



Watitiis

Thoughtful, Thorough Testing

What Online Booking Engines Teach Us about the Science of Software Quality Assurance
Lannois Carroll-Woolery © 2007

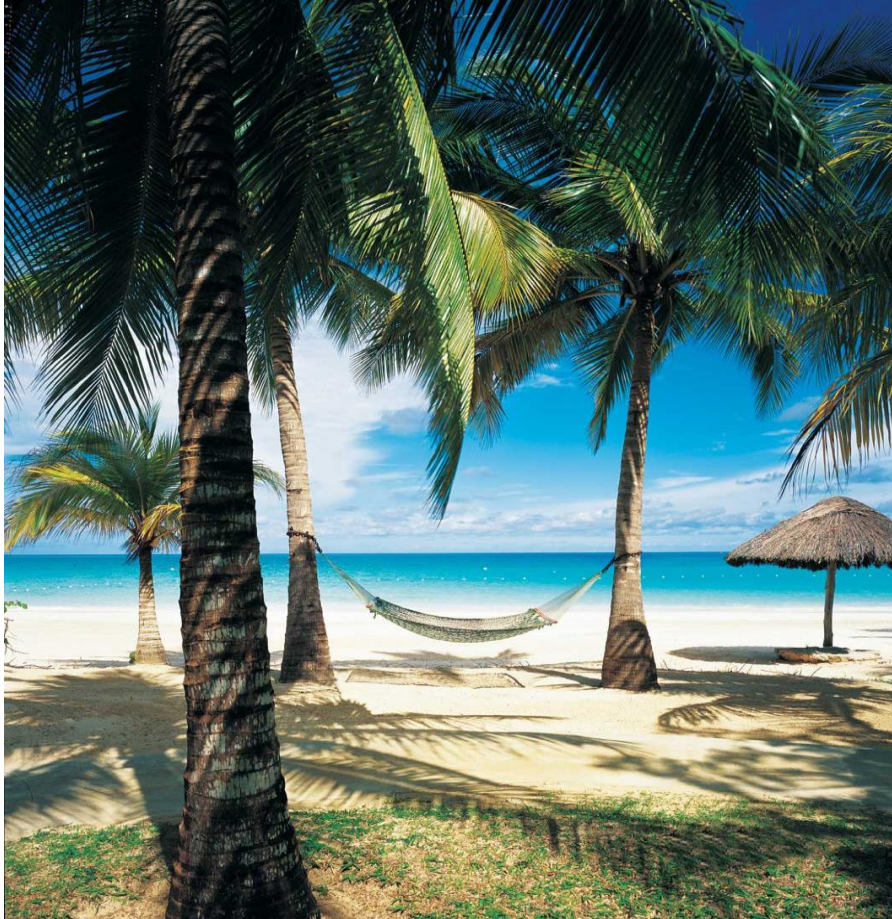


Oops! – Part I

“..They're called "fat finger" — as in typo — fares. And savvy, nimble-fingered bargain hunters have chased down a flurry in the past few weeks, from the prosaic (\$39 round-trip from Seattle to Lebanon, N.H.) to the exotic (\$51 round-trip from Los Angeles to Fiji).

Such accidental online deals, usually caused by human error while loading an airfare or hotel rate and corrected within hours, are nothing new. Last year, several hundred travelers took advantage of a short-lived CheapTickets.com snafu that priced round-trip tickets from the East Coast to Iceland for \$61, less than a tenth of the normal fare. In 2001, a series of high-profile glitches included a one-hour window in which lucky shoppers snapped up more than 140 international tickets on United for less than \$100 round-trip total, including a round-trip jaunt from San Jose, Calif., to Paris for \$27.98.

In a cutthroat environment when legitimate, rock-bottom fares appear and vanish with dizzying regularity, it's not always easy to tell a glitch from the real thing. And travelers lucky enough to be online at the right time have benefited. In April, US Airways sold about 1,000 tickets before fixing a computer error that had priced round-trip flights at \$1.86, plus taxes and fees. And last Saturday, Delta posted round-trip fares of \$0, plus fees and taxes, for flights between Washington, D.C., and Portland, Maine....”



