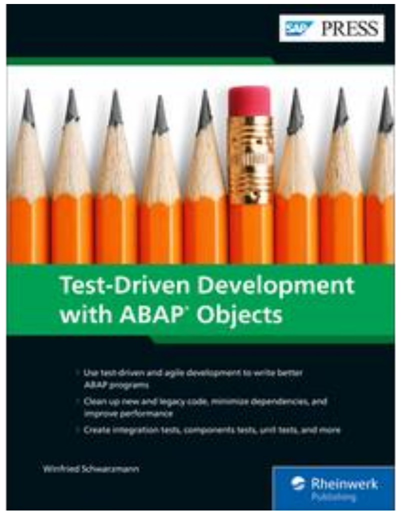
ABAPConf 2024 South Africa

Designing Testable ABAP Classes and Packages

Winfried Schwarzmann, SAP SE | November 13, 2024

PUBLIC

Introducing Winfried Schwarzmann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Test-Driven Development with ABAP Objects
Use test-driven and agile development to write better ABAP programs
Clean up new and legacy code, minimize dependencies, and improve performance
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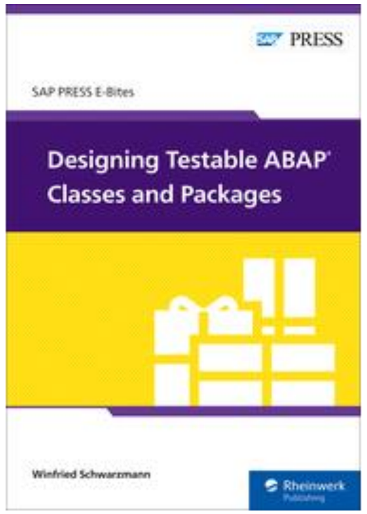
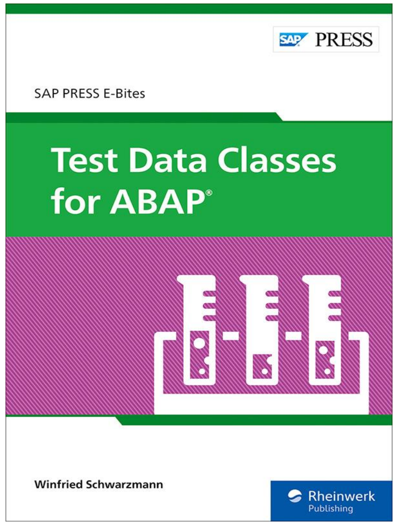
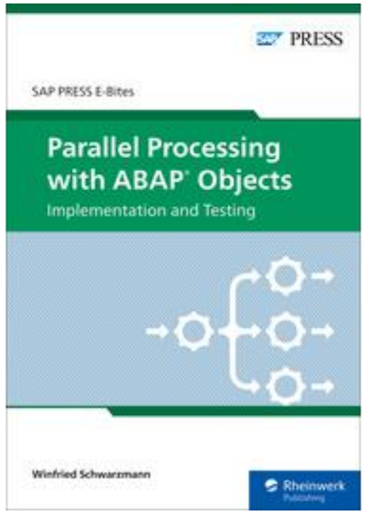


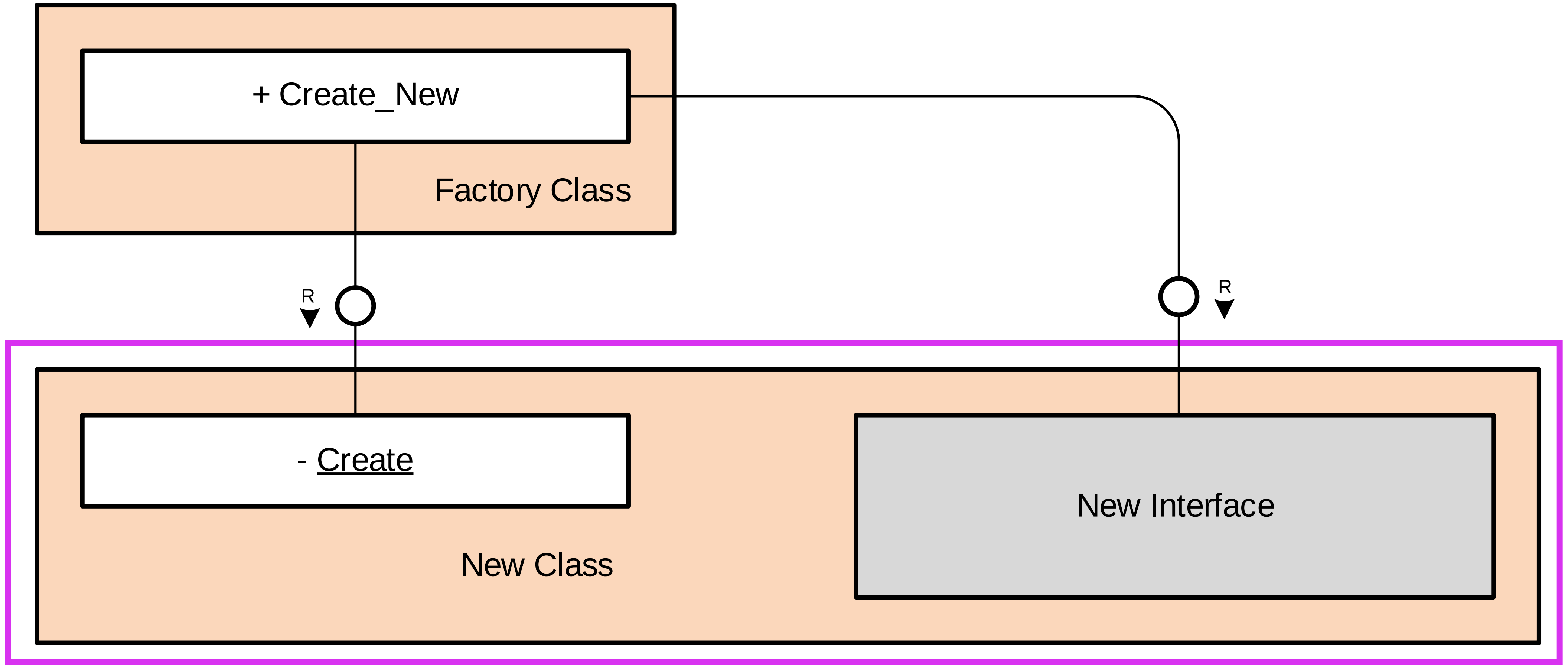




Working for SAP for more than 25 years as:

