Common Problems Developing WAP Applications

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Why Should You Stay?

- In this session you’ll learn:
  - Common problems you’ll encounter as a new or practicing wireless app developer
  - What to do about them
- Audience:
  - Both new and experienced WAP developers, regardless of client or server platform
  - Some relevance to non-WAP developers, but focus is WAP

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Who Am I?

- Founder, CTO of SysteManage
  - Focusing on ColdFusion, Wireless, and Java app dev, training
- Author
  - Contributor to the Wrox Press book, Professional WAP, as well as to Wireless magazine, CFDJ, and others
- 20 Years IT Experience
  - System & database admin, development
- Professional Trainer
  - Teaching technical topics to wide ranging audiences in addition to consulting

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What’s on the Menu?

- Common “Getting Started” Challenges
- Common “Big Picture” Challenges
- Common “Implementation” Challenges

Inspiration For This Talk

- Experience developing WAP apps
  - Encountered these problems
- Contribution to Professional WAP as well as magazine articles
  - Documented their solutions
- Participation in and review of several WAP mailing lists and FAQs
  - Same problems continually asked and answered

Common “Getting Started” Challenges

Problems All Newcomers Encounter
- How WML differs from HTML
- Configuring server for WML
- Do I need a WAP Gateway?
- WML and HTML from same source
- Finding emulators, editors
- What good is WMLScript to me?
- Finding documentation, language references
- Finding books, magazines
- Finding online resources to learn more
- Weathering the hype and anti-hype
Great WAP Portals for Answers

- www.allnetdevices.com
  - FAQ is an outstanding repository of common questions and answers, and many other resources
- www.anywheremyougo.com
  - Many resources, including a “5 steps to WAP” that covers all manner of ‘getting started’ topics
  - Several other features highlighted later
- www.wirelessdevnet.com
  - Many “channels”, articles, news items, more
- www.wapuseek.com
  - FAQs, articles, WML checker, WBMP image creator/ converter, and more

Common “Big Picture” Challenges

“Not a week goes by without an announcement by a major European or Asian business that they have mobilized at least some aspect of their business, be it through SMS, WAP, or i-mode.

But Americans are more apt to spend time crying about what the mobile Internet can’t do rather than what it can.”

-Carlo Longino, An Ocean Apart, TheFeature.com

Common “Big Picture” Problems

- Which Technology To Bet On
- Using Location Sensing
- Using Secured Communications
- Usability/Interface Design
- Implementing Push Notification, SMS/Messaging
- Converting Existing Content, XSLT, etc.
- Integrating with Web App Servers (ASP, JSP, CF, PHP, etc.)
- Email Integration
- Directory Service Integration
- Interacting with the Phone

- These are all beyond scope of this class

See other sessions at conference, Professional WAP, FAQs
Common “Implementation” Challenges

- Cross Browser Incompatibility
- Browser/Phone Detection
- Server-side Redirect Problems
- Page Caching Problems
- Life Span of Client Variables
- Cookies & Sessions
- Form Processing Problems
- Error Detection, Handling, and Prevention
- Real World Testing

We’ll Focus on These Today

- Identify Each Challenge
  - Provide Discussion and Background
  - Identify Solutions and Techniques
  - Identify Resources and Services to Assist

Common Implementation Challenges

“Online Application Testing Finds One in Four WAP Sites Have Serious Errors”

WAP Testing Lab @ anywhereyougo
Challenge: Cross Browser Incompatibility

"Why do different phone browsers render my site in different ways?!

Discussion

- Number 1 source of frustration
  - Visitors to your site will likely see a range of appearances
  - and some will fail to load your decks at all
- WAP specifications don’t say how a phone should implement features
  - Different phone manufacturers can (and do) choose to implement features differently
  - Even those using the same browser (such as phone.com’s up.browser) can implement features differently

Solutions

- Could target a particular phone, ignore differences
  - Only suitable for early efforts
    - Where you don’t expect many visitors anyway
    - or an internal system
    - Where you can specify what phones are used
- Could code to common denominator
- Could detect phone type and generate WML accordingly for each major phone/browser
  - Either programmatically or via XSLT
Resources

- Allnetdevices.com FAQ, part 5 question 2 offers grid of WML feature support in popular phones
- Anywhereyougo offers similar grid with far more phones but comparing fewer features
- Phone manufacturers (and phone.com) sites
  - Often compare features for specific phones
- FAQs at most WAP portals provide more info
- See Professional WAP, Chapter 7; WAP Development, Chapter 14

Challenge: Browser/Phone Detection

“So how do I know what browser or phone they are using?”

