Optimizing the Cost of Quality

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Cost of Quality

- Prevention
- Appraisal
- Internal Failure
- External Failure

Prevention Costs

- Retrospectives
  - Root Cause Analysis
- Charters
- Better design models & processes
- Better requirements
  - Talking to customers
  - Setting expectations
- Planning & risk analysis
- Tracking and oversight

more Prevention Costs

- Configuration management
- Defensive coding
- Inspection
- Process definition & improvement
  - Life Cycle Models
- Team Building
- Project & Program Management

Appraisal Costs

- Milestone Reviews
- Testing
- Quality Assurance
- Reviews
- Risk Assessment and Mitigation
- Auditing
- Beta Testing
- Internal Loss of Goodwill
- Project Management

Internal Failure Costs

- Rework - Rebuild
- Regression Testing
- Negotiation over tradeoffs in requirements
- Lost Production Potential
- Problem Tracking
- Cost of Late Shipment
  - Direct
  - Opportunity
- Loss of Morale
- Attrition

External Failure Costs

- Support Costs
- Refunds & Recalls
- Compensation
- Opportunity Cost
- Re-release & re-stock
- Loss of morale
- Attrition

more External Failure Costs

- Customer's Loss of Productivity
- Customer's Loss of Capability
- Customer's Loss of Business
- Lost Customer Goodwill
- Loss of Market Share
- Lawsuits