- Developer and Architect
- Agile Software Engineering Coach

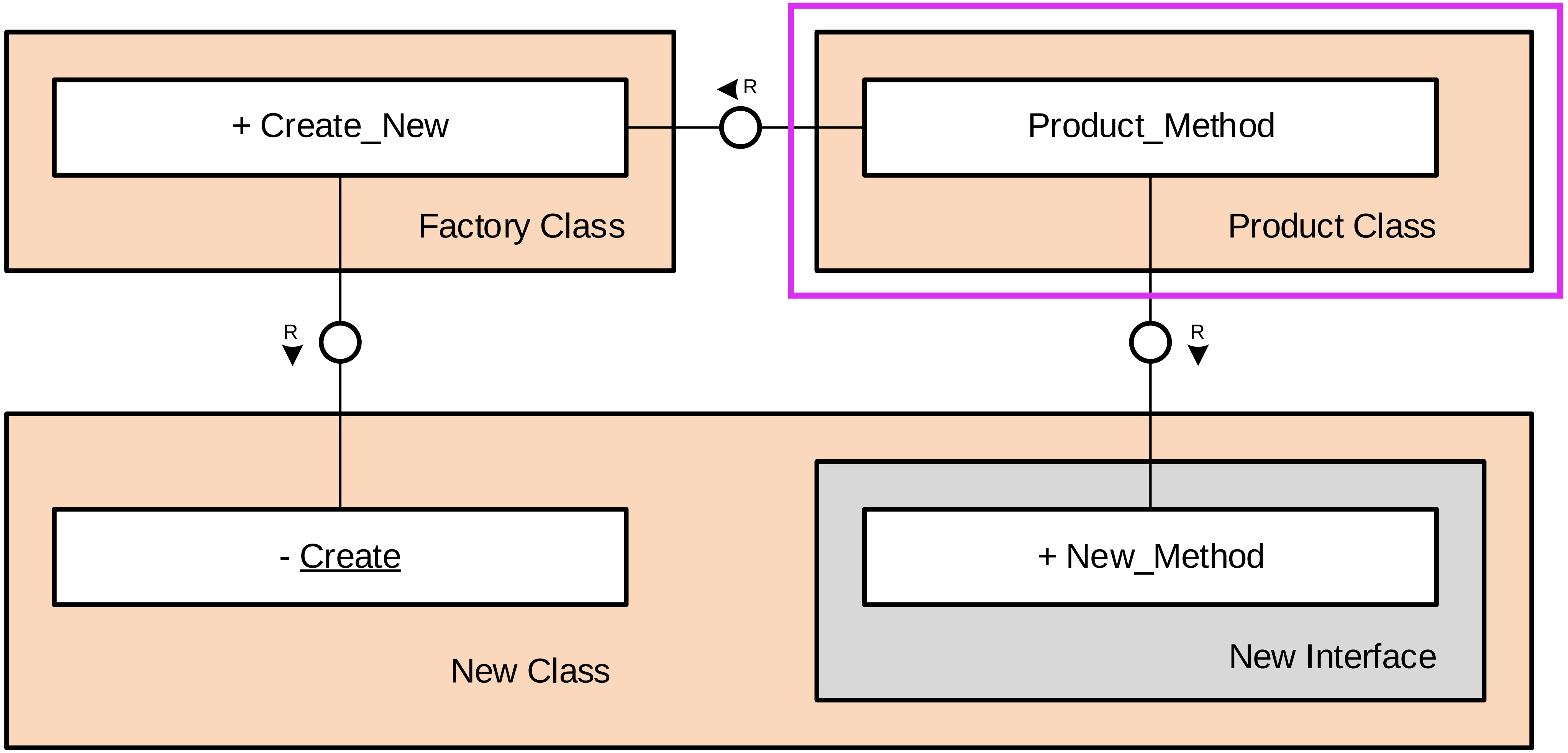
Designing a New Class



Implementing the Skeleton of a New Class

```
CLASS cl_new DEFINITION PUBLIC FINAL CREATE PRIVATE
GLOBAL FRIENDS cl_factory.
  PUBLIC SECTION.
    INTERFACES if_new.

  PRIVATE SECTION.
    CLASS-METHODS create
      RETURNING VALUE(ro_object) TYPE REF TO cl_new.
ENDCLASS.

CLASS cl_new IMPLEMENTATION.
  METHOD create.
    ro_object = NEW cl_new( ).
  ENDMETHOD.
ENDCLASS.
```