Discussion

- Detect browser type visiting your web server
- Send HTML and WML browsers to separate pages
  - Or create different content for each from same dynamic page
Solutions

- Headers from device identify browser type
- Two key headers to look at:
  - "http_accept"
    - Look for "vnd.wap.wml"
  - "http_user_agent"
    - Takes on different value for each browser/phone
- Can search and respond programmatically
  - Or advanced web app server may handle

Solution: ASP

- One possible approach, written for ASP
  - Detect browser type, send WML browser to WML page
  ```
  <%httpAccept = LCase(Request.ServerVariables("HTTP_ACCEPT"))
  if Instr(httpAccept,"wml") then
    Response.Redirect "/index.wml"
  Else
    Response.Redirect "/index.html"
  End if%>
  ```

Solution

- Relying only on http_accept is risky
  - Some HTML browsers now can read WML
  - Could end up sending regular web browser to WML pages
    - Viewer may miss content intended for HTML viewers
- Better to test both http_accept and http_user_agent
  - Don't send regular browser to WML pages
- Drawback: must code for each browser/gateway combination that you may need to support
  - Xml driven solutions show promise
Challenge: Server-side Redirect Problems

"When I try to redirect clients to WML pages [in an ASP, CF, or JSP program, etc.], it fails. I know the file’s there!"

Discussion

- Problem can occur if 3 conditions are true
  - Path provided in redirection is “relative”
    - no leading / at front of path specification
  - File doing the redirection isn’t in web root
  - WAP gateway, acting on browser behalf, follows strict HTTP standard
- Gateway, acting on client’s behalf, can request page from wrong directory on server
Discussion

- Redirect gets communicated back to browser
  - WAP gateway is acting on phone’s behalf
  - Intercepts the redirect and creates page request
  - Can fail to create redirection to current directory, looking instead at the root
    - Won’t recognize current path for current page executing
    - Expects redirect to be specified with full path
    - Makes request using path provided, if any
    - If relative, expecting to find file in “current” subdirectory, may end up requesting from root rather than intended subdirectory
  - Behavior conforms with HTTP standard (RFC2068)

Solution

- Example: Response.Redirect "nextfile.wml"
  - Calling page and nextfile.wml are in /test subdirectory off webroot
  - Most HTML browsers would do this redirection ok.
  - Some WAP gateways may create redirect to /nextfile.wml rather than /test/nextfile.wml (doesn’t recreate /test path)
- Should do redirects with at least a web server root relative URI
  - Response.Redirect "/test/nextfile.wml"
- Be careful using absolute URIs, phone memory limits
- Problem may not appear in emulator
  - If emulator is using HTTP direct mode (more later)

Challenge: Page Caching Problems

“I change the code in my source file but when I save it and browse it, it’s not changed!”

“Database data is changed on the server but the phone shows old data!”
Discussion

- Pages are cached on client to save network communications
  - Can cause problems for pages being generated dynamically or being changed during development
  - May want browser to request latest version of page, will get cached version
  - Need to balance performance against integrity
- Read HTTP/1.1 protocol at w3.org
  - To understand details of caching protocol

Solutions

- Force browser to refresh
- Specify cache directives to prevent caching
- Provide unique URL on page requests
- Will explain each of these

Solution: Browser Refresh

- For pages changing due to development
  - Can just request a browser refresh, or clear cache
- Most emulators have a “refresh” command
- In real phones, may have to cycle off/on
  - Still may not work in real phone if cache expiration has not passed
Solution: Cache Directives

