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# Fundamentals of Automated Testing

Basics of Unit Testing and Test Driven Development

Peter Starefeldt

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# Agenda

- Why Automated Tests?
- Testing pyramid
  - Unit Tests
  - Integration Tests
  - User Interface Tests
- Demo – Unit Testing (C#)
- Test Driven Development (TDD)
- What is TDD?
  - Starting with the test
  - Having a failing test
  - Refactoring
- Demo – TDD (C#)

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# Why automated tests?

- Teams can:
  - Hinder and find regression fast
  - Confidence when changing code

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# Why automated tests?

- Teams can:
  - Hinder and find regression fast
  - Confidence when changing code
  - Get immediate feedback
  - Save money
- Manual testing is:
  - Inaccurate
  - Slow
  - Repetitive
  - Can become boring
  - Needed in most apps

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# Why automated tests?

- Continuous Integration/ Continuous Deployment (CI/CD)
  - Automated build and release
  - Basically a faster way to get code into production
  - Quality assurance -> Automated Tests!

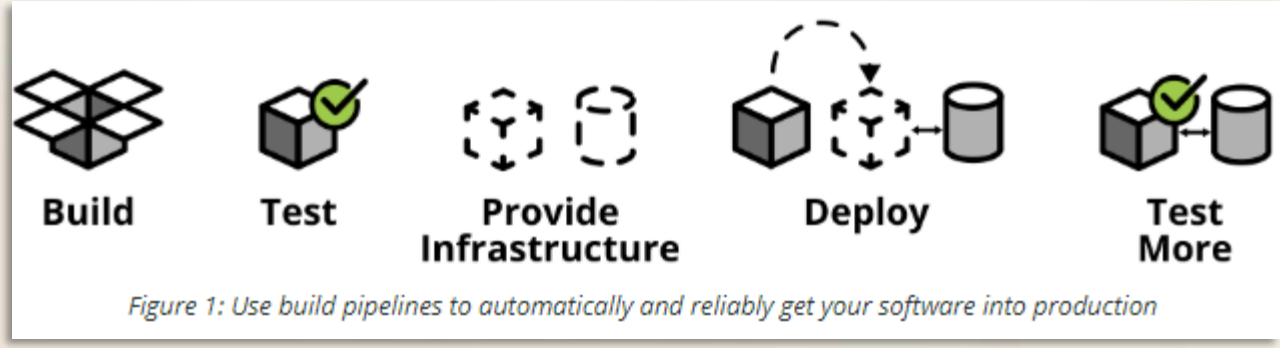


*Figure 1: Use build pipelines to automatically and reliably get your software into production*

Ham Vocke. *The Practical Test Pyramid.*
Hämtad 2019-06-25. https://martinfowler.com/articles/practical-test-pyramid.html