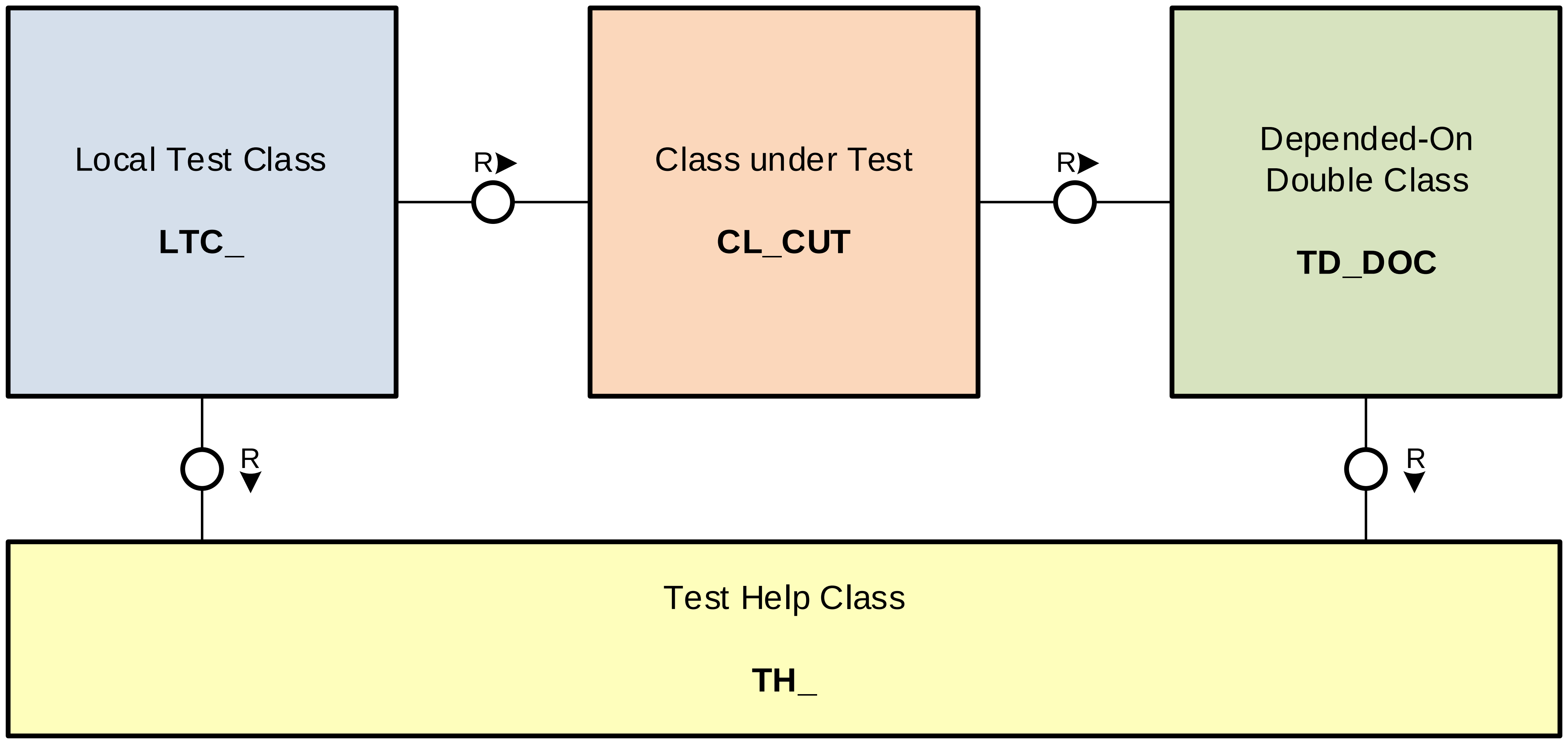
Decoupling from New Class



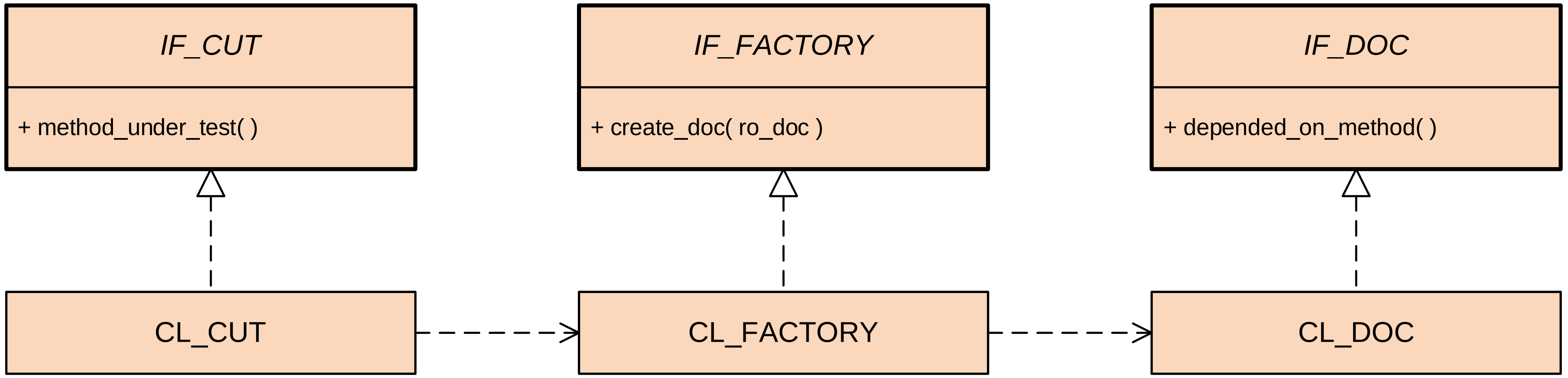
Using the New Class

```
CLASS cl_product DEFINITION PUBLIC CREATE PUBLIC.
  PUBLIC SECTION.
    METHODS product_method.
ENDCLASS.


CLASS cl_product IMPLEMENTATION.
 METHOD product_method.
    …
    DATA(lo_new_object) = cl_factory=>get( )->create_new( ).
    lo_new_object->new_method( ).
    …
  ENDMETHOD.
ENDCLASS.
```

