XP-rience: eXtreme Programming Experience

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Confessions of a (not that) eXtreme Programmer leading a teleworking team building a Meta-Programming and Meta-Modelling Framework for Network & Service Management.
Outline of Talk

• The XP method
  – testing, refactoring and pair-programming
    • experience of each, how they combined
    • the role of architecture and design
    • pair programming experiment
• The XP process
  – what we thought it was
  – our experience of it
• Introducing XP to a team
  – Kent’s advice - pure XP from day 1
  – Niall’s practice - (comparatively) less strict
• XP FAQs
  – handover (unverified)
  – scaling up (plan based on others’ experience)
The Cost of Being Wrong

Each fault costs more to fix the later you fix it

Make decisions early; freeze them early
The Cost of Being Meta-Wrong

Software is not hardware

Software is malleable

The cost to fix can be steady
Experience of Test-before-Code (1)

• The need for speed
  – the current test / the whole test suite runs in
    • 10 seconds / 10 minutes: fine
    • 5 minutes / 1 hour: stop and refactor
  – ‘no time to redo test, must deliver’ WRONG!
• Beware ‘necessary but not sufficient’
  – starting with a necessary test is essence of XP
  – complete the test set
    • partition axes (e.g. lifecycle stages, config types)
  – complete the assertions
    • two wrongs don’t make a right ...
    • … but may pass a failure-reliant test
  – general domain truths: put in generic classes ?
    • e.g. tp realizer connector == tp connector realizer
• Write tests, not design docs or task lists
Experience of Test-before-Code (2)

- Test case pattern only implicit in paper
  - formalizing it helped achieve common style
    - combine test cases via inheritance and delegation
- Needed flyweight pattern (SUnit 3.0 has this)
  - reuse/reset complex test configurations when
    - expensive to build or tear down
    - invariant or resettable under the tests
- Evolve hard-to-compute test results (J. Pelrine)
  - chose initial config to test simple service
  - computed deltas to config for complex service
- Testing the UI
  - ‘some XP-complete projects only test 50% code’
  - Kent says ‘O.K. to skip UI tests’ (paraphrase)
  - mea culpa !!! (and it sometimes hurt)
Experience of Refactoring (1)

• All coding is refactoring
  – theory: never write a line without a broken test
  – practice: after a while, we almost never did

• The need for elbow room
  – deliveries inside increments kill refactoring
    • must break to remake
    • customer understood (enforced cycles on his team)
      – ‘We’ll push on you, you push back on us.’
    • our new manager did not (survive :-)
      – ‘Mustn’t annoy them, let’s do it this once.’

• What role for Architecture?
  – Refactoring demands fine-granularity
    • must be able to move behaviour incrementally
  – Barriers need architecture (or removal)
    • our ST-Corba-Java interface needed an architecture
Another Architecture Example

1) Low tax on refactoring; use XP across boundary

2) High tax on refactoring; architect boundary
Experience of Refactoring (2)

• What role for design?
  – XP says, ‘Let the code teach you’
    • pair-program sessions create design fragments
      – tests are primary, configure-controlled
      – models quickly sketched, useful in discussion
    • hard to reuse / refactor models due to poor tools
      – drawing tool: no understanding (bad)
      – modelling tool: wrong understanding (worse)
  – Documentation for new starters
    • most of our designs wrong / out-of-date
      – as XP says they will be
    • wrote some post-hoc designs
      – they were wrong / out-of-date too :-)
  – Design to find what tests to write
    • brief initial design helped a major refactor
    • impromptu sessions re non-code issues: helpful?
Notes for prior slide

Architecture and Design

(Slide not shown, only for notes.)
Experience of Pair-Programming

• The hardest part of XP?
  – ‘We don’t have time to pair-program’
    • you don’t have time not to
    • pays back surprisingly quickly
    • a useful pacing mechanism
  – ‘If only I hadn’t so many meetings’
    • stop meeting to talk and separating to work
    • start meeting to work and separating to think

• Pair-compatibility issues
  – powerful when both are system-experienced
  – used as training mechanism; mixed results