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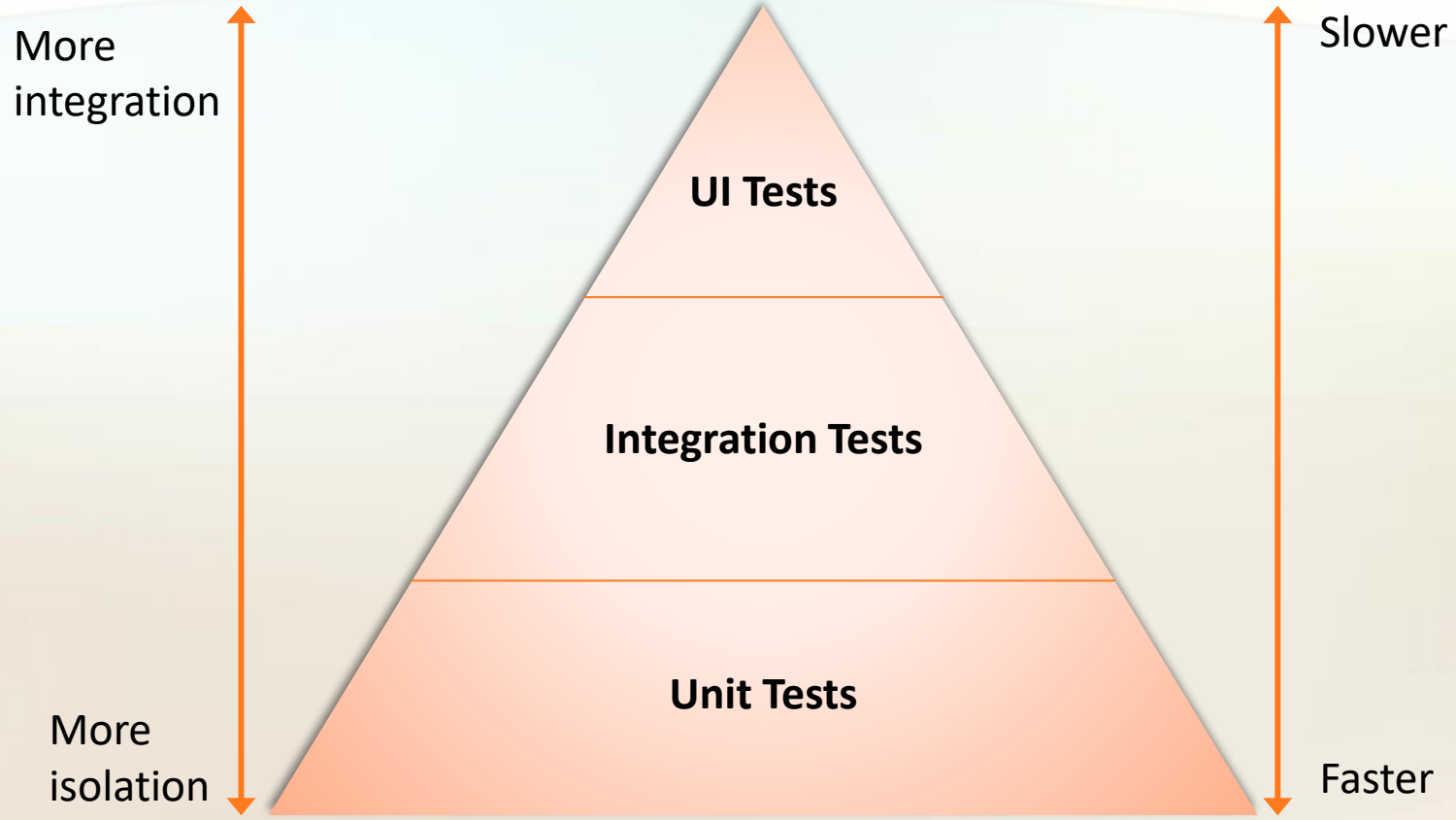
# Testing pyramid




Mike Cohn. *Succeding with Agile*
(New Jersey: Addison-Wesley Education Publishers Inc, 2009).

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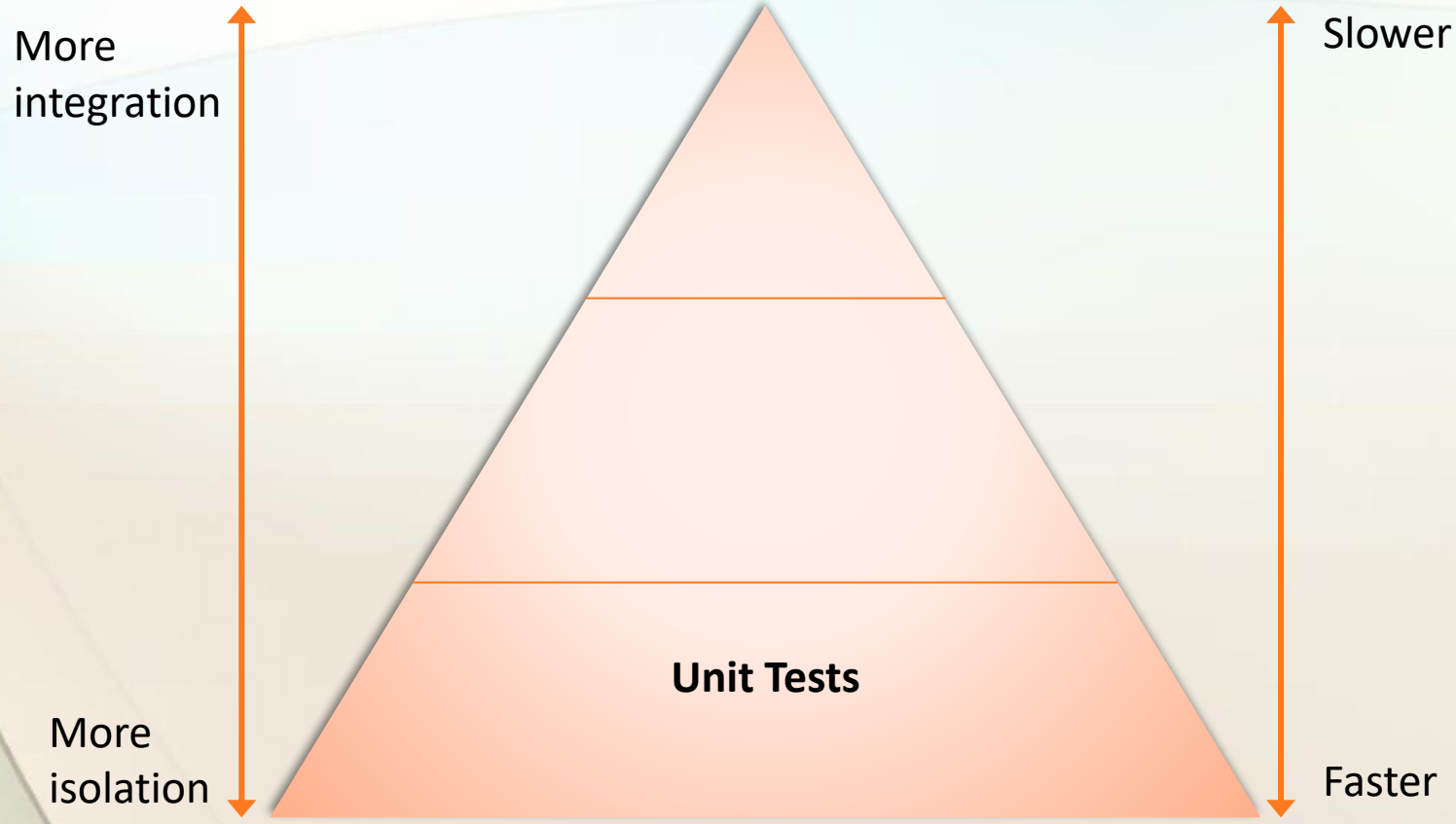
# Unit Tests




