web service, match the data contained in a message to a Web service operation
- Matching message data to Web service operations is known as binding

Test an MDS Application

- MDS Studio includes a BlackBerry simulator
  - Can simulate virtually any device model
- Reduces development time
- Note: You should still always test on a physical device as well

Publish an MDS Application

- Publish an MDS application to the Application Repository
- BlackBerry users can see available applications from a registry and
- Download the published application from the repository

Conclusion

- **Easy**
  - Virtually no programming required
- **Security**
  - Build on the BlackBerry platform
- **Bandwidth Efficiency**
  - Proprietary WBXML format optimizes bandwidth, reduces processing, and improves device battery consumption
- **Availability**
  - Always-on network
- **Real-time**
  - Utilizes BlackBerry's push-based technology