• **Testing Guidelines**

- Goals
- Attitudes – Old and New
- Aids
- Applying the Principles – I
 - Getting yourself from YYZ to MBJ
- Applying the Principles – II
 - Getting others from YYZ to MBJ
- Wrap-Up
 - Review of Testing Principles
 - Taking it Further
 - Oops! – Part II
- Questions



time & cost



VS.



scope & quality

- The identification of as many defects as possible, as early in the process as possible, so that software **costs** (e.g. time, money) are **minimized**.
- To validate the software product's functionality before implementation, so that software **quality** (e.g. performance, efficiency, reliability) is **maximized**



Testing Attitudes – Old & New

- It's something you do at/near the end of the project
- It's _____'s responsibility
- It's too expensive.
- It doesn't require planning, it's the same from project to project



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- Testing begins when the project starts, and continues throughout
- Testing is the responsibility of every member of the project team
- NOT testing is too costly.
- Testing must be carefully planned, and customized for each project

- **Project Initiation** (Why are we doing this?)
 - Are all stakeholders on board? What are the business drivers? Payback period?
- **Requirements Gathering** (What needs to be done?)
 - Are they understandable? Measurable? Complete?
- **Design** (How will we do it?)
 - Does it meet the requirements? Has it been peer-reviewed? Is it maintainable?
- **Development** (Is programming complete?)
 - Is each component unit-tested? How are errors handled? Logging?
- **Acceptance Testing** (Does it work?)
 - Are the Test Scripts representative? What about atypical inputs? User-friendly?
- **Implementation** (How do we roll this out?)
 - Who needs to know? What are the detailed steps? Is there a contingency plan?



Testing Aids for each Phase

- Project Initiation
 - Project Plan
- Requirements Gathering
 - Business Requirements, Test Plan
- Design
 - Design Document
- Development
 - Test Scripts
- Acceptance Testing
 - Test Report
- Implementation
 - Implementation Plan



Testing Aids - Business Requirements

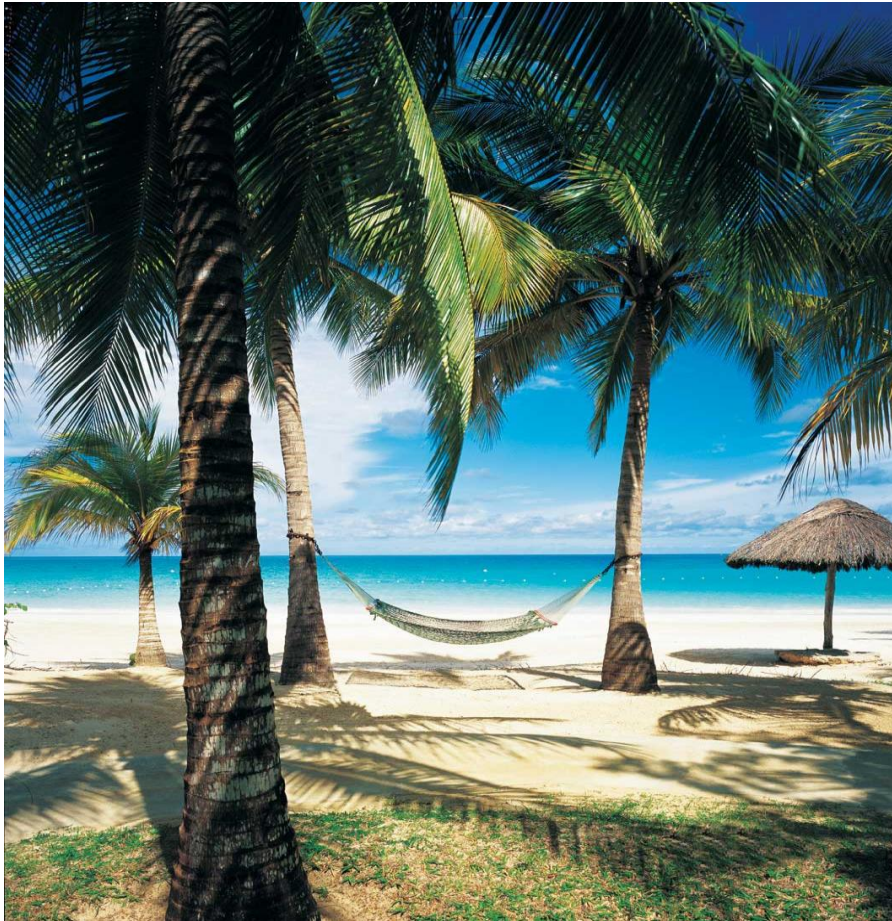
- A “contract” between business users and IT
- Specifies whether project is new, or a maintenance change
- Each requirement should be numbered/labelled
- Use structured English. Point form is preferable to paragraphs.
- Use examples for clarification
- Each requirement must be “testable”/“measurable”.
- Document any assumptions for later review / clarification