- For pages generated dynamically, where latest data is always desired
- Use cache controlling directives in response header, as provided in W3 standard
  - Pragma: no-cache
  - Cache-Control: no-cache, must-revalidate, max-age=0
  - Expires: past date or 0 or −1, etc
- Each works to prevent caching
  - first one should be all that’s needed

Solution: Specifying Directives

- Can specify in WML
  - in <head> tags
- Can specify in HTTP response header
  - Placed there by server-side language (PERL, ASP, JSP, PHP, ColdFusion, etc.)
- Each approach has its place
  - Latter approach puts less work on browser to interpret and process <head> tags

Solutions: ASP

```asp
<%Response.ContentType = "text/vnd.wap.wml"
Response.Expires = -1
Response.AddHeader "Pragma", "no-cache"
Response.AddHeader "Cache-Control", "no-cache, must-revalidate, max-age=0"
%>`
Solution: ColdFusion

```<CFCONTENT type="text/vnd.wap.wml">
<CFHEADER Name="Expires" Value="-1">
<CFHEADER Name="Pragma" Value="no-cache">
<CFHEADER Name="Cache-Control" Value="no-cache, must-revalidate, max-age=0">
```

Solution: Force Client to Refresh Card If Executed Again by Client

```<wml>
<head>
<meta forua="true" http-equiv="Cache-Control" content="no-cache, must-revalidate, max-age=0"/>
</head>
<card id="alwaysexpire">
<p>This deck will never be stored in the cache</p>
</card>
</wml>```

Solution: Pass Unique ID on URL

- Some have found this to work as last resort
- Build all page request WML code to specify URL with a unique id in query string
  - Could never be found in cache, will reload
- Relatively easy to do when generating WML dynamically
- Approach not recommended by some
Challenge: Life Span of Client Variables

“Hey, a user browsing my site is seeing a userid he entered on someone else’s site!”

Discussion

- Scary prospect if you’re not prepared for this
  - Client variables are those set in the browser
  - Often used to pass data among decks
  - Also used in creating WML forms to pass data from <input> tag to <go> tag
- Problem: client variables are persistent and not domain-specific
  - Generally remain available until phone is turned off

Solutions

- Can clean them out manually after using them
  - <setvar name="userid" value=""/>
- Phone.com has newcontext="true" on card tag
  - Creates new, empty context or “scope” of variables to be used by current card
  - Hides other variables, and hides our variables from others
  - Is a Phone.com extension, so may not be widely supported
Resources

- See WAP Development, Chapter 12
- See Professional WAP, Chapter 5

Challenge: Cookies & Sessions

"Speaking of remembering data, what if I really want to remember data across decks and sessions?"

Discussion

- In traditional web applications, cookies were used to store data on client
  - Used to keep track of data for a client, on the client
    - Could be kept for current visit or even across visits
    - Also used to create a means to keep track of data across several pages (a session)
  - Unfortunately, most phones and gateways don’t support them
Solution: Phone.com gateway

- Phone.com gateway supports cookies
  - Can set them in whatever server-side language being used to create WML
- Is part of WAP 1.2 spec, so may come to other gateways and possibly phones
  - Memory limits on phone make browser storage of cookies less palatable

Solution: SubscriberId

- Some phones/gateways report a unique "subscriber id"
  - Can obtain that on server and use to store data on behalf of user across multiple sessions
  - Won't work for phones/gateways that don't report subscriber id

Solution: Tracking SessionId

- Keep in mind, too, that client variables in WML are persistent across all pages in session
  - Obviates cookies, to a degree
- Can append a system generated sessionid on all WML making page requests to server
  - When creating pages dynamically
  - Can also use a client variable to store such a sessionid
Most FAQ resources cover cookie challenges

Professional WAP, Chapter 8: WAP Development, Chapter 12

Challenge: Form Processing Problems

"Whenever I submit a form for processing to my web application server, no data is being passed to the form’s action page"

Discussion

WML support posting of forms, such as:

```xml
<card>
  <do type="accept">  
    <go href="wml_action.cfm" method="post">  
      <postfield name="stock" value="$(stock)"/>
    </go>  
  </do>
  <p>Enter stock symbol:  
    <input name="stock" format="4A"/>  
  </p>
</card>
```
Discussion