- Developer
- Small piece of code
- Uses **no** external dependencies
- Fast
- Consistent
- Easy to write

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# 2 Unit Tests, 0 Integration Tests

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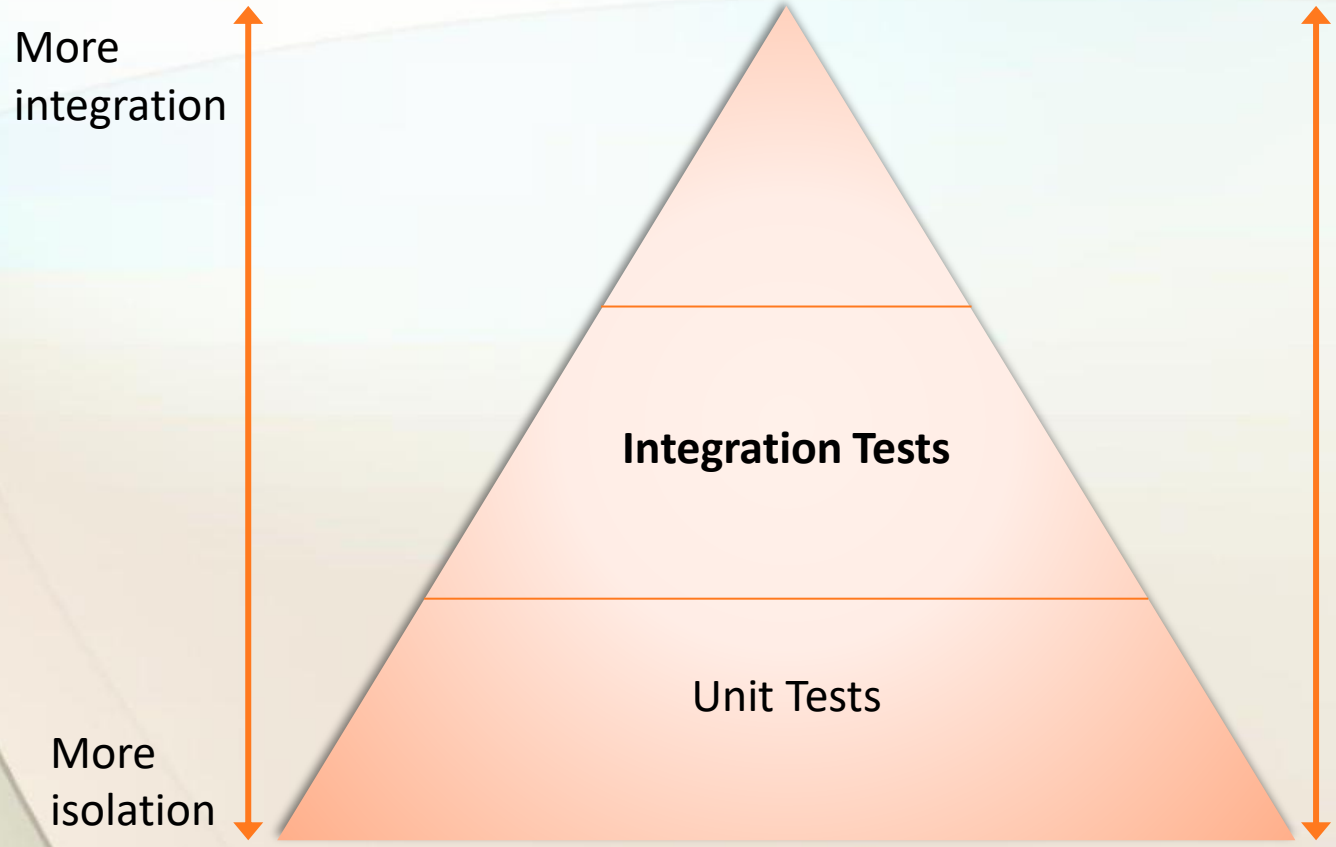
# Integration Tests




