Mastering Systems Integration; Testing

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Abstract

During integration, the integrators continuously test parts, functions, and systems. Testing requries the creation of an experimental set-up, where the test enviroment offers stimuli and measures responses. This lesson discusses some of the testing methods and considerations.

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Why Testing?

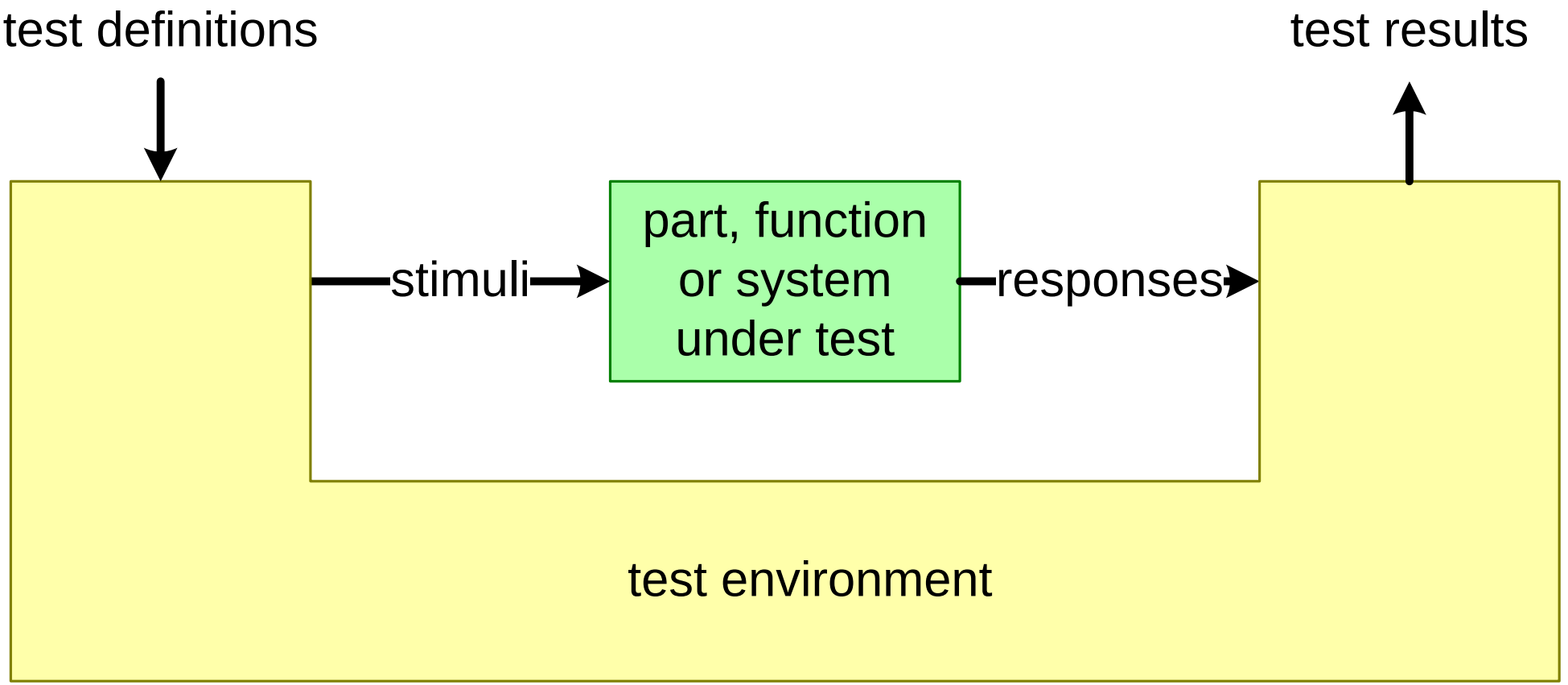
Objectives of testing during integration:

- to find potential quality attribute and behavior problems at specification and design level as early as possible.
- to learn as much as possible about the emerging quality attributes and behaviors.