• Teleworking tool + handsfree phone ideal
  – better than sharing one mouse and keyboard
  – puts locals and teleworkers on even footing
  – collateral benefits: better split-site working
Teleworking and Pair-Programming

(Slide not shown, only for notes.)
Experience of Combinations (1)

- Refactoring and Pairing
  - let the code (and talking about it) teach you
    - discover a better design than you could deduce
  - example 1) object subClass: #class pattern
    - I built lightweight metaclass for special case
      - code told me, ‘metaclass wants class’ behaviour’
      - pair asked me, ‘Why not do that everywhere?’
      - suddenly we had a working system
  - example 2) model-or-user-driven pattern
    - I wanted model-driven algorithms
      - but couldn’t solve every case
    - pair wanted user-driven, model-constrained
      - but couldn’t make UI comprehensible
    - union was ‘simplest thing that could work’
      - and result was tool for finding better algorithms
Experience of Combinations (2)

- **Refactoring and Testing**
  - basic XP: tests let you refactor
    - 100%: refactor broke feature $\Rightarrow$ feature lacked test
    - 99%+: refactor broke feature, *area* lacked tests
- **Pairing and Testing**
  - pair-programming a test defines a task
    - especially good for new starters
  - test lets pair agree understanding of task
- **Refactoring, Testing and Pairing**
  - I several times experienced the sequence:
    - my refactor fails someone else’s tests
    - my pair worked with them earlier, so explains code
    - pair fixes, fails refactor test; I fix, get better refactor
  - discuss, and so defeat, ‘shy arrogance’
    - ‘I can’t pair till I’ve worked out how to do this task’
Pair-Programming Experiment

• Popularity
  – doubting start grew to 82% paired coding time
    • (industry: some always pair, some feel ‘burnt-out’)
    • (I browsed code alone, trying things out)
  – compatibility: rotate to ease clashes
    • 2 x expert great, 2 x novice good, expert-novice OK
    • extrovert-extrovert slow !!! (but they liked it :-) )
    • introvert-introvert good training for v. introverted

• Effectiveness
  – paired code is of higher quality
    • pairs always write test cases
  – pairs take much the same effort
    • median: same effort, 50% elapsed time ) due to 2
    • average: 115% effort, 58% elapsed time ) outliers
    • pairs defeat parkinson’s law and ratholes
Our Experience: Process

- **Discipline** customers and managers with:
  - the planning game
    - customers always want everything yesterday
    - to get maximum value from technical synergy
      - customer maps stories to values
      - developer maps stories to iterations
  - iterative cycles
    - once upon a time we revectored every year
    - revector every month = process
    - revector anytime = no process

- **Need to coach customers and managers**
  - XP doesn’t say how; our best customer
    - already believed in iterative cycles
    - was idea-rich but time-poor
    - was erratic in pushing XP to his team
  - XP says, ‘refuse the ones who won’t learn’
Interrupts: an eXtreme Solution

Heads-up Week
queries welcome

bay 5

Heads-down Week
go away; come back Aug 15

bay 6
Introducing XP: what Kent says

• Preach simple design
  – communicate in source code
    • no configure-controlled design docs
  – never duplicate logic
• Enforce XP’s rules on the team from day 1
  – if you don’t need it, don’t do it
    • no line of functional code written without broken test
  – pair program
    • no line of production code written unpaired
  – keep the feedback loop short
    • build system and run all test cases every day
  – work smarter not harder
    • concentrate work in middle of day
    • be exhausted by 16:00
    • 40-hour maximum working week (popular :-)

Introducing XP: what Niall did (1)