- Component tests
- System Integration Tests
- System Tests

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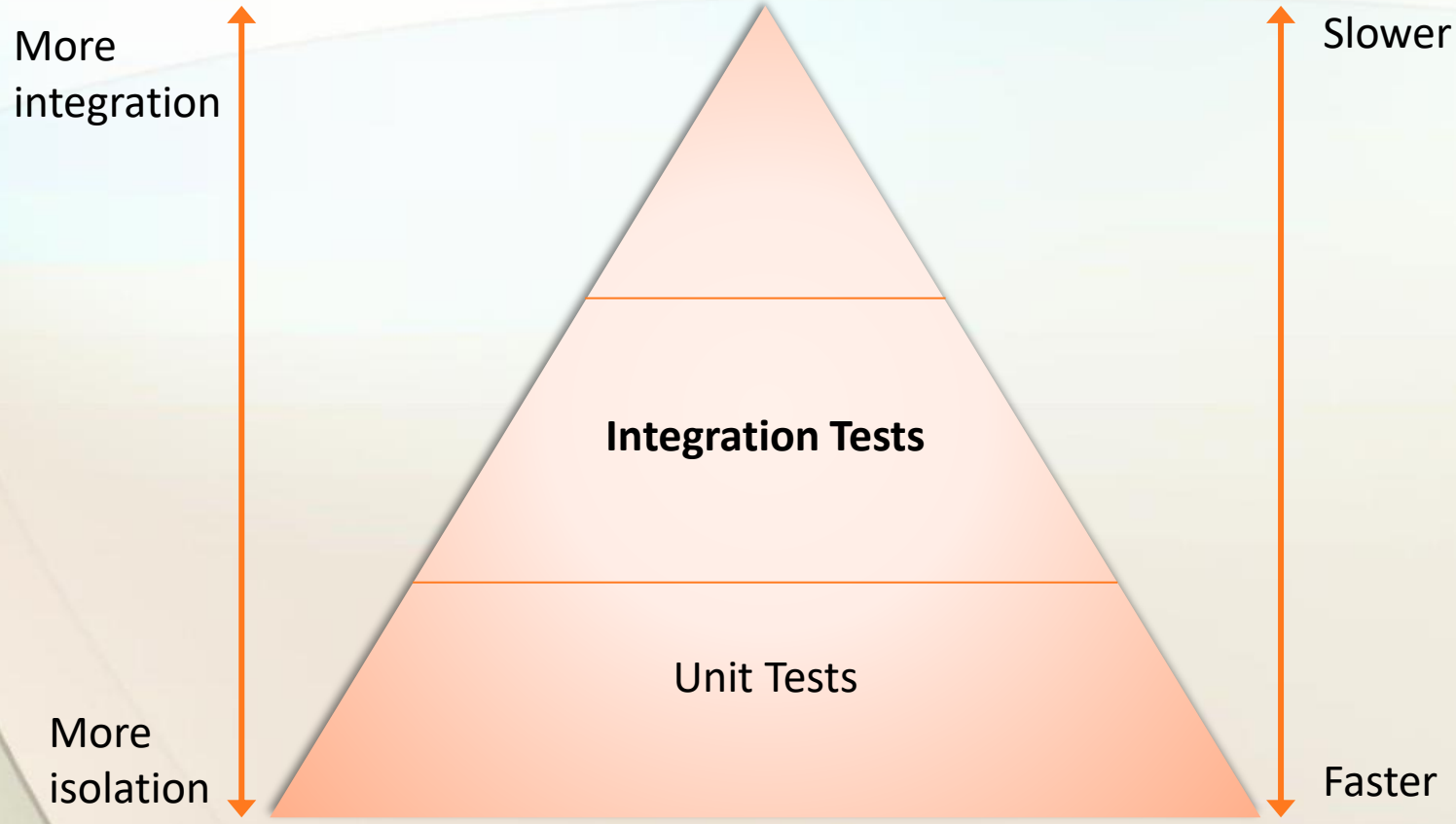
# Integration Tests