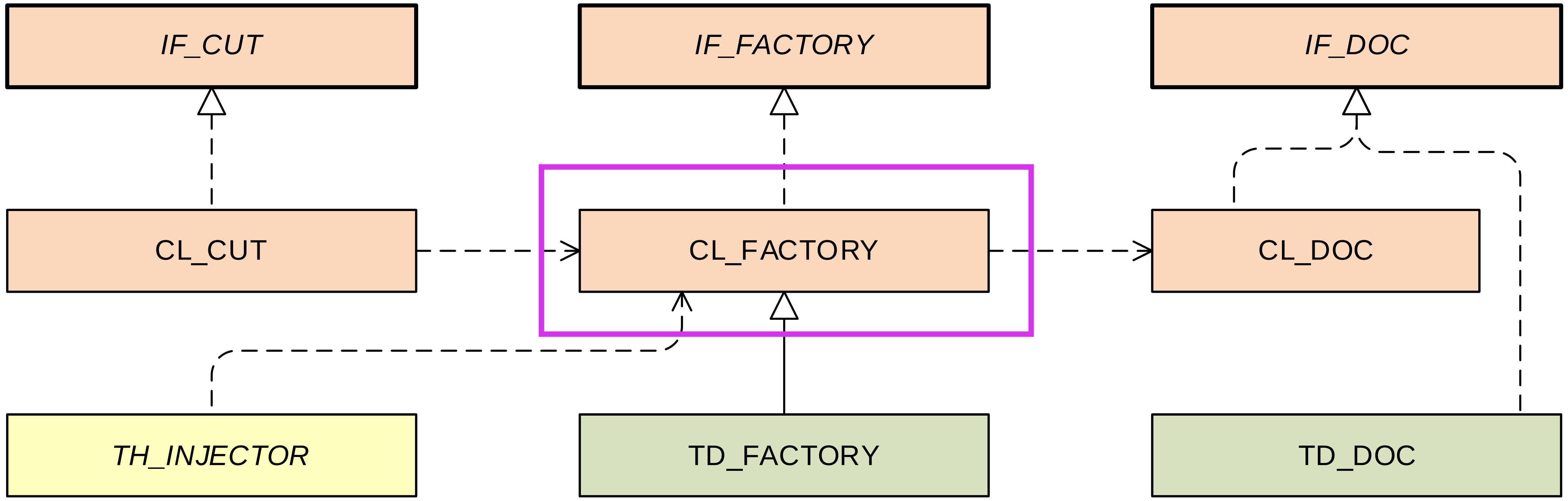
Test Abbreviations



Clean Design: Product Classes



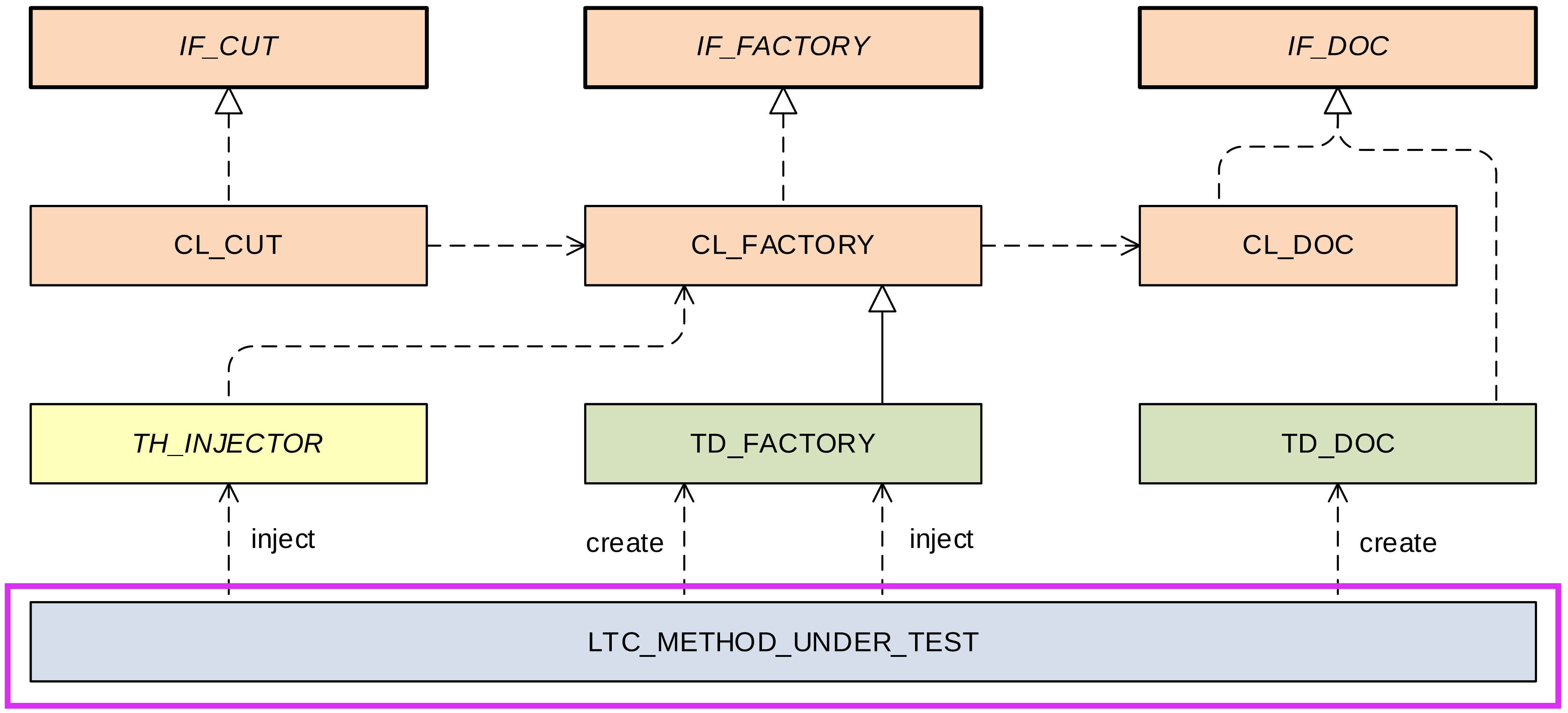
Clean Design: Double Classes



Singleton Factory

```
CLASS cl_factory DEFINITION PUBLIC CREATE PROTECTED
GLOBAL FRIENDS th_injector.
  PUBLIC SECTION.
    CLASS-METHODS get
      RETURNING VALUE(ro_factory) TYPE REF TO if_factory.

    INTERFACES if_factory.

  PRIVATE SECTION.
    CLASS-DATA so_factory TYPE REF TO if_factory.
ENDCLASS.
```

Clean Design: Local Test Class



Local Test Class: Injecting Singleton Double (1)

```
CLASS ltc method under test IMPLEMENTATION.
  METHOD setup.
    DATA(lo_factory_double) = td_factory=>create( ).
    th_factory_injector=>inject_factory( lo_factory_double ).

    mo_doc_double = td_doc=>create( ).
    lo_factory_double->inject_doc( mo_doc_double ).
  ENDMETHOD.

  METHOD test_method.
    mo_doc_double->configure( ... ). ”late configuration
    ...
  ENDMETHOD.
ENDCLASS.
```

Local Test Class: Injecting Singleton Double (2)

```
CLASS ltc_method_under_test DEFINITION FINAL
FOR TESTING DURATION SHORT RISK LEVEL HARMLESS.
  PRIVATE SECTION.
    METHODS setup.
    METHODS test_method FOR TESTING.

    DATA mo_doc_double TYPE REF TO td_doc.
ENDCLASS.
```

