## Testing Wireless Applications – Part I
*by Randy Rice, CQA, CSTE*

### Abstract

*Traditionally, testers have been behind the development curve in defining and adopting new test strategies. This article is a strategy-level overview which describes the background and future of wireless technology, the major risks and critical success factors, an overview of the technologies used to deliver wireless applications, and a strategy for testing wireless applications.*

### The Hype vs. The Reality

There is a great deal of promise in the future of wireless applications. However, in many ways, wireless technology is a plane that has not yet taken off. The forecasts of wireless technology adoption vary greatly, depending on the source. Major problems, such as inconsistent service levels, bandwidth constraints and usability factors have yet to be solved.

Consider the results of the Forrester Group survey recently published in the April 2001 issue of M-business magazine. In this survey of North American PDA and Web Phone users, over 85% of current users of these devices indicated they were either uncomfortable or very uncomfortable about using the wireless features of those devices for M-commerce. Is it any wonder? How many times do you get disconnected from a wireless phone call, or find yourself in a "dead zone?"

### North American Web Phone and PDA Users' Comfort Level with M-Commerce
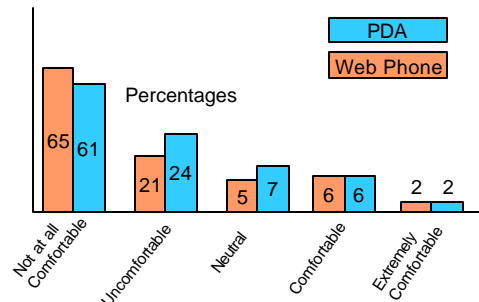


Source: Forrester Research, April 2001

If you examine where the M-commerce users are, a study by M-business Research finds that North America lags behind Europe and Eastern Asia in the percentage of the global population of M-commerce users, with 21% of the world's M-commerce users. If projections hold true, the M-commerce user base may become even more prevalent in Europe and Eastern Asia.
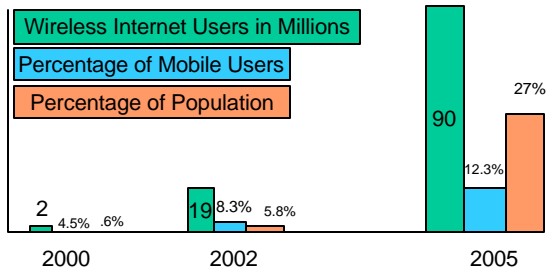
### Where are M-Commerce Users Located?
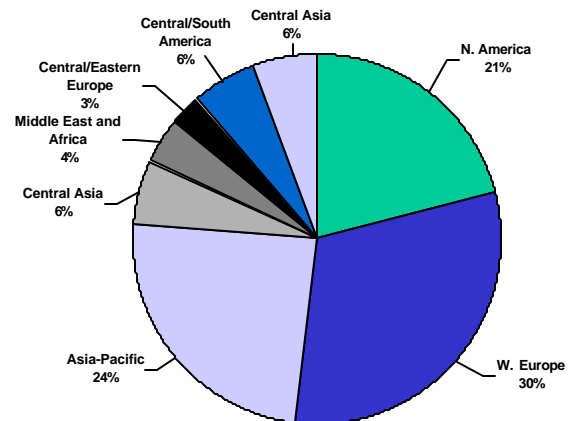


Source: M-Business Research, April 2001

When it comes to projections of future wireless and M-business activity, the outlook depends on which forecast you read. The forecast from ETFORCASTS predict that

the number of U.S. wireless web users will skyrocket to 90 million people by 2005. However, one of the more significant findings was that the number of European wireless web users is predicted to outdistance those in the U.S. by a 2 to 1 margin by 2005!

## Projections for the U.S.



Wireless Internet Users in Millions
Percentage of Mobile Users
Percentage of Population

2000 — 2, 4.5%, .6%
2002 — 19, 8.3%, 5.8%
2005 — 90, 12.3%, 27%

*Note: Western Europe's wireless internet access is expected to double that of the U.S. by 2005!*

Source: ETFORCASTS

What do these trends and forecasts mean in terms of testing? For the first time, in my memory at least, the U.S. will be a follower instead of a leader in IT applications. This means that many of the lessons learned will come from Europe and Eastern Asia instead of here. This also means that people in the U.S. will have to seek out expertise from other countries in finding out what works and what doesn't in wireless web and M-commerce applications.