- **WHO** – Who will perform the tests? Are experts from another department required? What are the roles and responsibilities? Is training required?
- **WHAT** – What features/functionality will be tested? What are the inputs and expected outputs?
- **WHEN** – When will testing take place? Are there scheduling issues for machines or personnel? Are testers available?
- **WHERE** – Where will testing take place? Is a refresh required? In which test environment? Are there software version issues?
- **WHY** – Why test? Is this component critical?
- **HOW** – How will testing be performed? Is any setup required? What are the detailed steps? Are there interfaces to other software products? Is automated testing a possibility?



Testing Aids – Test Scripts

- Have at least 1 Test Case for each requirement
- Perform positive and negative tests
- Test boundary values
- Test all scenarios and permutations. (All code branches.)
- Use decision tables to simplify complex requirements
- Test unusual inputs
- Test that existing functionality is not impacted
- Document Test Scripts for later review, or future maintenance



- Testing Guidelines
 - Goals
 - Attitudes – Old and New
 - Aids
- **Applying the Principles – I**
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- Wrap-Up
 - Review of Testing Principles
 - Taking it Further
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How to get from YYZ to MBJ – Business Requirements

Search for Flights

Departing From:
Toronto

Going to:
MBJ

Departure Date: 12/22/2007 Time: Flexible

Return Date: mm/dd/yyyy Time: Flexible

Today: 11/27/2007

December 2007

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

Non-stop flight
One way

Close

search for flights

- Project Initiation
 - Project Plan
- Requirements Gathering
 - Business Requirements
 - Test Plan
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 - Implementation Plan



How to get from YYZ to MBJ – Design Document

Exact Dates Shown

Adult Price \$1103.04 + \$288.00 Tax * (CAD) Per Person Book This Flight Now!	Toronto, Ontario, Canada (YYZ) Montego Bay, Jamaica (MBJ)	
	Departs from:	Arrives at:
	Toronto(YYZ) Dec 22 2007 at 09:10 am Class: Y	Montego Bay(MBJ) Dec 22 2007 at 01:20 pm Class: Y
	Montego Bay(MBJ) Jan 05 2008 at 02:15 pm Class: Y	Toronto(YYZ) Jan 05 2008 at 06:55 pm Class: Y

Adult Price \$2431.00 + \$69.69 Tax * (CAD) Per Person Book This Flight Now!	Toronto, Ontario, Canada (YYZ) Montego Bay, Jamaica (MBJ)	
	Departs from:	Arrives at:
	Toronto(YYZ) Dec 22 2007 at 07:55 am Class: Y	Atlanta(ATL) Dec 22 2007 at 10:15 am Class: Y
	Atlanta(ATL) Dec 22 2007 at 01:50 pm Class: Y	Montego Bay(MBJ) Dec 22 2007 at 04:45 pm Class: Y
Montego Bay(MBJ) Jan 05 2008 at 04:05 pm Class: Y	Atlanta(ATL) Jan 05 2008 at 06:55 pm Class: Y	
Atlanta(ATL)	Toronto(YYZ)	

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How to get from YYZ to MBJ – Implementation Plan