- Sometimes form data never seems to arrive
- Problem generally appears with web app servers (like CF, ASP, JSP) or Perl
- Gateway may be passing enctype of "application/x-www-form-urlencoded" in request header
  - with additional data such as charset="utf8"
- Server may be looking for exact match on enctype, not expecting the additional data

Solution

- Problem can really only be solved by web app server vendor
  - Need to request vendor to change expected enctype
- Note that problem may not occur for some browsers using the same code on the same server
  - since it starts with the WAP gateway sending the enctype on their behalf
  - And different users can come from different gateways!

Resources

- AllNetDevices FAQ 8.6
Challenge: Error Detection, Handling, and Prevention

"So how will I know when these errors are happening?!"

Discussion

- With so many things that can go wrong, end user errors are inevitable
  - Unfortunately, most phones don’t report much detail when errors occur
  - Really need to leverage details offered by emulators
- Web App Servers (CF, ASP, JSP, etc.) also tend to report errors in HTML
  - Won’t render properly in WML browsers
- Need to use means available to detect when errors occur
- Can implement better error handling
- Also need to do all possible to prevent errors

Solutions

- Error Detection
  - Most emulators provide means to display errors (and WML being sent) in a separate window
  - Some services are available to test for errors
    - See resources page to follow
Solutions

- Error Handling
  - On server, need to leverage tools to detect run time errors and report them in WML format
  - On client, phone.com browser offers <try><catch> tags to handle errors on client

Solutions

- Error Prevention
  - Resources exist to test WML for formatting and syntax errors
  - Some even look for common mistakes in design

Resources

- Ericsson ToolKit has a WML code compiler & verifier
- WAPTest at Z-y-g-o.com
- WAP Wanderer
  - tests for code errors, common mistakes, bad links
  - See “online WAP testing” at anywhereyougo.com
- Phone.com offers tool to display WML that would be sent from a given URL
- See also Professional WAP, Chapter 11
Challenge: Real World Testing

“Hey, Dude, it’s working for me and you. Let’s go live with it!”

Discussion

- Different phones, gateways
- Emulators may not respond like real phone
- Emulator may offer both local and gateway modes
- Need to anticipate expected load
- Need to consider impact of code changes

Solution

- Try many phones, using many gateways
- Emulator may allow specification of different gateways
  - Try some, if possible
- Be sure to test in gateway mode in emulator
  - HTTP direct mode can hide many problems
- Keep in mind as well:
  - Emulator’s gateway won’t likely be the same gateway as that used by real phone users
- Regression and Load Testing
- Source Code Control
Resources

- AllNetDevices
  - Service to test site on range of phones, by volunteers
  - http://www.allnetdevices.com/FAQ/repository/
- Anywhereyougo.com Wireless Internet Lab (service)
  - Fee for service testing against multiple phones
  - Also see their talk (M6)
- Regression/Load Testing
  - MercuryInteractive.com, Segue.com, RSWsoftware.com
- Source Code Control
  - Microsoft Visual Source Safe, SourceOffSite (3rd party sourcegear.com)

Bonus Topic: WML as first byte

- Problem most often encountered in dynamically generated code
- If an ASP/CF/JSP program creates the WML page,
  - make sure it puts <?xml> tag as first bytes (no whitespace)

Discussion

- For ASP:
  <Response.ContentType="text/vnd.wap.wml"><?xml version="1.0"?>
- For CF:
  <CFCONTENT TYPE="text/vnd.wap.wml"><?xml version="1.0"?>
Summary

- "Getting Started" Challenges
  - Pointed to web resources
- "Big Picture" Challenges
  - Identified, left for your review
- "Implementation Challenges"
  - Discussed, offered solutions

Let's Get to Work!

"My philosophy is if you have an ax, every problem looks like hours of fun."

- Developer at a Recent Symposium

For Further Questions

- For follow-up questions
  - Or more information on WAP or ColdFusion consulting, training, or presentations
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