If you look carefully at the issues behind wireless web applications, you will start to see flawed business logic. Is this "Déjà vu all over again?" For example, one might think that it would be helpful to check airline departure times from your web-enabled phone or PDA while you are in the taxi on the way to the airport, stuck in traffic. Consider this, though. How often are the flight times posted on the monitors in the airport correct?

It seems that most of the activity, benefit and confidence of the wireless web is coming from wireless web vendors, not actual users!  See Figure 1.

If you want to read an interesting article on this topic, go to http://www.mbizcentral.com/m-business_story /new/05_top10 to read the article, "The Top 10 Lies Wireless Marketers Tell."

**Wireless Technology is More Than the Wireless Web**

Even in this time of uncertainty, people are working on pilot projects using wireless technology and we are seeing a variety of types of wireless applications. Wireless technology is more than the wireless Internet. People are using wireless technologies to build long-range wireless networks and perform short-range personal wireless functions. Some of these wireless applications are extremely critical in terms of risk. Paging systems allow medical professionals to view an EKG chart and other diagnostic data using pagers. Wireless scanners help stores keep track of inventory levels.

Regardless of the application and specific technology, wireless applications require a unique testing strategy that can be identified and documented. In addition, although the future of the wireless web is hard to predict in terms of when and how it will actually take off, it is time to start thinking about the implications of testing wireless applications. Even if the wireless web is very slow to gain stride,  many businesses will be building and deploying other types of wireless initiatives to serve customers better and more efficiently.

## Some Varieties of Wireless Applications



Web-enabled phones

Handheld Controllers

Pagers

PDA Applications

Peer-to-peer Applications

Some examples of other types of wireless applications beside the wireless web and M-commerce include:

- **Handheld devices** for applications such as inventory control and shipping
- **Pagers** for instant messaging and data delivery – even for applications such as medical diagnostics
- **PDA applications** to sync with notebooks computers and to perform functions such as automated hotel check-in and check-out while in the hotel
- **Peer-to-peer applications** for workgroup collaboration and gaming
- **Wireless networks** to allow maximum flexibility in workspace configuration

## How Wireless Applications are Developed

To develop a test strategy for wireless applications, we need to know how they are developed in terms of tools and technologies. We don't have time in this article to cover all technologies, but some of the major ones include:

**Wireless Access Protocol (WAP)** - An initiative that was started by Unwired Planet, Motorola, Nokia, and Ericsson to define a secure specification that allows users to access information instantly via handheld wireless devices such as mobile phones, pagers, two-way radios, smartphones and communicators.

**Bluetooth** - A short-range (up to 10m) 2.4 GHz radio technology aimed at simplifying communications among Net devices and between devices and the Internet. It also aims to simplify data synchronization between Net devices and other computers. Products with Bluetooth technology must be qualified and pass interoperability testing by the Bluetooth Special Interest Group prior to release. The Bluetooth 1.0 specification consists of two documents: the Foundation Core, which provides design specifications, and the Foundation Profile, which provides interoperability guidelines.

**XML** - *Extensible Markup Language* – allows designers to create their own customized tags, enabling the definition, transmission, validation, and interpretation of data between applications and between organizations.
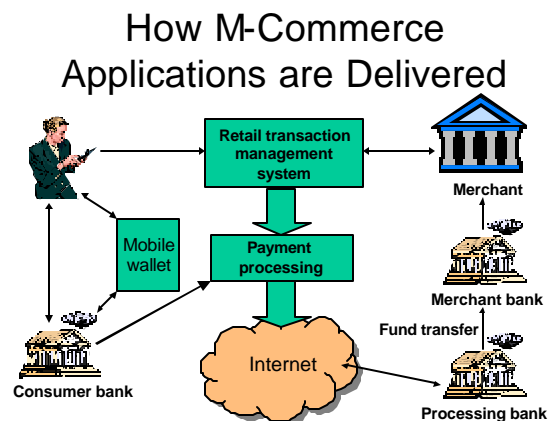
**WML** - Wireless Markup Language is an XML language used to specify content and user interface for WAP devices. WML is supported by almost every mobile phone browser around the world. WML pages are requested and served in the same way as HDML pages.