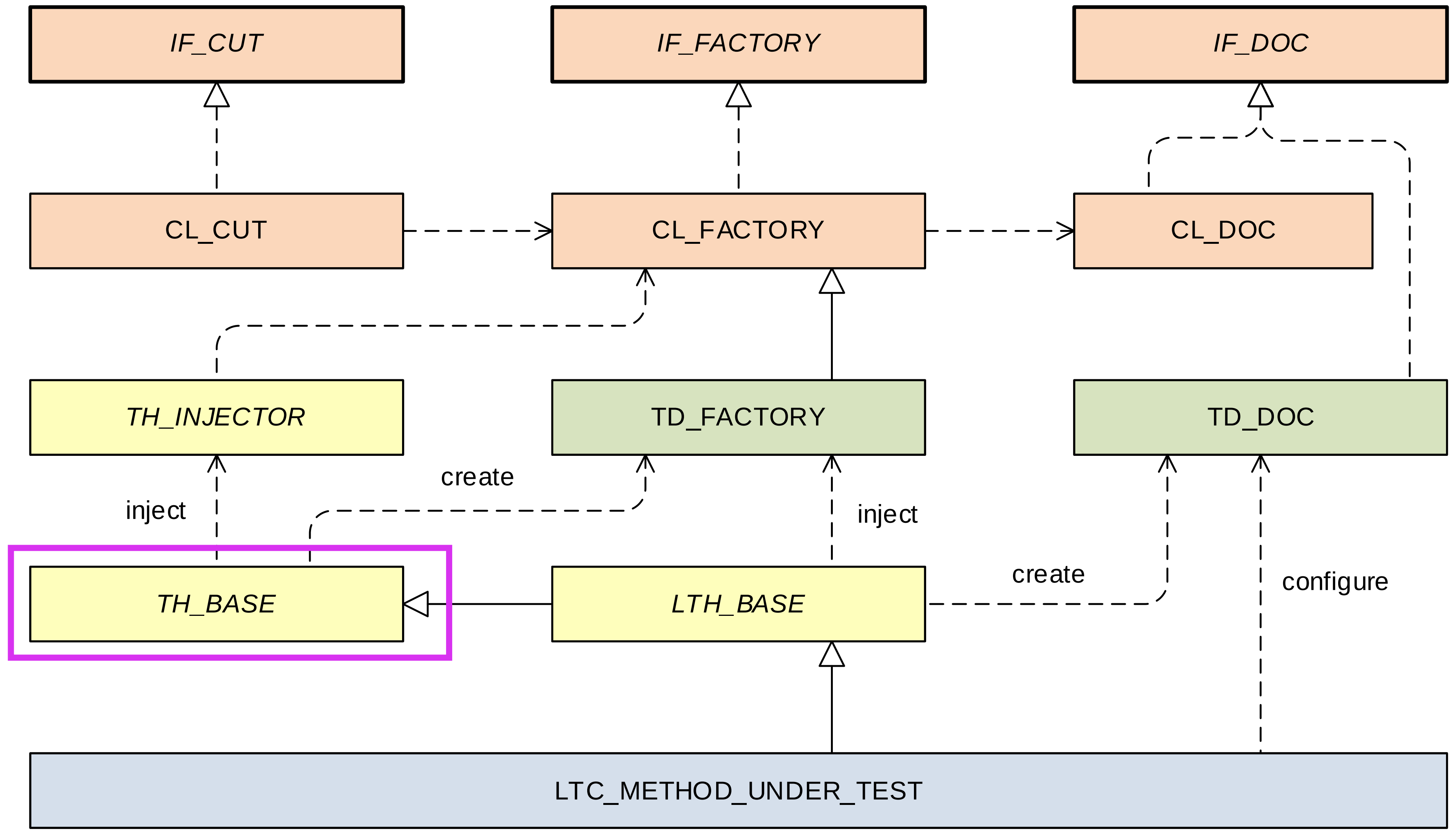
Local Test Class: Injecting Non-Singleton Doubles (1)

```
CLASS ltc_method_under_test IMPLEMENTATION.
  METHOD setup.
    mo_factory_double = td_factory=>create( ).
    th_factory_injector=>inject_factory( mo_factory_double ).
  ENDMETHOD.

  METHOD test_method.
    DATA(lo_doc_double_1) = td_doc=>create(...). "configuration
    DATA(lo_doc_double_2) = td_doc=>create(...). "configuration
    mo_factory_double->inject_doc( lo_doc_double_1 ).
    mo_factory_double->inject_doc( lo_doc_double_2 ).
    ...
  ENDMETHOD.
ENDCLASS.
```

Local Test Class: Injecting Non-Singleton Doubles (2)

```
CLASS ltc_method_under_test DEFINITION FINAL
FOR TESTING DURATION SHORT RISK LEVEL HARMLESS.
  PRIVATE SECTION.
    METHODS setup.
    METHODS test_method FOR TESTING.

    DATA mo_factory_double TYPE REF TO td_factory.
ENDCLASS.
```