5. Any changes necessary after your booking has been processed will result in additional charges.
6. If a per person processing fee is applicable, this amount has been added to your price.
7. For your protection, All tickets will be AIRPORT PICKUP. If different, an itravel2000 representative will provide you with delivery information. If paper tickets are required and additional charge (\$10 within Ontario for these tickets, or you may pick them up at our offices at 5560 Explorer Drive, Mississauga, Ontario.
8. All reservations are not guaranteed until ticketed or the Booking Status says CONFIRMED.
9. Once a reservation has been made, it is non-refundable.
10. For full terms and conditions, please refer to the Supplier's Website.
11. Guests must check-in at least 24 hours before departure for international flights. For domestic flights, check-in must be completed at least 2 hours before departure. Guests arriving at the airport late for their flight will be denied boarding.
12. We highly recommend that you purchase travel documents and insurance before your departure.
13. All proper credit card information must be provided to the Supplier before departure. Credit card information will be processed and a charge will be made prior to the departure.
14. The Credit Card Holder should be one of the Traveling Passengers or present at check in to be presented at time your pick up your tickets at the Tour Operator or the Airline. A valid ID may be required to purchase a new ticket.
15. For full terms and conditions, click on the following link(s): [itravel2000 TERMS AND CONDITIONS](#).



yes Please type "yes" in the box to agree and accept the terms and conditions and authorize itravel2000 and its suppliers to charge the value of your trip on the card.

yes Please type "yes" in the box to agree that the information above is correct information as received from the Tour Operator/Airline up to the day of departure and [itravel2000 TERMS AND CONDITIONS](#) section.

- Project Initiation
 - Project Plan
- Requirements Gathering
 - Business Requirements
 - Test Plan
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How to get from YYZ to MBJ – Implementation Plan

Payment Method:	MasterCard
Card Number:	1234567800009999
Expiry Date:	7/2008
Verification Number:	222

Billing Details

Street Address:	123 Anywhere Street
City:	Waterloo
Country:	Canada
State/Province:	Ontario
Postal Code:	N2N9P9
Daytime Phone:	(519) 888-4567
Home Phone:	(519) 888-9999

Special Requests

None

Pricing Information

Adult Price (per person):	CAD \$2431.00
Taxes and Surcharges (per person):	CAD \$108.35
Sub Total (per person):	CAD \$2539.35
Total for Trip:	CAD \$7618.05
Payment Amount:	CAD \$7618.05

* Taxes for your flight are charged by the Tour Operator/Airline, any Surcharges are charged by itravel2000 directly.

BY CLICKING "BOOK NOW", YOU CERTIFY THE INFORMATION ABOVE IS CORRECT AND ANY CHANGES WILL INCUR ADDITIONAL CHARGES AS INDICATED BY THE AIRLINE/TOUR OPERATOR.

[book now](#)