**WMLScript** - Scripting language used with WML to allow interactivity on WML applications.

It is important to understand that just like web applications are often built using a combination of technologies such as XML, Java, and Java Script, so are wireless applications. The mix depends on the application objectives, project objectives and business strategies.

Wireless application developers use development tool kits provided by the wireless device vendors, such as Nokia, Ericcson and Motorolla. These development kits also contain simulators that allow developers and testers to test wireless applications in a controlled environment.

**The Big Picture – How M-Commerce Applications are Delivered**

## How M-Commerce Applications are Delivered



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The above figure shows how the M-commerce user conducts a transaction. One of the major differences between this model and the E-commerce model of recent years is the prevalent use of a mobile wallet to facilitate fast and secure payments. Like the E-commerce model, integration is the key to making the business side of M-commerce work.

Next month we will examine the critical issues of assuring quality in the wireless environment and how to build a strategy for testing wireless applications.

## Conference Review
*by Randy Rice, CQA, CSTE*

**QAI's 2001 International IT Quality Conference**
**April 23 – 27, 2001**
**Orlando, Fl.**

The 2001 International IT Quality Conference in Orlando, Florida was a well-run and well-attended conference. This conference covered all aspects of the software quality discipline, including process definition and deployment, measurements, leadership, standards, testing and inspections.

The keynote speakers were Leonard White, Tom Gilb, Tim Lister, Mark Paulk of SEI, and William E. Perry, all of whom I found very interesting and informative.

Leonard White gave a good talk on outsourcing and what it takes to build a quality outsourcing relationship. Tom Gilb spoke on the value of software inspections as the best way to find defects early in a project. He also spoke of the value of the evolutionary software development process, when used correctly, to deliver high-quality software. On many occasions during the conference I observed Tom Gilb spending much time with attendees answering questions and sharing information. Tim Lister is always an engaging speaker. His presentation on risk was fantastic, and he did a great job in trying risk to software quality. Tim was also generous with his time with attendees to answer questions. Mark Paulk gave a great presentation on software process models. It was a good talk for people who have to make sense of all of the models out there. Bill Perry summarized the keynote sessions, as only Bill can, by recapping key points and relating them to the overall conference.

John Horsch received the Lifetime Achievement Award for his contributions to the field of software quality.

All of the track sessions I attended were informative. Since all of the speakers work in quality as practitioners, the topics are long on actual practical application. There were so many good sessions, I can't mention them all for fear of leaving out someone.

My observation was that the key question and theme during the week was "How do we get software quality issues to the attention of the CEO?" There was a panel on this topic and a variety of answers. The consensus throughout the conference seemed to be that software professionals must tie software quality initiatives to business goals. The CEO must be informed about quality issues, but many QA teams are organized to prevent this from happening. Until QA reports to executive management, the real information will be hidden from them.

As always, this conference by QAI was very well organized and conducted. The QAI staff is always superb at handling registration and attendee needs. The Caribe Royale resort is also a great place to have a conference. One comment that I heard from many of the attendees was the sense of community they feel at the QAI conferences. I can highly recommend this conference to anyone in a QA, Software Process Engineering or QC role in their organization.

## Frequently Asked Questions
*by Randy Rice, CQA, CSTE*

**Q:** I am working as a Software Testing Analyst, I would like to know details about "The Complete Software Testing Life Cycle". Also, please give your suggestion about good books related to Software Testing

**A:** The complete software testing life cycle (at least in my usage of the term) refers to all phases and types of testing performed in a project and throughout its operational life. For examp le, a typical testing life cycle might be:

- Unit testing
- Integration testing
- System testing
- User acceptance testing

(Within each of the above test phases, many types of tests, such as functional, structural, performance, conversion, usability, etc. may be performed.)

