Software System Architectures (NSWI130)

Testability

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Testability Quality Attribute

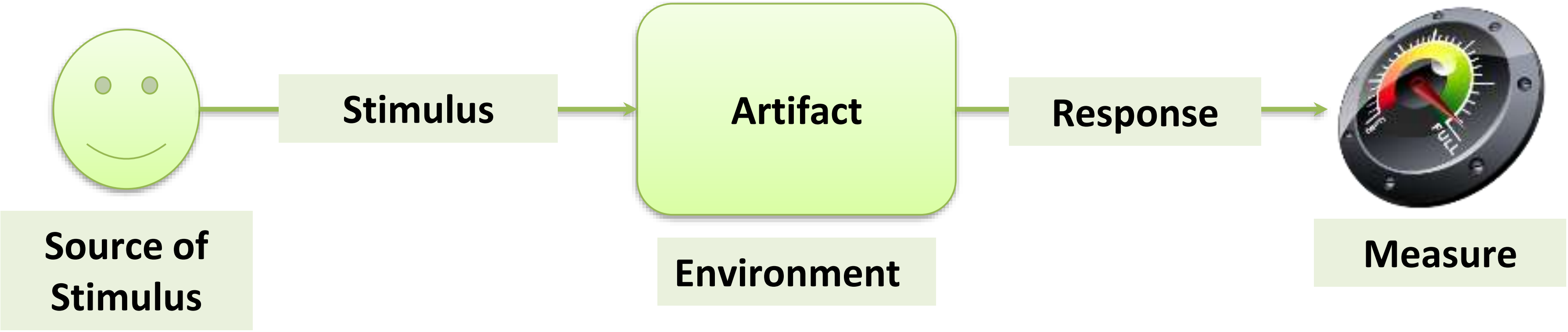
Software testability refers to the ease with which software can be made to demonstrate its faults through testing.

Testable System

- control each component’s inputs
- observe its outputs (and possibly its internal state).