Project Initiation

- Project Plan

Requirements Gathering

- Business Requirements

- Test Plan

Design

- Design Document

Development

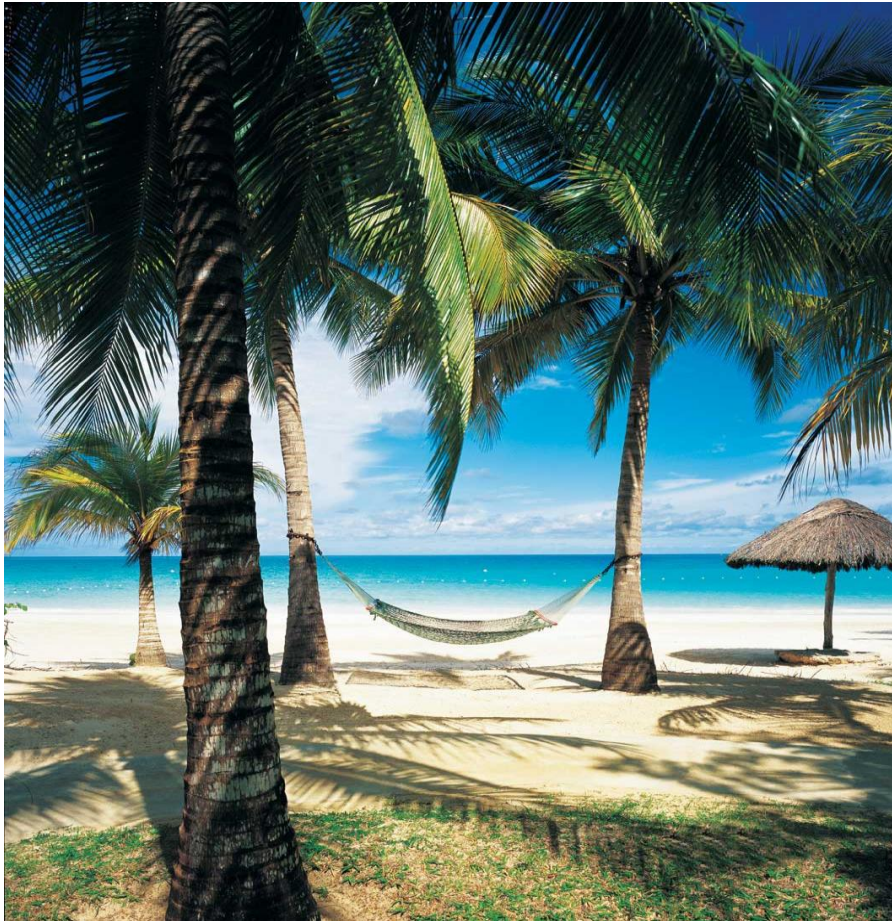
- Test Scripts

Acceptance Testing

- Test Report

Implementation

- **Implementation Plan**



- Testing Guidelines
 - Goals
 - Attitudes – Old and New
 - Aids
- Applying the Principles – I
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Testing Aids for each Phase

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Testing Aid– Project Plan

- Project Initiation
 - **Project Plan**
- Requirements Gathering
 - Business Requirements, Test Plan
- Design
 - Design Document
- Development
 - Test Scripts
- Acceptance Testing
 - Test Report
- Implementation
 - Implementation Plan
- *Cost / Benefit Analysis*
- *Competing Priorities*
- *Team Members*
- *Timelines*
- *Scope*



Testing Aid – Business Requirements

- Project Initiation
 - Project Plan
 - Requirements Gathering
 - **Business Requirements**, Test Plan
 - Design
 - Design Document
 - Development
 - Test Scripts
 - Acceptance Testing
 - Test Report
 - Implementation
 - Implementation Plan
- *Content*
 - *Look & Feel*
 - *Performance*
 - *Controls*
 - *Platforms*



Testing Aid – Test Plan

- Project Initiation
 - Project Plan
 - Requirements Gathering
 - Business Requirements, **Test Plan**
 - Design
 - Design Document
 - Development
 - Test Scripts
 - Acceptance Testing
 - Test Report
 - Implementation
 - Implementation Plan
- *Test Team*
 - *Test Environment*
 - *Risk Assessment*
 - *Scheduling*
 - *Training*



Testing Aid – Design Document

- Project Initiation
 - Project Plan
 - Requirements Gathering
 - Business Requirements, Test Plan
 - Design
 - **Design Document**
 - Development
 - Test Scripts
 - Acceptance Testing
 - Test Report
 - Implementation
 - Implementation Plan
- *Process Maps*
 - *Tools & Platforms*
 - *Flow Charts*
 - *Sample Screens*
 - *ERD Diagrams*



Testing Aid – Test Scripts

- Project Initiation
 - Project Plan
 - Requirements Gathering
 - Business Requirements, Test Plan
 - Design
 - Design Document
 - Development
 - **Test Scripts**
 - Acceptance Testing
 - Test Report
 - Implementation
 - Implementation Plan
- *YYZ vs. YTZ*
 - *Departure & Return Dates*
 - *Flex Searches*
 - *Credit Card checks*
 - *MAC vs. PC*