Then, as the system is in use and modifications are made, a functional and structural test of the change along with regression testing may be the primary types of testing performed.

A helpful way to visualize the development and testing lifecycles is the V diagram, which you can find on our web site at http://www.riceconsulting.com/library/v-diag.gif.

My favorite testing book, which is also a very good discussion on full life cycle testing is William E. Perry's *Effective Methods for Software Testing*.

**Q:**  What is the role and responsibilities of a SQA (Software Quality Assurance) member in a software organization?

**A:**  Wow, that's a small question with a big answer. Let me just answer briefly by saying that SQA is responsible for process development and deployment, measurement, standards, training, and the facilitation of testing. Despite the common use of the term, SQA is NOT testing. Basically, SQA ensures that the quality processes of an organization are being followed, and also works to constantly improve those processes. SQA is the management of software quality, not the inspection for quality.

**Q:**  Could you please explain why a traceability matrix is needed and why it is important?

**A:** A traceability matrix simply shows a relationship between what is planned and what is tested and delivered. The value of the matrix is that you make sure you don't leave anything out, or include things that were never intended. A typical traceability matrix is the requirements/test case matrix, which shows that each functional requirement has been validated by one or more test cases.

# Links to Check Out…

**Blame it All on Bad Data**

http://www.thestandard.com/article/0,1902,23791,00.html

**WAP**
http://www.wap.com/
www.wap.net

**Bluetooth**
http://www.zdnet.co.uk/news/specials/1999/04/bluetooth/

**Security**
http://www.securityportal.com/research/wireless/wirelessgeneral20000421.html

**The Top 10 Lies Wireless Marketers Tell**
http://www.mbizcentral.com/m-business_story/new/05_top10



# Test Leadership

### *by Carl Chandler*

Having the right vision for their testers is an important responsibility of a test team leader.  This vision must include the perspectives of all stakeholders with an eye towards timelines, budgets, maintaining tester focus on the mission, and the quality of testing being completed. How can this be accomplished?

Randy covers the following points in greater detail in his book *The Top Ten Challenges of Software Testing*.  To note a few of the responsibilities, a test team leader must:

- Determine the business needs

- Exhibit vision for problem solving

- Set priorities

- Work with users and customers

- Interact with people and understand their motivations

- Establish levels of quality and performance

The greatest challenge in software testing is always in the people factor. This is especially true when attempting to get buy-in from all of the stakeholders and working with and leading team members through the testing process.

A stakeholder is anyone involved in the process from gathering requirements to the end-users. The best way to get buy in from the stakeholders is to sell the software testing process to them. A leader has to put on a salesman's hat and find the needs and interests of all stakeholders. Showing them how the process can meet their needs is crucial to closing the sale.

You can learn more about becoming an effective team leader through Rice Consulting Services' Test Team Leadership training course. In this course we cover:

- Core competencies for a software tester

- Team building skills

- Assessing people issues

- Risk assessment

- Measuring your progress as a leader

- Project management skills

- The role of test tool automation

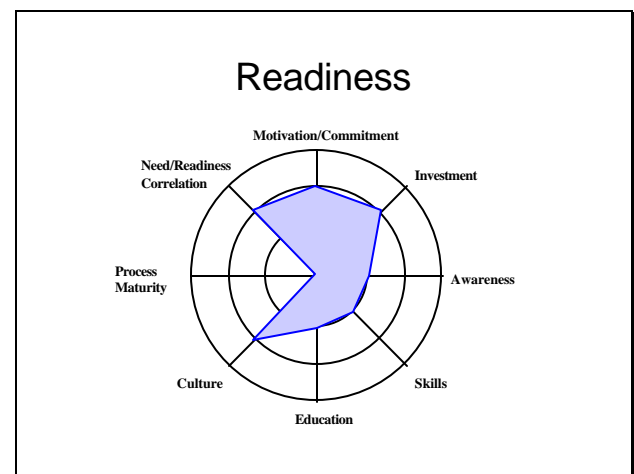See the Rice Consulting Services' Course Offerings section of this newsletter for more details on this course.