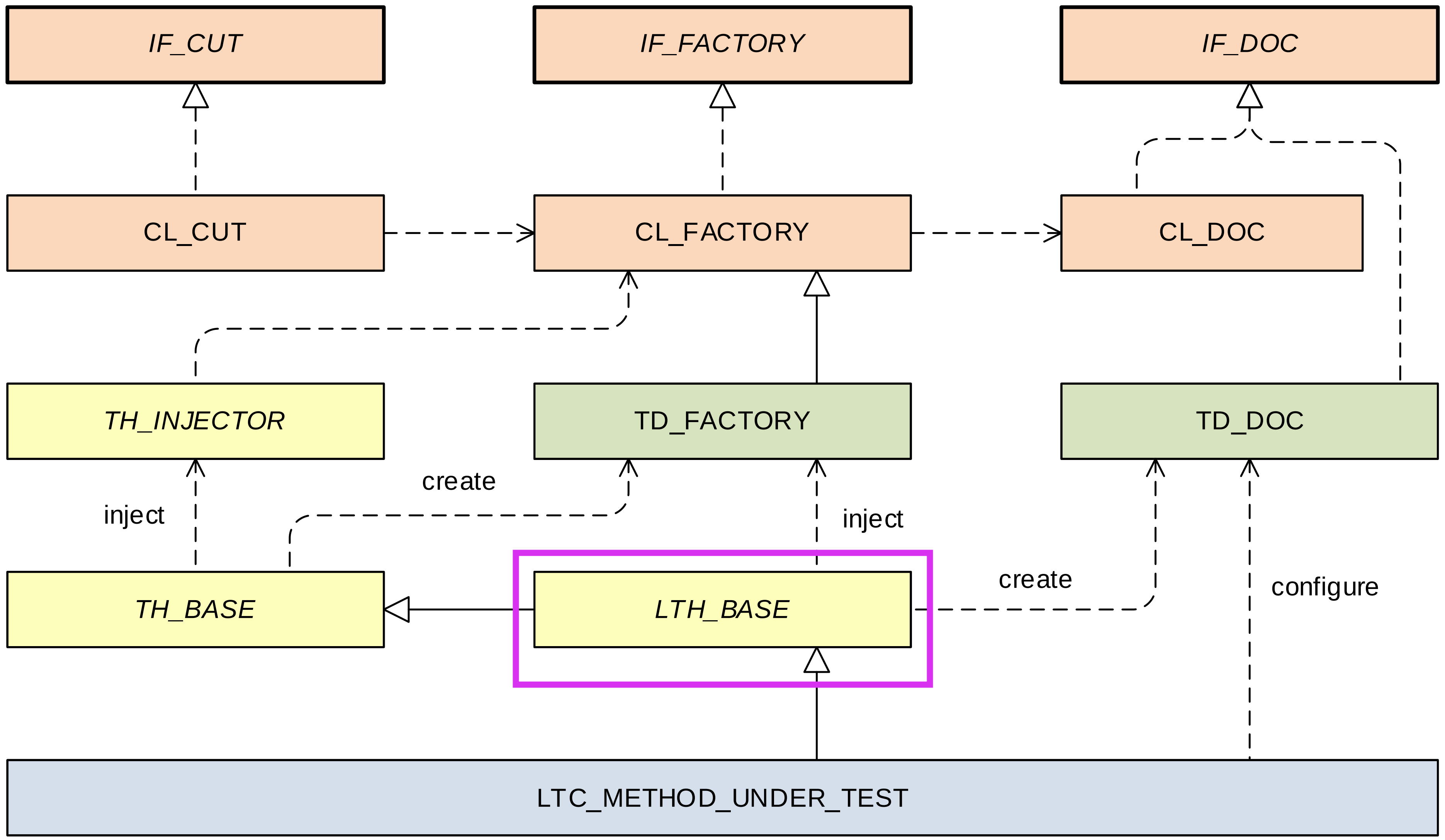
Clean Design: Test Base Classes



Global Test Base Class: Injecting Factory Double

```
CLASS th_base DEFINITION PUBLIC ABSTRACT
FOR TESTING DURATION SHORT RISK LEVEL HARMLESS.
  PROTECTED SECTION.
    DATA mo_factory_double TYPE REF TO td_factory.

  PRIVATE SECTION.
    METHODS setup.
ENDCLASS.

CLASS th_base IMPLEMENTATION.
  METHOD setup.
    mo_factory_double = td_factory=>create( ).
    th_factory_injector=>inject_factory( mo_factory_double ).
  ENDMETHOD.
ENDCLASS.
```

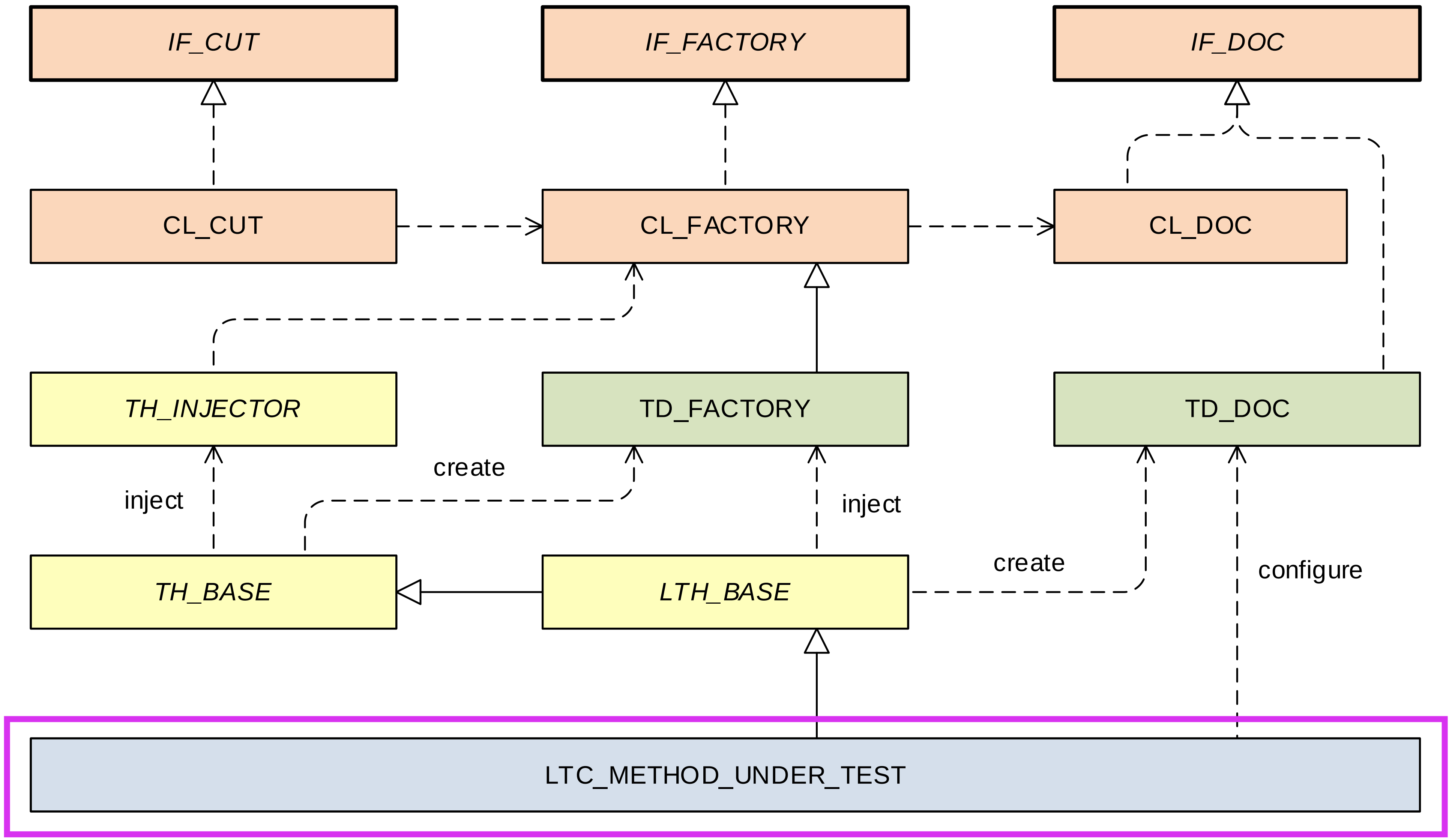
Clean Design: Test Base Classes



Local Test Base Class: Injecting Singleton Double

```
CLASS lth_base DEFINITION ABSTRACT
INHERITING FROM th_base
FOR TESTING DURATION SHORT RISK LEVEL HARMLESS.
  PROTECTED SECTION.
    DATA mo_doc_double TYPE REF TO td_doc.

  PRIVATE SECTION.
    METHODS setup.
ENDCLASS.

CLASS lth_base IMPLEMENTATION.
  METHOD setup.
    mo_doc_double = td_doc=>create( ).
    mo_factory_double->inject_doc( mo_doc_double ).
  ENDMETHOD.
ENDCLASS.
```

