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

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

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 <u>Professional WAP</u> 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.anywhereyougo.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

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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

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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
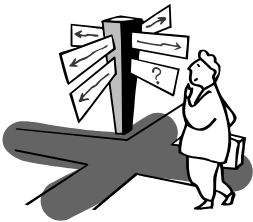 - Either programmatically or via XSLT

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
  - http://www.anywhereyougo.com/ayg/ayg/wap/devices/Index.po
- 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

Resources

- List of agents:
  - http://www.allnetdevices.com/FAQ/useragents.php3
- BrowserHawk tool identifies agents (html/wml)
- Enhydra, ThinAirApps Servers handle agents
- FAQs at WAP Portals provide for more info
- See <u>Professional WAP</u>, Chapter 11 ; <u>WAP Development</u>, Chapter 14

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 <u>know</u> the file's there!"

Discussion

- Problem can occurs 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)

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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)

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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!"

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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

```
<%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
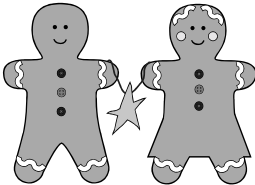 - Is a Phone.com extension, so may not be widely supported

Resources

- See <u>WAP Development</u>, Chapter 12
- See <u>Professional WAP</u>, Chapter 5

Challenge: Cookies & Sessions

"Speaking of remembering data, what if I really <u>want</u> 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

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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 subscriberid

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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

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Resources

- Most FAQ resources cover cookie challenges
- <u>Professional WAP,</u> Chapter 8 ; <u>WAP Development</u>, 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:

```
<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
  - http://updev.phone.com/dev/utils/geturl.html
- 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
- Please contact:

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