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# Rice Consulting Services' Consulting Offerings:

**Testing Assessments**

Rice Consulting Services' testing assessment is a quick and effective way for an organization to determine where they are in terms of software testing maturity. The assessment looks at three areas that are critical to testing:

• **Test organization** - Who performs testing, what levels of experience are present, and when testing is performed in the development/maintenance life cycle.

• **Test process maturity** - How well-defined, well-deployed, and repeatable the test process is, and whether it incorporates good testing management, practices, tools, and techniques.

• **Readiness** - An assessment of the organization's readiness to improve the testing process. This involves an assessment of the staff's testing awareness, testing skills, and motivation to change current practices. The deliverable is a report detailing the assessment's findings, a recommended quality improvement strategy, and a plan for addressing the improvement needs identified. If the assessment uncovers the need for in-house skills training and consulting, we will include proposed training and consulting plans in the report. The report is typically about 15 pages in length.



Readiness

## Rice Consulting Services' Course Offerings:

If you would like to learn more about the information covered in Carl's article we at Rice Consulting Services, Inc. offer an excellent course that will enhance your company's software quality process.

### Becoming an Effective Test Team Leader – 2 days

This session teaches you how to be the very best test manager and leader.
By attending this workshop, the attendee should leave equipped to gather, define, manage and validate requirements in his or her own organization. No special knowledge of systems or requirements is required or assumed to attend this workshop.

This two-day session is designed for test leaders and test managers, people who expect to be in a test leadership role, or people who lead other test managers and test leaders. The main objective of this session is to teach you how to be the very best test manager and leader. This course also answers the question, "What does it mean to be the best?" There are many people functioning as test managers, but how many are really leading the team? In leading a test team, you must not only understand the basics of software testing, but you must also understand your own organizational culture. Once you understand your organizational culture, you might find that testers have a less than positive image. This session will discuss how to transform the image of testers from one of police to one of team members.

You will learn the terminology, process, and challenges of testing in the real world. Team-based exercises reinforce the concepts of facilitating team activities and performing leadership activities.

As a result of attending this seminar, you should have a good working knowledge of software testing and what it takes to design and conduct an effective test of software, regardless of the technology.

*Becoming an Effective Test Team Leader* will help you become more comfortable and confident in leading the testing effort in your organization. You will emerge from this two-day session knowing how to develop test cases and test plans. You will also leave with the knowledge of how tools can help you perform testing.

Sometimes people feel intimidated by the technical aspects of software testing and lack the confidence they need to be credible test leaders in their organization. Learn the issues and processes for effectively testing software by attending this hands-on course.

**For more information on this course or one of our many other offerings please contact Carl Chandler at (405) 414-6759**
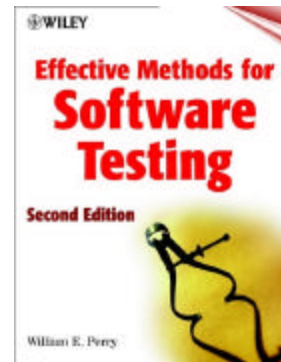
## Book Review
*by Randy Rice, CQA, CSTE*

### Effective Methods for Software Testing
**By William E. Perry**

**Hardcover** - 832 pages 2 edition (January 24, 2000) John Wiley & Sons; ISBN: 047135418X ; Dimensions (in inches): 2.05 x 9.62 x 7.76



### Overview

*Effective Methods for Software Testing* is a complete text for taking you through the software testing process from start to finish. Plus, you will learn strategies and techniques for testing in a variety of technical and application environments.

### Who Will Benefit From this Book

- Test Managers
- QA Managers
- Project Managers

- Test Team Leaders
- Testers
- Test Engineers, Planners and Designers
- Business Analysts
- Software Developers

## A Disclaimer

I will admit my bias right up front in reviewing this book, for two considerations. First, William E. Perry is my co-author on *Surviving the Top Ten Challenges of Software Testing* and I think a lot of his ideas and writing process. Secondly, I have taught the material in this book since 1994 when I started teaching the Effective Methods of Systems Testing course for the Quality Assurance Institute. However, even those things could be seen as a slanted opinion, I prefer to think that I have an intimate understanding of the concepts behind the processes presented here.