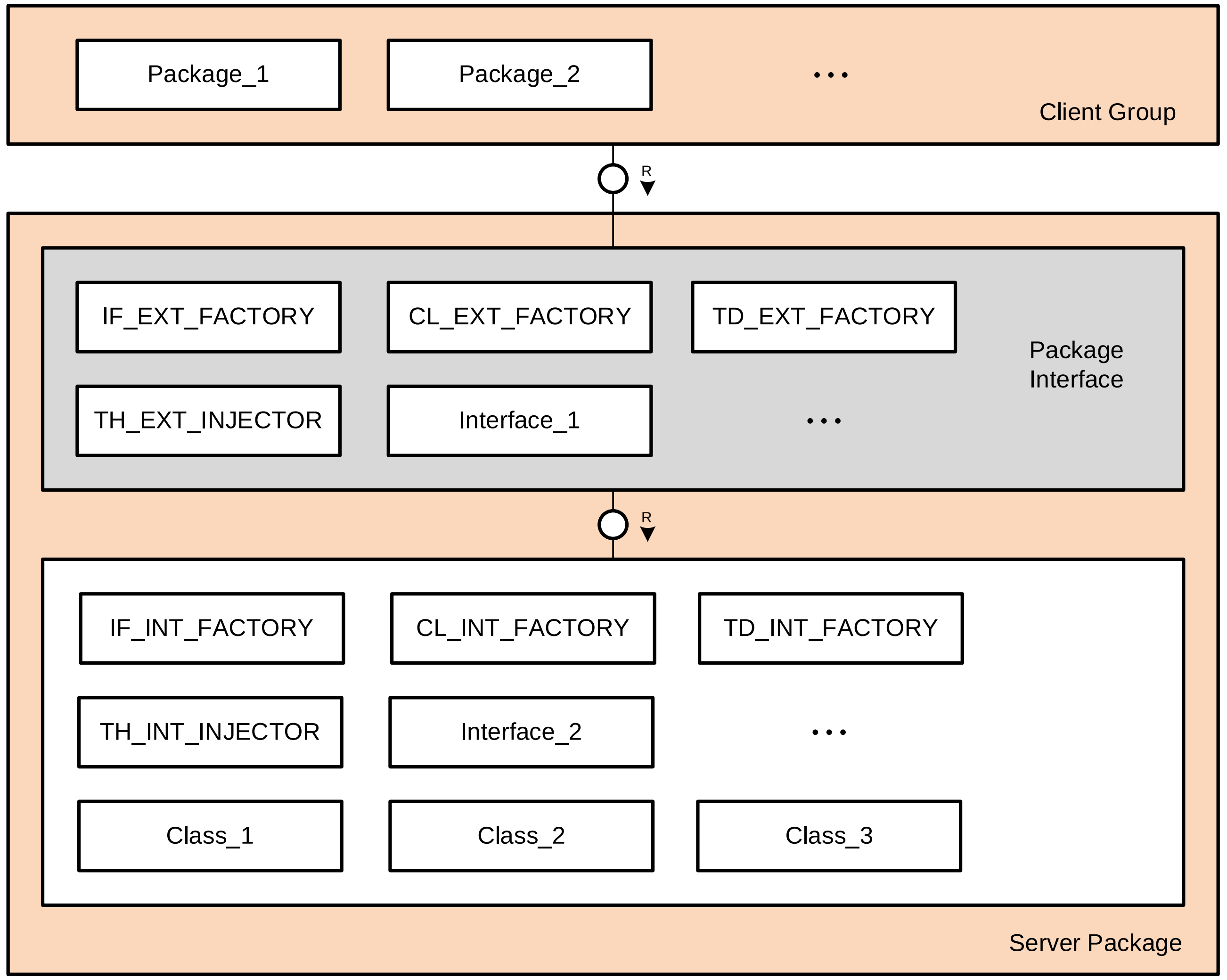
Clean Design: Test Base Classes



Local Test Class: Configuring Singleton Double

```
CLASS ltc method under test DEFINITION
INHERITING FROM lth_base FINAL
FOR TESTING DURATION SHORT RISK LEVEL HARMLESS.
 PRIVATE SECTION.
    METHODS test_method FOR TESTING.
ENDCLASS.


CLASS ltc_method_under_test IMPLEMENTATION.
  METHOD test_method.
    mo_doc_double->configure( ... ). ”late configuration
    ...
  ENDMETHOD.
ENDCLASS.
```