Testing Aid – Test Report

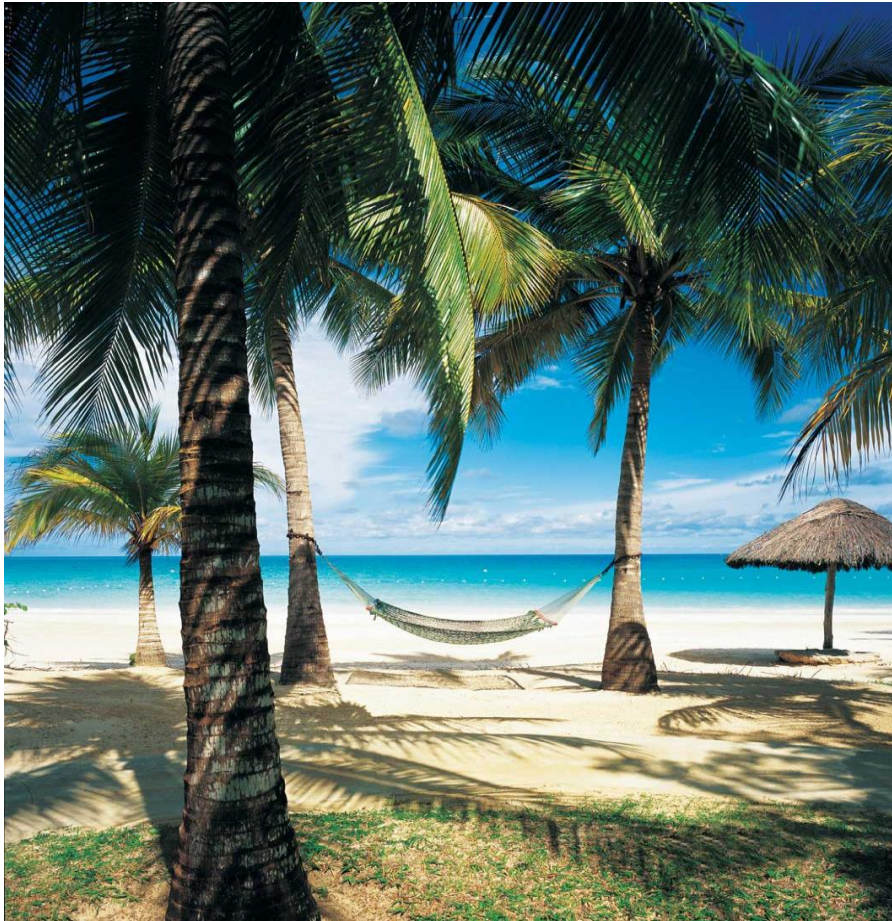
- Project Initiation
 - Project Plan
 - Requirements Gathering
 - Business Requirements, Test Plan
 - Design
 - Design Document
 - Development
 - Test Scripts
 - Acceptance Testing
 - **Test Report**
 - Implementation
 - Implementation Plan
- *Expected vs. Actual Results*
 - *Summary*
 - *Recommendation*



Testing Aid – Implementation Plan

- Project Initiation
 - Project Plan
- Requirements Gathering
 - Business Requirements, Test Plan
- Design
 - Design Document
- Development
 - Test Scripts
- Acceptance Testing
 - Test Report
- Implementation
 - **Implementation Plan**
- *Communication*
- *Back-Out Plan*
- *Implementation Team*
- *Dates*
- *Training & Documentation*

Wrap-Up



- Testing Guidelines
 - Goals
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 - Aids
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- Right-Sizing the Testing Effort
 - Is this a large project?
 - Are the project timelines aggressive?
 - Are you using new technology?
 - Is the change risky?
 - Would this be embarrassing if it were to fail?
 - Is the developer experienced?
 - Is the functional person experienced?
 - Is the Test Environment representative?
 - Is the project team trained in Testing techniques?
 - Is documentation up to date and accurate?
- SQA Designations
 - Certified Software Test Professional (CSTP)
 - Certified Test Manager (CTM)
- SQA Organizations
 - http://www.kwsqa.org/kwsqa_links.asp

A 21-year-old German tourist who wanted to visit his girlfriend in the Australian metropolis Sydney landed 13,000 kilometers (8,077 miles) away near Sidney, Montana, after mistyping his destination on a flight booking Web site.