- Developer
- Bigger pieces of code
- Uses **real** external dependencies
- Slow
- Not consistent
- Harder to write

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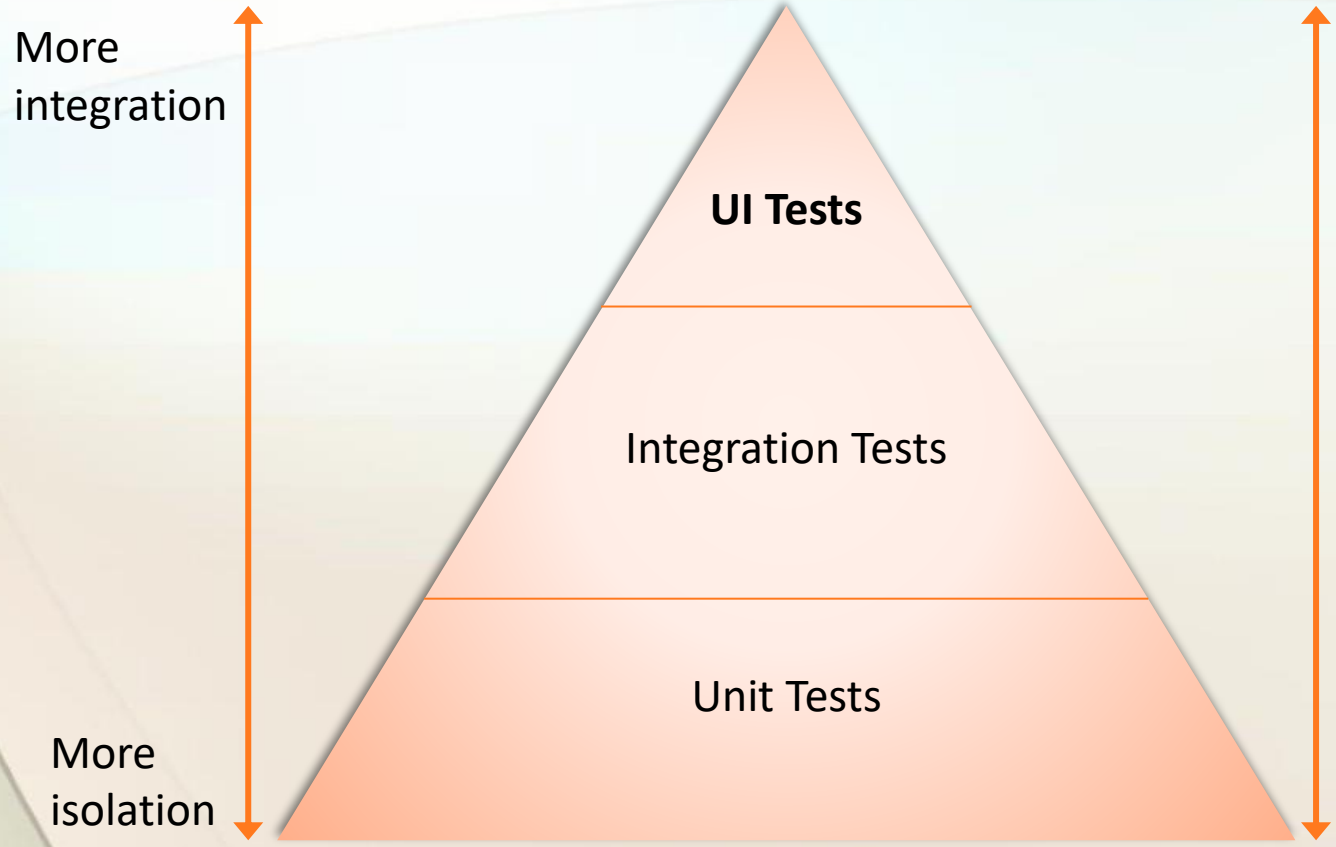
# User Interface Tests