• Preached the theory: created champion(s)
  – talk (wanted workshop, summer school, ... )
• Started with Testing
  – chose test utility
    • ?Unit from www.XProgramming.com/software.htm
    • commercial testing tools that are XP-aware
  – for each team member, assigned starter task
    • champion pair programs test with them
    • lets them code task, running test often
  – gradually enforced rule
    • each task must have test(s)
    • all tests must be written paired or code-reviewed
  – once test suite built up, took time to
    • refactor tests for speed and common style
    • extend suite to a reasonably complete set
Next came Refactoring
  - made first major one visible (team discussion)
    • the need to refactor arose naturally
    • waited till test suite was large enough for safety
  - got bolder as our test suite grew
Grew into Pair Programming
  - started gently
    • thou shalt pair-program for 2 hours each week
    • thou shalt pair or review all tests
    • started by pairing equals
  - when team opinion leaders won over
    • upped weekly paired hours
    • rotated pairs
  - discussed, and so defeated, ‘shy arrogance’
    • ‘I can’t pair till I’ve worked out how to do this task’
Introducing XP: Up-front Costs

- Up-front costs: technical
  - finding, loading, learning the test utility
  - getting used to test-failure-drives-coding
    - cost is IDE-dependent
    - some benefit in all IDEs
- Up-front costs: non-technical
  - some customers / managers are keen
    - ‘the creative engagement of combative intellects’
    - ‘let’s pair-program tests to define use cases’
  - some give the uncommitted ‘yes’
    - put ‘heads-up / heads-down week’ on everything
  - some fight it
    - ‘XP doesn’t need those documents and meetings’
      - ‘those documents and meetings are what I’m about’
    - never give way, never give (avoidable) offence
FAQs (1): Handover ?

• Can you sleep / handover an XP project?
  – I followed VCAPS model
    • wrote 10 page document with pointers to tests
    • seemed O.K. to me
    • wished I could reuse design discussion diagrams
  – our handover process is not yet verified
    • recipients were reassigned

• Whether or no, should you worry about it?
  – XP’s philosophy is about opportunity cost:
    • don’t waste time preparing for unlikely events
    • you can refactor to handle them if they occur
  – (Almost) ‘nothing that dies ever comes back’
    • spend your time on useful features => no handover
    • handover ifTrue: [self writeBetterDocNowThanBefore]
FAQ (2): Scaling Up?

- Some say scale is an issue, others say not
  - Projects of 25 have used XP: ‘the tools creak’
  - I lack experience but have contacts
- Scaled-up extreme s/w eng process (eCom)
  - three teams with parallel increments
    - Xanalysis: 2 ‘relationship people’ model domain
    - Xreqts: 2 ‘lawyers’ write OCL use cases
    - XP: 8 programmers do standard XP
  - each team’s output feeds others’ next cycle
    - XP hate rate of business revectoring XA like
    - XA terrified by rate of system refactoring XP like
  - some programming styles collapse XR and XP
    - yes: Smalltalk, Prolog, Lisp, …
    - no: C++, Java, …
Use it !!!

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Backup slides
The Cost of Being Wrong

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The Key Ingredients

test
- Write the tests, then the code
  - can’t code what you don’t know how to test
  - the test proves your function still works
    - next day, week, month, year
  - only write tests
    - that you know will fail, and/or
    - that capture domain knowledge

refactor mercilessly
- Let the code teach you
  - Learn how to do it as you do it
  - Code to learn
    - first make it run
    - then make it right
    - last make it fast

pair
- Frequent pair sessions
  - force you to learn, explain and justify
  - force you to share system knowledge

program
The XP Process Philosophy

- **Give customers what they want**
  - Delivered used software is where it’s at
    - customers want code, not design documents
    - customers want features that add value
  - Building what turns out not to be wanted
    - costs effort and opportunity
    - when in doubt, just wait
  - An XP Story is the right, not obligation,
    - to build a feature at some future time

- **Used software never dies**
  - successful software is simultaneously
    - in production, being evolved
    - in use, being maintained
  - (almost) nothing that dies comes back
    - and VCAP did, via XP
The XP Process

• **Story: some testable features**
  – written by customer, estimated by designers
  – not what designers commit to

• **Iteration: ~ 4 weeks’ worth of stories**
  – collectively, estimate iteration and list tasks
  – individually, sign-up for and estimate task
    • write test case for task
    • (re)write code till it passes test
    • either write another test or move to another task
  – customer reviews result between iterations
    • can’t change story within iteration (can raise bugs)

• **Release: a set of iterations**
  – that make business sense together