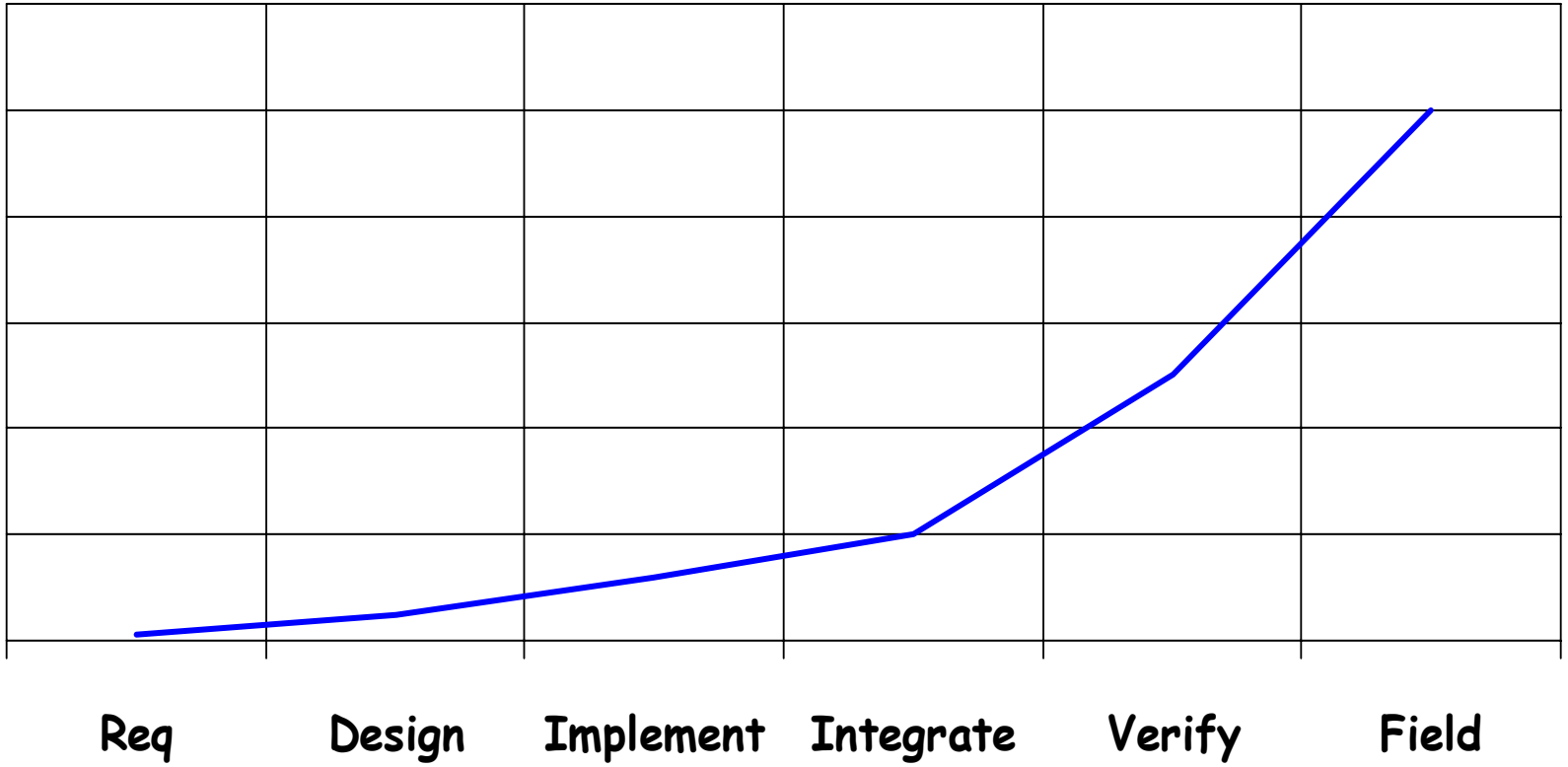
Two Kinds of External Costs

- Yours
  - Shows up on your bottom line
- Your Customers
  - Doesn't show up on your bottom line
  - But it shows up on theirs!

An Important Observation

- Your always pay for your cost of quality one way or another.
- The question is “How much do you want to pay in each category?”

Cost of a Defect



To Do *ANYTHING*...

- You must:
  1. Know How,
  2. Have Permission,
  3. Have Sufficient Resources,
  4. Be Sufficiently Motivated,
  5. Have Some Way of Judging Success.

From *Quality Software Management*

- Zeroth Order Measurement
  - Projects Composed of Measurable Tasks
  - Communicating Plans and Progress
  - Reviews as Measurement Tools
  - Requirements as Foundation for Measurement

Possible Places

- Retrospectives
- Life Cycles
- Inspection or other reviews
- Requirements modeling and management
- Architecture & Design modeling
- Project management
- Risk management
- Configuration management
- Testing and QA
- ISO and CMM

Example: Retrospectives

- This is the best place to start
- Don't do them alone—get yourself a retrospective expert as a disinterested facilitator, otherwise you get
  - incomplete data, and
  - blaming
- Be ready, able, and willing to act on recommendations

Example: Requirements

- This is usually the weakest link in the software chain
- Also the highest potential ROI
- To truly “get” requirements, is a paradigm shift
- Best done using a project team with a facilitator in meetings

Example: Reviews

- Can be more or less rigorous
- Inspection is most rigorous
  - Hardest to get right and sustain
  - Also very high potential ROI
  - But very high investment rate
- Other reviews may also be effective

Example: Risk Management

- 2 kinds of Risk
  - Project
  - Design
- Integral to project planning
- Need not be complex or sophisticated

Example: Infrastructure

- Project frameworks (Life Cycles)
- Understand true cost of tracking defect information
- Understand true cost of version control
- If you're serious about managing costs, get good tools

Some Considerations

- Attempting many of these strategies is not without risk. "They only work if they work."
- Attempt should be treated like a project:
  - Scope - a set of specific objectives
  - Schedule - a defined start and finish
  - Resources - a limited investment
- To succeed, you must also have:
  - a Sponsor
  - an Owner
  - Doers

Next Steps

- Figure out what your worst problems really are
- Consider how you might mitigate those problems
- You may not be able to choose some options
- Choose improvements that can really work in your context
- Iterate

A Caution

- You may be told or tempted to compute an exact cost of quality—DON'T do that!
  - Some parts of cost of quality are intangible, and are unlikely to be calculated accurately.
  - You will either miscalculate them, or leave them out altogether.
  - This will drive you to poor decisions about improvement.
- Instead, try to get a sense for how your cost of quality is distributed over the four cost categories, then base you decisions on how that feels.

Further Reading

Don Gause and Jerry Weinberg, *Exploring Requirements*, Dorset House, 1989.

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