- End-to-End Tests
- Acceptance Tests
- Functional Tests
- Black-box Tests

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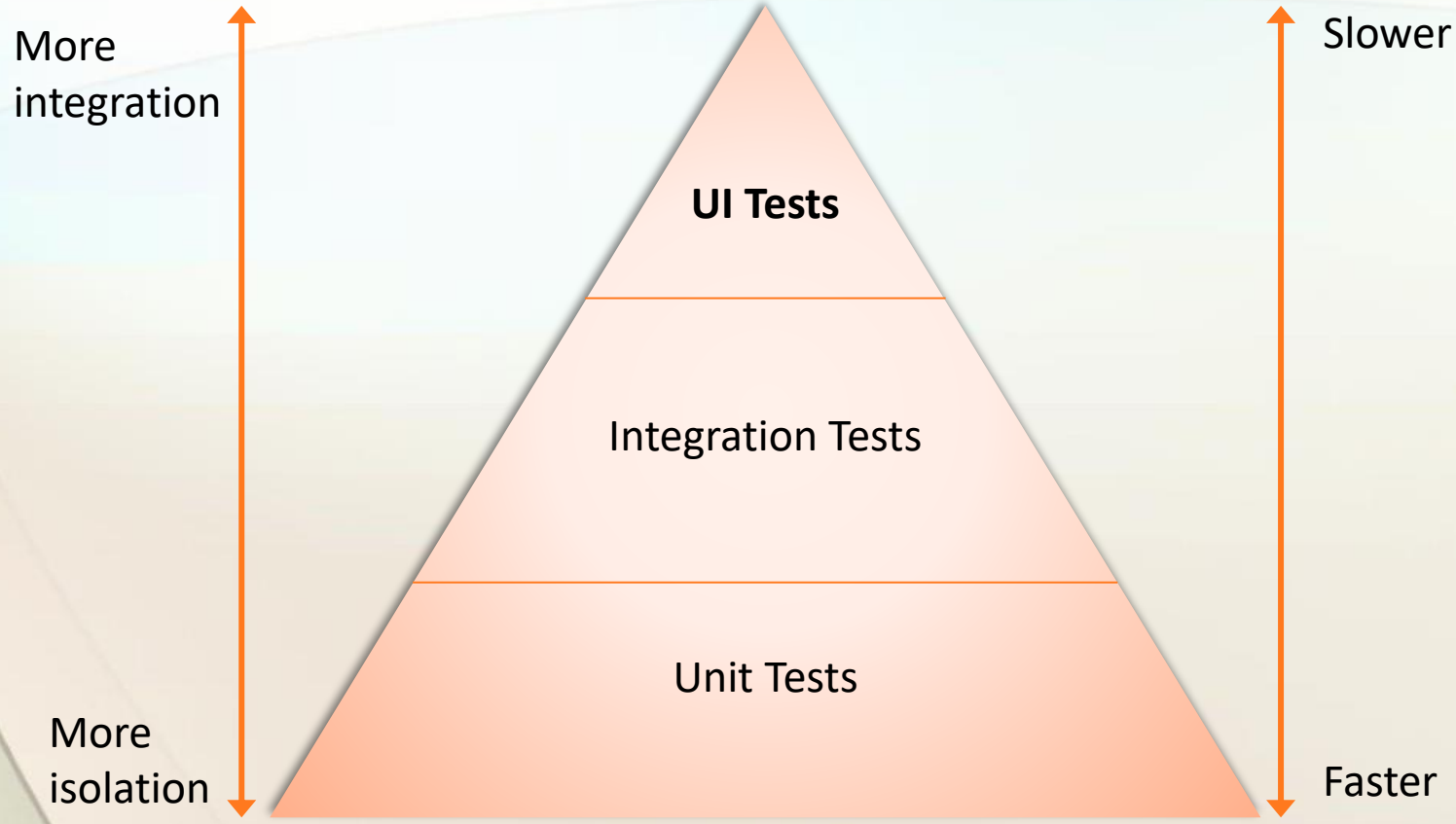
# User Interface Tests




- Usually Tester
- User's perspective
- Complete testing environment
- Not consistent – false positives
- Normal scenarios
- Toughest to automate

Mike Cohn. *Succeding with Agile*
(New Jersey: Addison-Wesley Education Publishers Inc, 2009).