## What I Liked About This Book

I liked the first edition of this book, but I liked the second edition even more, as Perry added chapters on web testing, testing commercial off-the-shelf (COTS) applications, interoperability testing in multi-platform environments, testing data warehouse applications, client/server testing, and testing in a Rapid Application Development (RAD) environment.

For those of you who have read some of William E. Perry's other books (over 50 of them!) you will appreciate an expansion and refinement of much of the material that has grown over the years as the quality assurance and testing has grown.

Perhaps the single greatest reason I like this book is the overriding view that testing does not exist in a set of techniques, but rather tasks to be performed in a unified process. This book takes you from start to finish in the software testing *process*! Although this book is not intended to be used as a process cookbook, you could take this book and base your testing processes upon it.

Like many of Perry's other books, this book is filled with samples, templates and checklists. You never leave a topic wondering how Perry envisions implementing it in a real-world situation. I realize that some people will see processes of this level as only suitable for "people who have time," and for government agencies, etc. However, the fast-track development companies are also the ones that create software that crashes and burns daily. There is a middle ground in designing processes, but in my experience it is easier to scale down than to scale up. The material in this book shouldn't be discounted simply

because there is a disciplined approach involved. Another thing I liked about this book is that you can use the processes whether you have no processes in place or are at Level 5 of the CMM.

I use this book as the textbook for testing courses I teach, especially those that dig deeper into the testing process. I highly recommend that every test team and every tester have a copy of this book. You will find yourself referring to it all the time.

## Table of Contents

- Assessing Testing Capabilities and Competencies.

- Assessing Software Testing Capabilities and Staff Competencies.

- Building a Software Testing Environment.

- Building a Software Testing Strategy.

- Establishing a Software Testing Methodology.

- Determining Your Software Testing Techniques.

- Selecting and Installing Software Testing Tools.

- The Eleven-Step Testing Process.

- Eleven-Step Software Testing Process Overview.

- Step 1: Assess Project Management Development Estimate and Status.

- Step 2: Develop Test Plan.

- Step 3: Requirements Phase Testing.

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- Step 4: Design Phase Testing.

- Step 5: Program Phase Testing.

- Step 6: Execute Test and Record Results.

- Step 7: Acceptance Test.

- Step 8: Report Test Results.

- Step 9: Testing Software Installation.

- Step 10: Test Software Changes.

- Step 11: Evaluate Test Effectiveness.

- Testing Specialized Systems and Applications.

- Testing Client/Server Systems.

- Testing Rapid Application Development.

- Testing the Adequacy of System Documentation.

- Testing Web-Based Systems.

- Testing Off-the-Shelf Software.

- Testing in a Multi-platform Environment.

- Testing Security.

- Testing a Data Warehouse.

- Building Test Documentation.

- Creating Test Documentation.

- Bibliography.

- Index.

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## Scoring

Readability - 5
Breadth of coverage – 5
Depth of discussion - 5
Accuracy - 5
Credibility - 5
Organization - 5
Overall Score – 5

## Summary

As a tester, you should evaluate everything for yourself. Before spending hours re-inventing the wheel, check out *Effective Methods for Software Testing*. I think you'll be glad you did.

**Reviewer: Randy Rice**

## Notable Quotes…

"Life is a lot like tennis - the one who can serve best seldom loses."
**Anonymous**

"Only fools are positive."
**Moe Howard**

"Wise men talk because they have something to say; fools, because they have to say something."
**Plato (427 AD - 347 AD)**

"Drive out the mocker, and out goes strife; quarrels and insults are ended."
**Proverbs 22:10**

## June 2001 Issue:

- **Testing Wireless Applications-Part II**
  *by Randy Rice, CQA, CSTE*

- **Test Leadership**
  *by Carl Chandler*

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*Category E - Self-Study Courses Activities designed to improve your proficiency in CSTE skill areas as defined in the *Common Body of Knowledge* may qualify for CPE credit up to a **maximum of 20 credits per year**. Qualifying activities include: Professional memberships that offer self-study education regarding quality assurance within information technology.  It's not the membership that earns the credit, but the study materials provided by the membership.

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