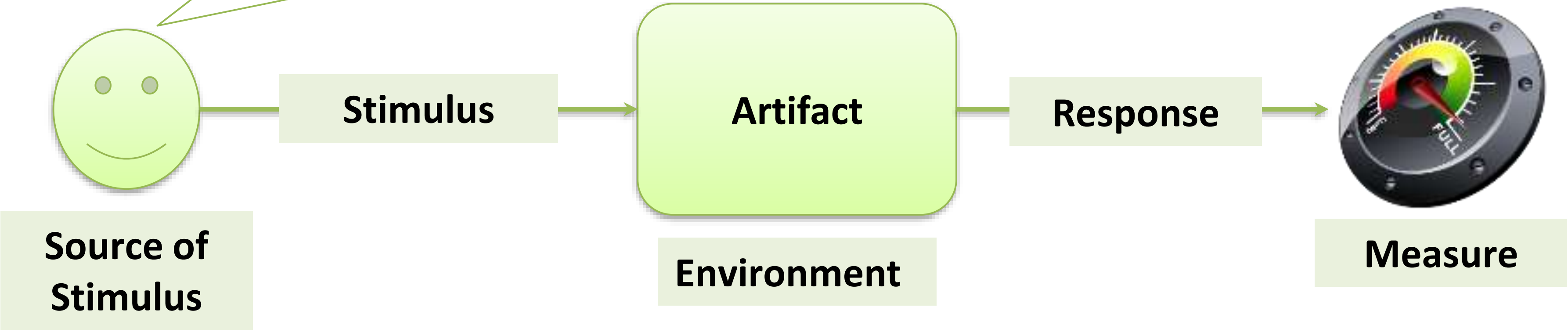
Modifiability Requirement Scenario

- portion of the system being tested



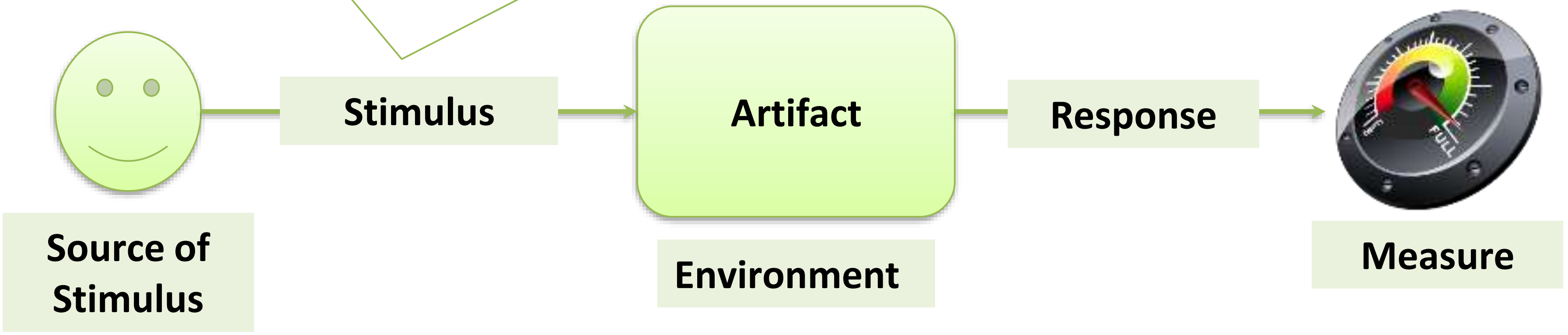
Modifiability Requirement Scenario

- who tests
  - testers, including users



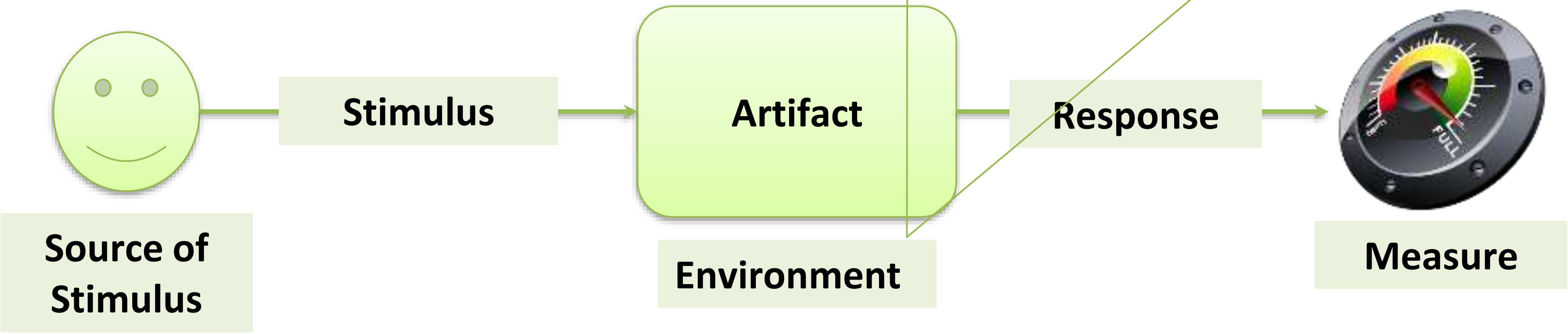
Modifiability Requirement Scenario

- set of tests executed by the source on the artifact



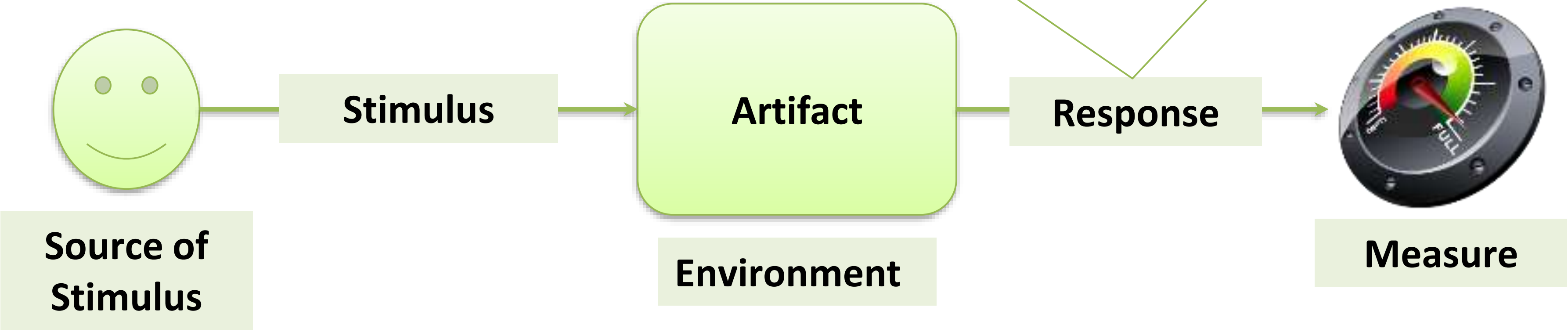
Modifiability Requirement Scenario

- time when the test happens
- test environment



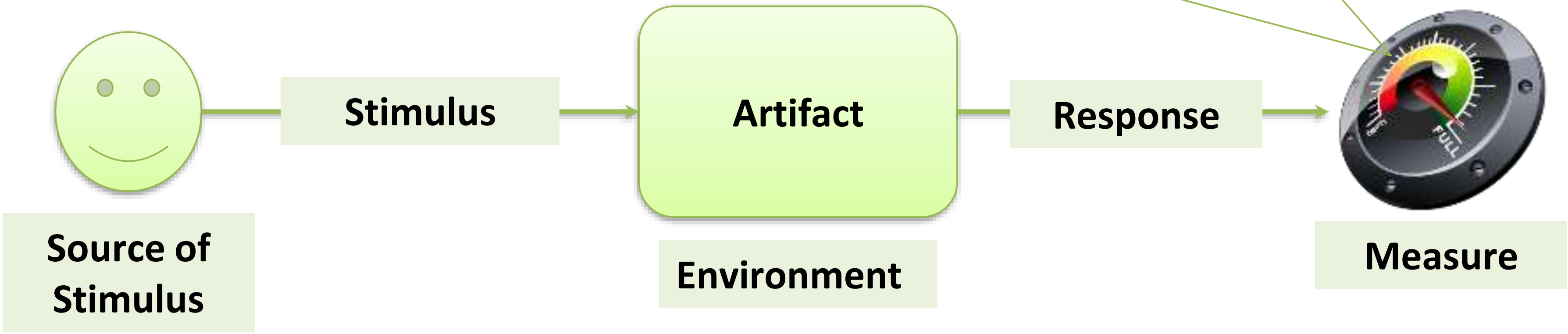
Modifiability Requirement Scenario

- system can be controlled to perform the desired tests and observe the results



Modifiability Requirement Scenario

- represents how easily system under the tests shall give up its faults



Stimulus

Artifact

