

# Model-based Testing: Fostering Reuse for Efficient Testing

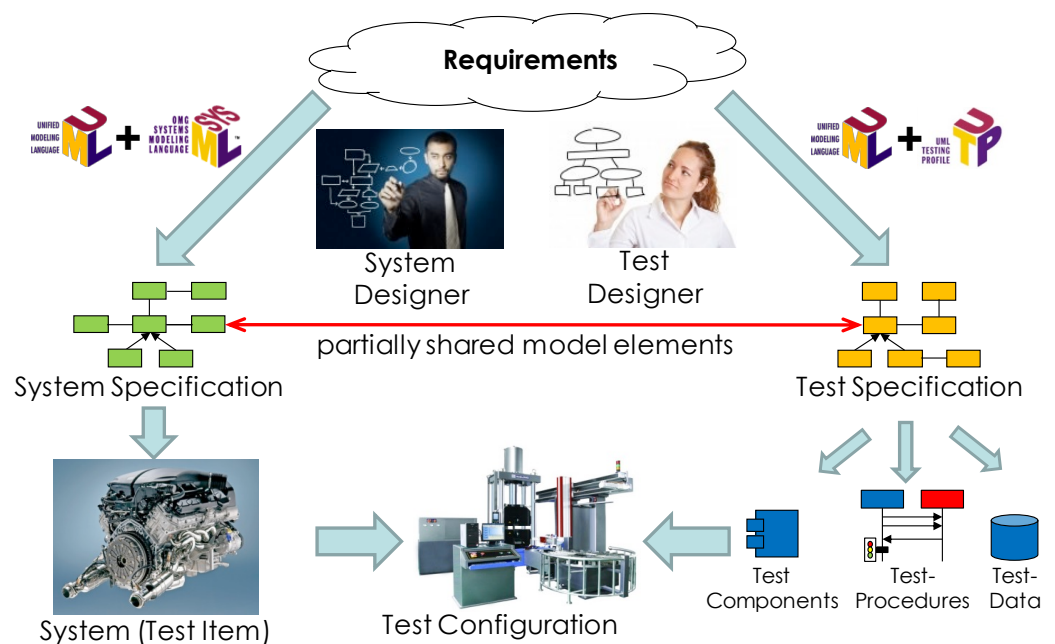


## Model-based Testing (MBT)

### Overview

Today, efforts for testing are still a substantial proportion of the effort required to develop a new system or to modify an existing system. Model-based Testing (MBT) promises a substantial reduction of the efforts required to **create and maintain test specifications** by providing model elements as reusable concepts. Furthermore, the increased formality offered by model-based test specifications simplify not only automation of test execution but also of test creation.

The **UML Testing Profile 2 (UTP2)** is a modeling language for MBT developed by the Object Management Group (OMG). As a UML Profile, the UTP2 is a domain-specific standard extension of the widespread Unified Modeling Language and may thus be used with most commercial UML modeling tools. For systems engineers, UTP2 is also seamlessly integrated with OMG's Systems Modeling Language (SysML).



Compliant with the ISO 29119 and various ETSI testing standards, UTP2 is designed to support the following testing aspects in a model-based fashion:

- Identification of the **system to be tested** as well as its configuration and environment
- Expression of **test objectives, test requirements, and test strategies**
- Specification of reusable **test procedures, test data, and test components**
- Specification of the reusable **decision processes** that decide on test verdicts
- Bundling of test procedures and test data to **test cases** and combination of those test cases to **test sets** such as acceptance tests, performance tests and others.

Wisely integrated into a test management process, MBT with UTP2 leads to a substantial reduction of the resources needed for testing. As a co-author of UTP2, KnowGravity is the ideal partner to help you harvesting the benefits of Model-based Testing.

## Services

Testing-related services offered by KnowGravity typically include the following activities:

- Analyze the existing test process and identify the potential to exploit the benefits of Model-based Testing
- Training and consulting test designers in the techniques and skills required to achieve successful application of MBT
- Efficient development of model-based test specifications by bringing-in an external view on the system to be tested as well as MBT-expertise
- Providing tools to support Model-based testing such as KnowGravity's KnowEnterprise® or by customizing other UML tools such as Enterprise Architect from Sparx or Magic Draw from No Magic
- Integration of test modeling into test management and test execution environments available at the customer's site

## Typical Applications

Typical examples for efficient application of Model-based Testing include:

- Complex heterogeneous systems comprising of both, hardware and software
- Product families with many variants and configuration options
- Embedded systems with needs for complex test equipment
- Software systems with complex functionality with lots of functional variants
- Data-intensive IT systems that process complex data structures
- Systems with long lifecycles and frequent updates
- Mission- or safety-critical systems

## Complementary Services

In addition to model-based testing services, KnowGravity offers the following complementary services:

- Model-based Risk Analysis (MBRA) to focus testing on the most critical safety and security risks
- Elaboration of functional and non-functional requirements by applying Model-based Requirements Engineering (MBRE)
- Development of executable functional specifications and/or test specifications for systems with high functional complexity

## Why KnowGravity?

- KnowGravity is one of the lead designers of OMG's UML Testing Profile 2 (UTP2). Furthermore, KnowGravity is an active member in several other modeling working groups of the OMG
- KnowGravity has developed its own modeling tools (KnowEnterprise®, KnowDocs™, CASSANDRA) out of the need of its customer projects
- KnowEnterprise® is one of the first modeling tools that comprehensively supports UML2 and is the platform that has been used to develop the UTP2 specification at the OMG
- KnowGravity has comprehensive engineering experience in a wide spectrum of domains and techniques
- All employees of KnowGravity are modeling experts for business systems as well as for technical systems and are proficient in many domain specific modeling languages

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