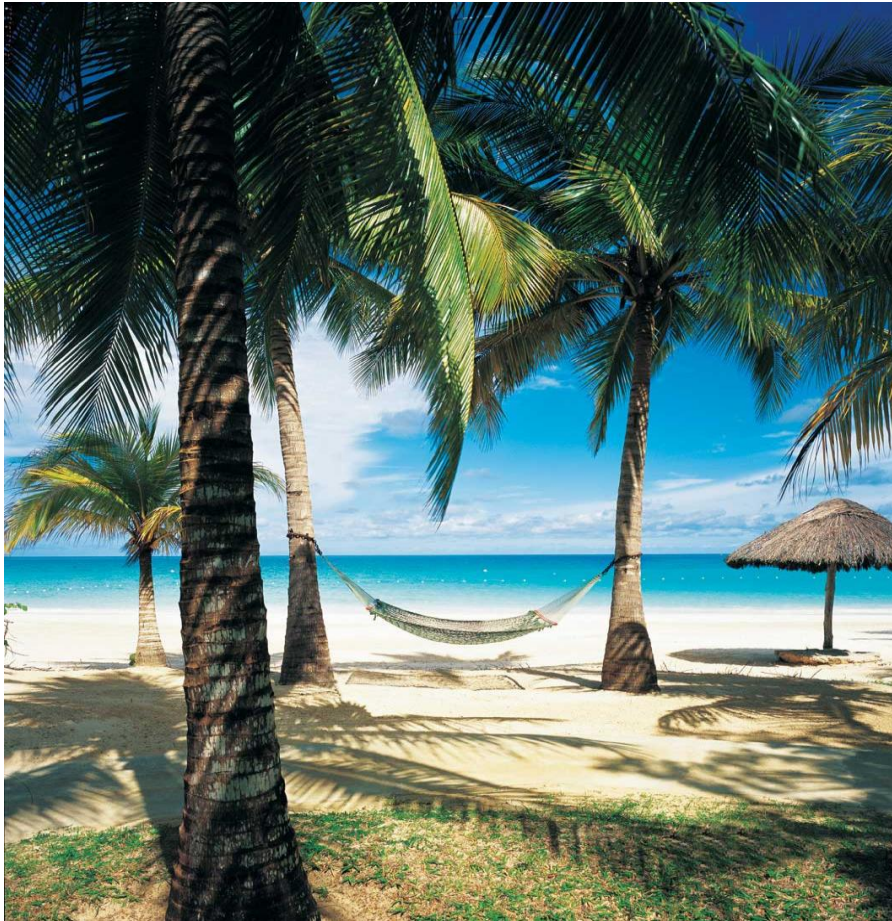
Dressed for the Australian summer in T-shirt and shorts, Tobi Gutt left Germany on Saturday for a four-week holiday. Instead of arriving “down under”, Gutt found himself on a different continent and bound for the chilly state of Montana.

“I did wonder but I didn’t want to say anything,” Gutt told the Bild newspaper. “I thought to myself, you can fly to Australia via the United States.”

Gutt’s airline ticket routed him via the U.S. city of Portland, Oregon, to Billings, Montana. Only as he was about to board a commuter flight to Sidney — an oil town of about 5,000 people — did he realize his mistake.

The hapless tourist, who had only a thin jacket to keep out the winter cold, spent three days in Billings airport before he was able to buy a new ticket to Australia with 600 Euros in cash that his parents and friends sent over from Germany

Questions



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Taking it Further II

■ Policy Changes:

- Item 1 from Upgrade Audit...
- Item 2 from Upgrade Audit...

■ Practice Changes:

- Don't wait for months to begin testing
- Log all issues in ACE. Avoid using voice mail
- Each task in ACE now has a Functional user assigned
- Plan your tests. Create Test Plans and Test Scripts, and store them for future use.
- Verify and Validate Requirements. See "Guidelines for Submitting Requests"
- Developers are responsible for Unit Testing their code.

■ Process Changes:

- Functional users must upgrade ACE status to "Specification Sign Off", after reviewing Customization Requirements and Design/Technical specs.
- Functional users must upgrade ACE status to "Functional Sign Off", after testing. Verbal signoff is no longer adequate.