

Fault Injection

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Discussion

Fault Injection deliberately introduces a specified [Fault](#) into a test object or its operating environment under controlled test conditions.

Fault Injection supports the evaluation of fault detection, containment, tolerance, recovery, resilience, and failure behaviour. The governing [Test Definition](#) identifies the Fault, target, injection point, initiating condition, timing, duration, intensity, scope, expected effects, prohibited effects, termination conditions, and recovery conditions.

The governing [Test Procedure](#) specifies the actions used to prepare, authorize, perform, control, terminate, and recover from the Fault Injection.

Fault Injection differs from the uncontrolled occurrence of a Fault. Fault Injection introduces the Fault deliberately under specified and controlled conditions. A Fault that occurs outside those conditions is not part of the authorized Fault Injection.

Fault Injection also differs from the resulting response of the test object. The injection is the deliberate test action; the Fault is the introduced condition; the observed behaviour is the response to that condition.

Definition

deliberate introduction of a specified [Fault](#) into a test object or its operating environment under controlled test conditions

Source

DIDO-TE controlled definition, informed by the dependability and software-engineering concepts in ISO/IEC/IEEE 24765, *Systems and software engineering — Vocabulary*.

Note

Fault Injection requires an identified target and a specified Fault. For NOD-010, the target is a [Node](#) or a condition governing the Node's operation.

The term does not imply a particular injection mechanism. Fault Injection may alter state, processing, timing, inputs, outputs, [Node Bindings](#), Dependencies, interfaces, services, communication, or

resource availability.

The presence of the injected Fault does not establish the Test Outcome. The observed response requires evaluation against the governing Test Definition.

Example

A Test Procedure introduces a specified 500-millisecond communication delay into a Node Binding for 30 seconds. The deliberate introduction of the delay is Fault Injection. The delay is the injected Fault. The Node's observed response provides information used to determine the [Test Outcome](#).

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