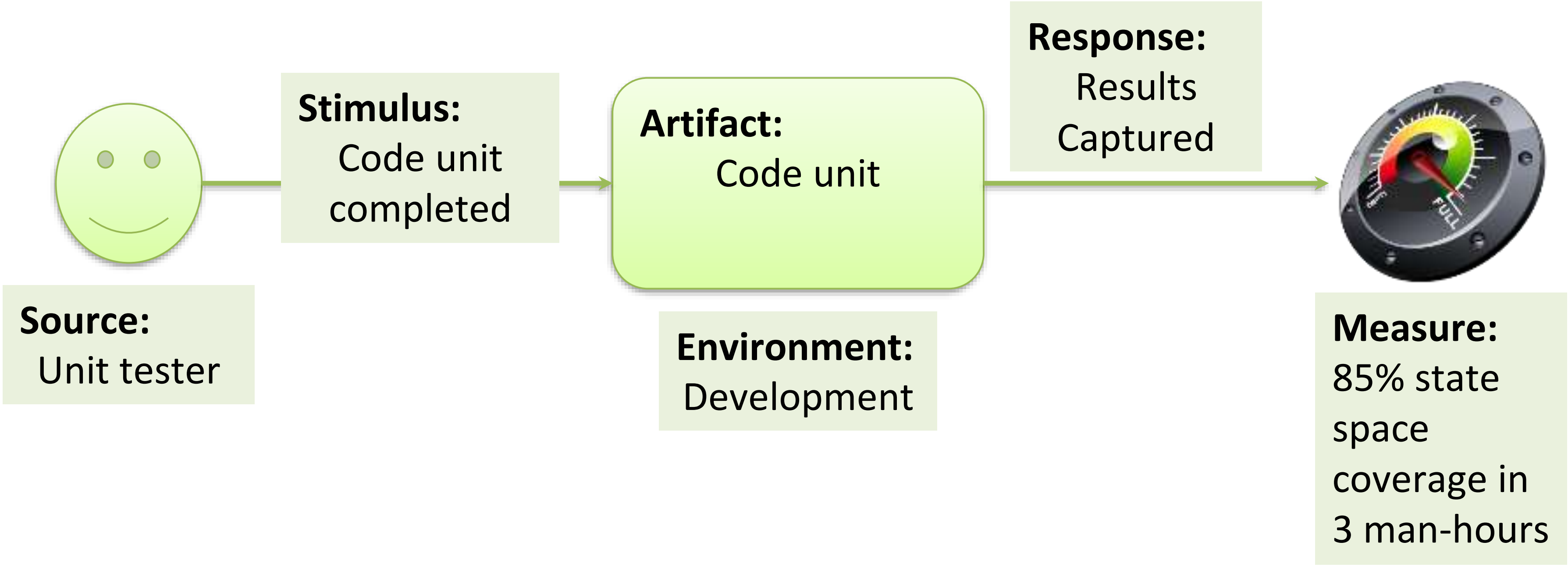
Response

Source of Stimulus

Environment

Measure

Testability Quality Attribute



Stimulus: Code unit completed

Artifact: Code unit

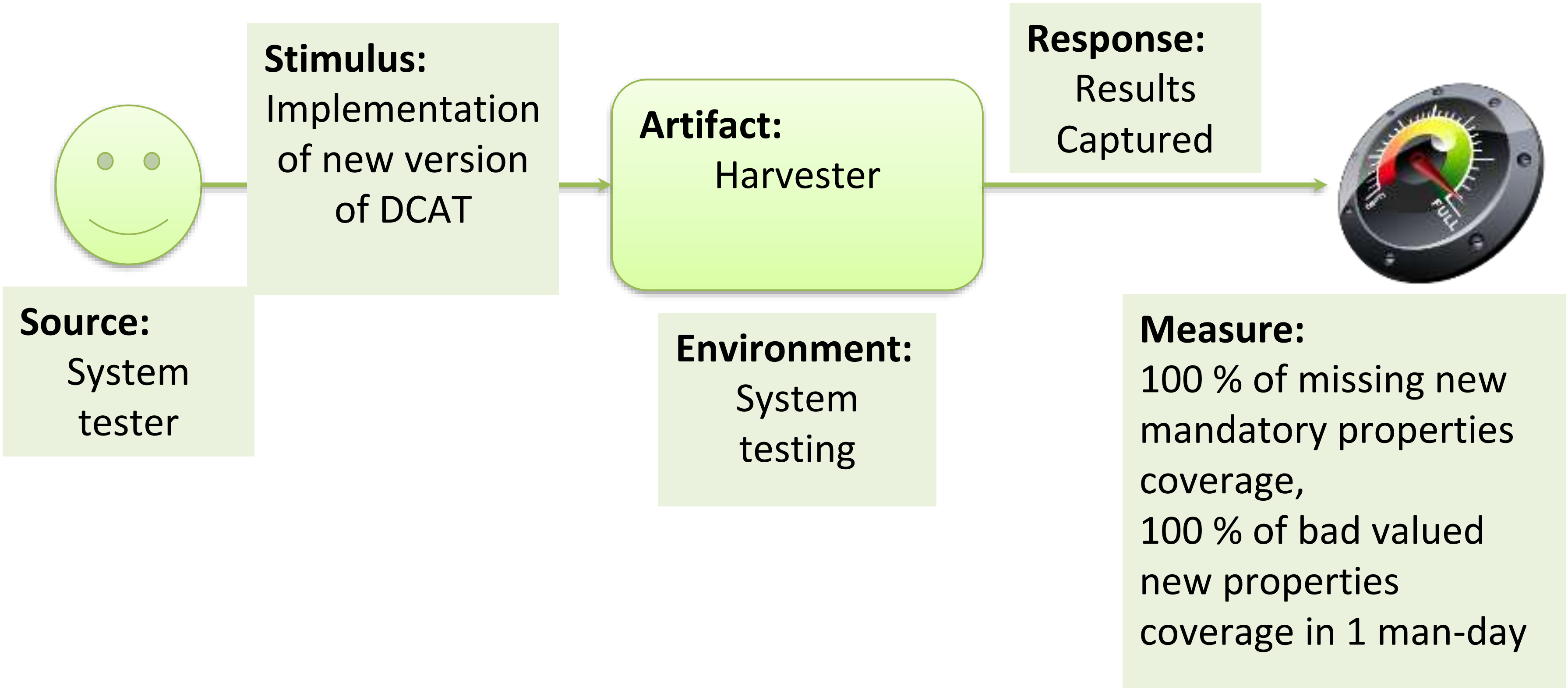
Response: Results Captured

Source: Unit tester

Environment: Development

Measure: 85% state space coverage in 3 man-hours

Testability Quality Attribute



Source: System tester

Stimulus: Implementation of new version of DCAT

Artifact: Harvester

Environment: System testing

Response: Results Captured

Measure: 100 % of missing new mandatory properties coverage, 100 % of bad valued new properties coverage in 1 man-day

Goal of Testability Tactics

- easier testing when an increment of software development has completed
- 2 categories of tactics
  - adding controllability and observability to the system
  - limiting complexity in the system’s design

Control and Observe System State

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- specialized interfaces

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- record/playback

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- localize state storage

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- specialized interfaces
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- abstract data sources

Control and Observe System State

- specialized interfaces
- record/playback
- localize state storage
- abstract data sources
- sandbox

Limit Complexity

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- limit structural complexity

Limit Complexity

- limit structural complexity
- limit nondeterminism