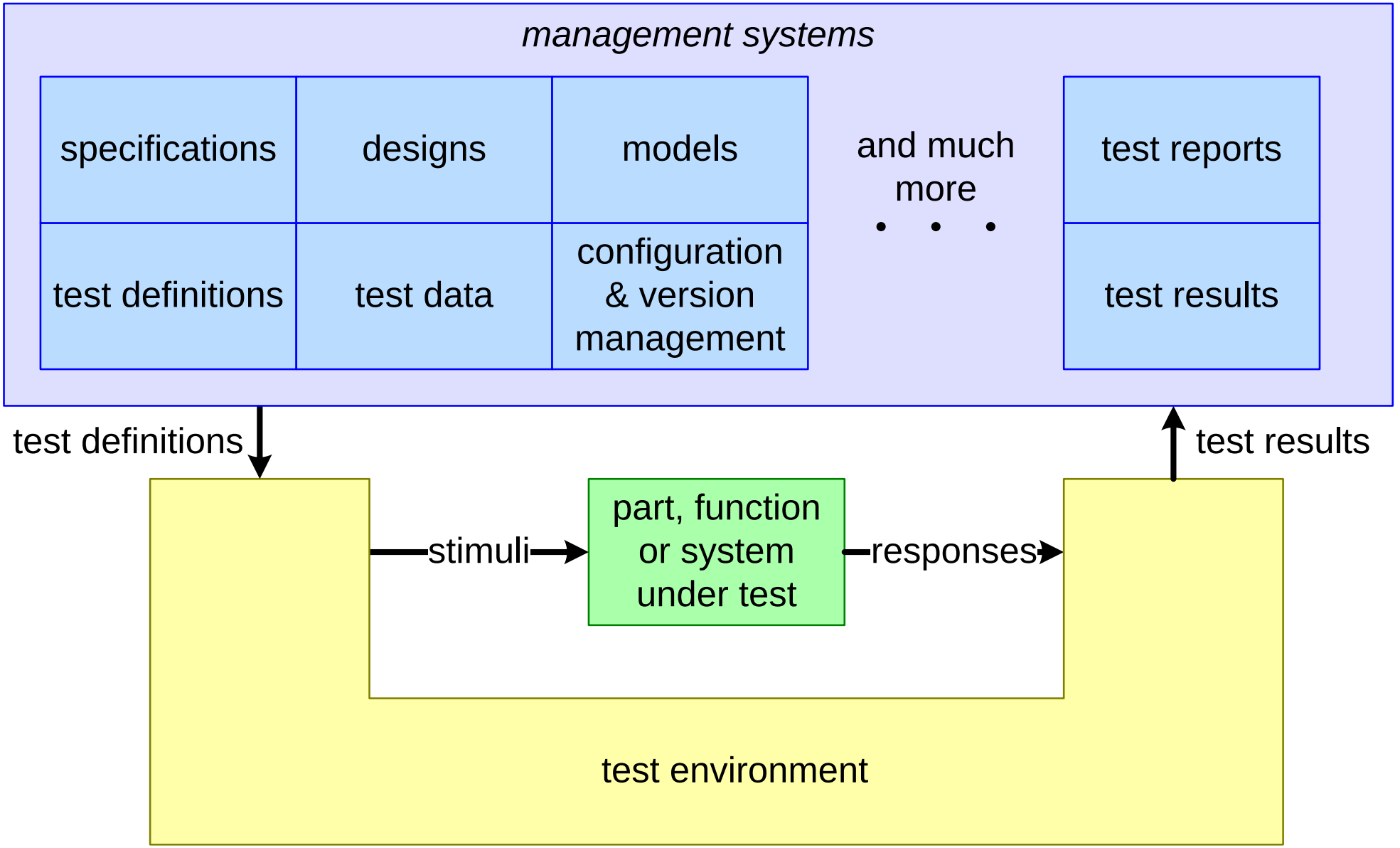
Consequences for testing:

- stimulate the object under test externally and internally (insertion)
- observe the system externally (specification) and internally (design)

Testing Environment



Testing Environment Management Systems Context



Accelerated Testing

During normal use, stimuli are periodic, with frequencies f_0, f_1, f_2, etc.

During accelarated testing these frequencies are increased.

- **ALT** (Accelerated Life Testing) is **Test-to-Pass** (showing how long the system can operate)
- **HALT** (Highly Accelerated Life Testing) is **Test-to-Fail** (learning weaknesses and margins)

The concepts are applicable in hardware, software, and systems. However, engineers know the stimuli for hardware better (temperature, humidity, vibrations, etc.).