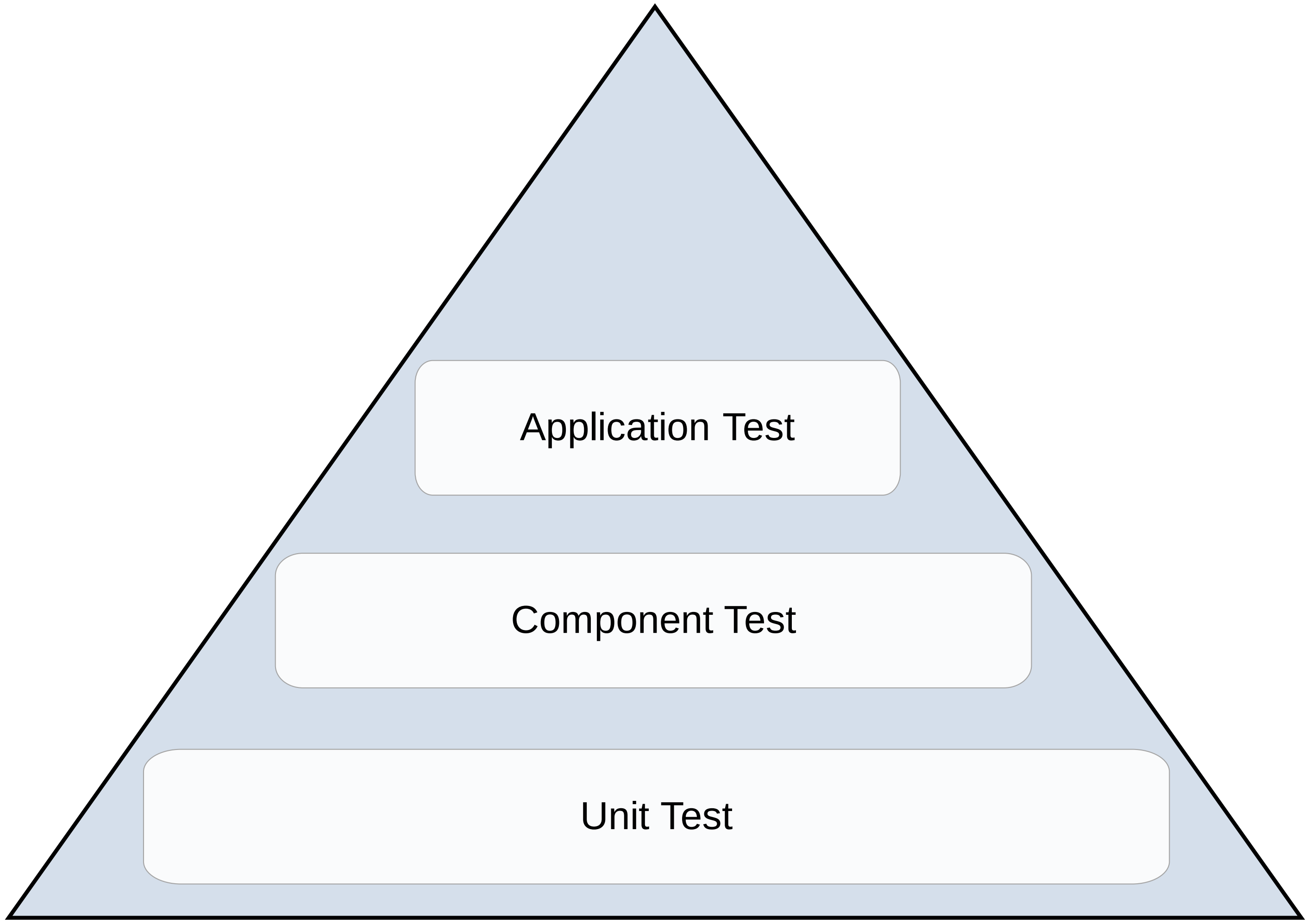
Clean Package



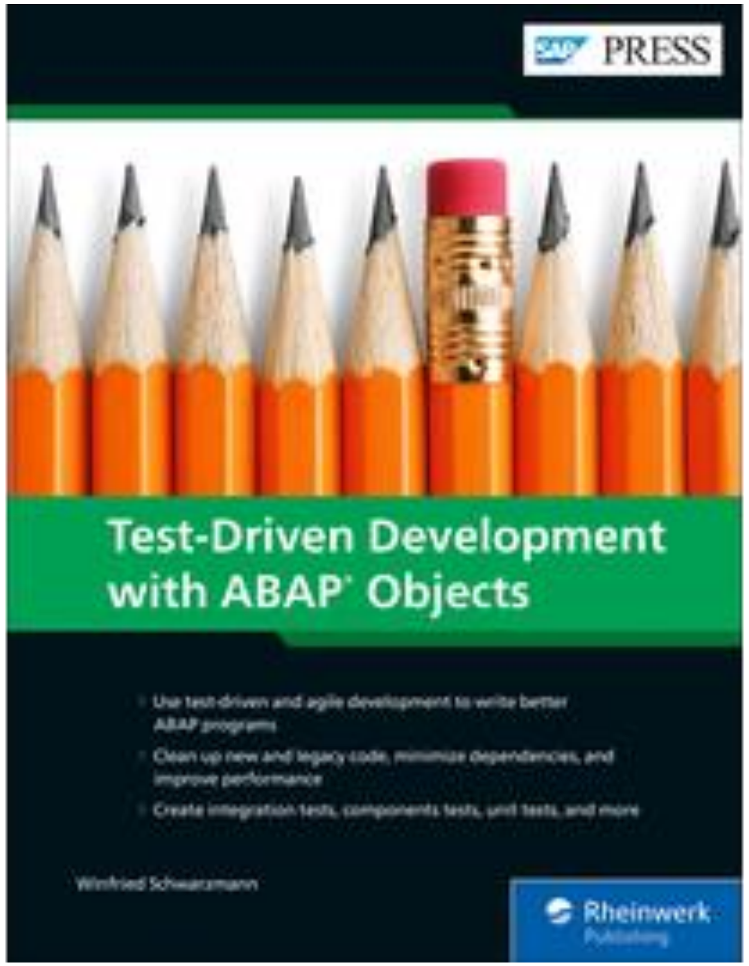
External factory provides access to the interfaces of the API Units.

Internal factory decouples encapsulated units.

Test Pyramid



Test-Oriented Improvement Process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Create integration tests, components tests, unit tests, and more
Winfried Schwarzmann
Rheinwerk Publishing

Book & E-Book
SAP Press
2019

Content:

Part I:
Modernization of legacy code

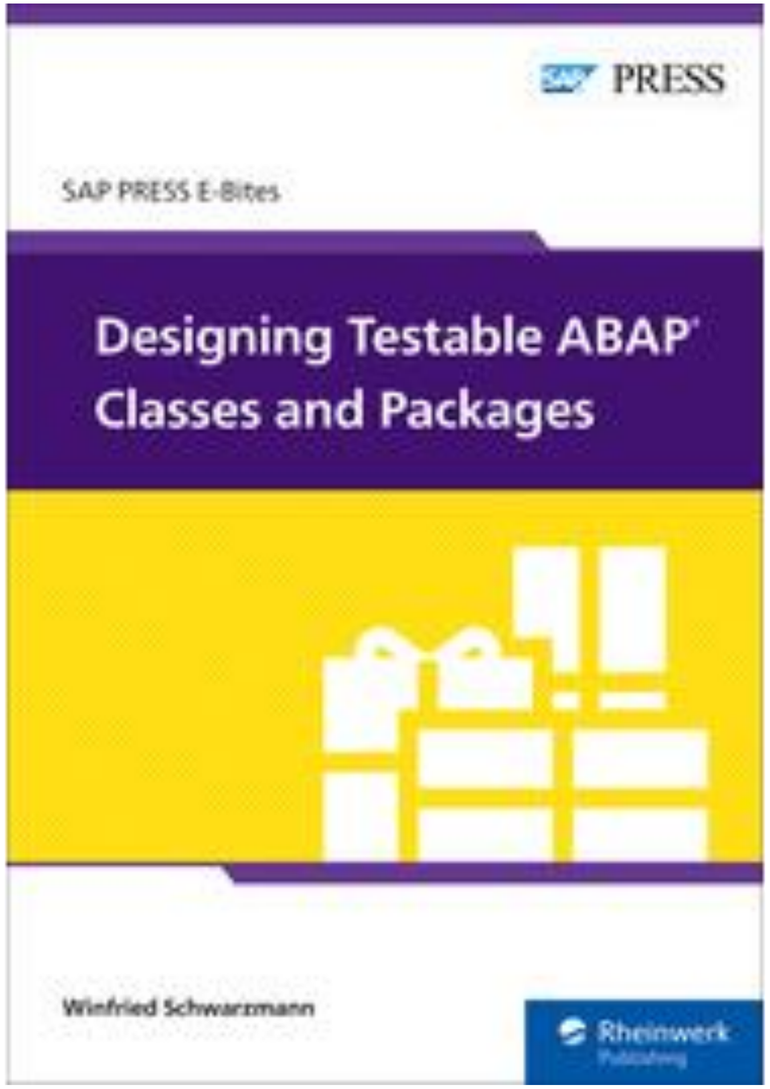
Part II:
Test infrastructure

Part III:
Test-driven development for new code

Part IV:
Agile software engineering

Part V:
Development & test tools

Clean Design



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Content:

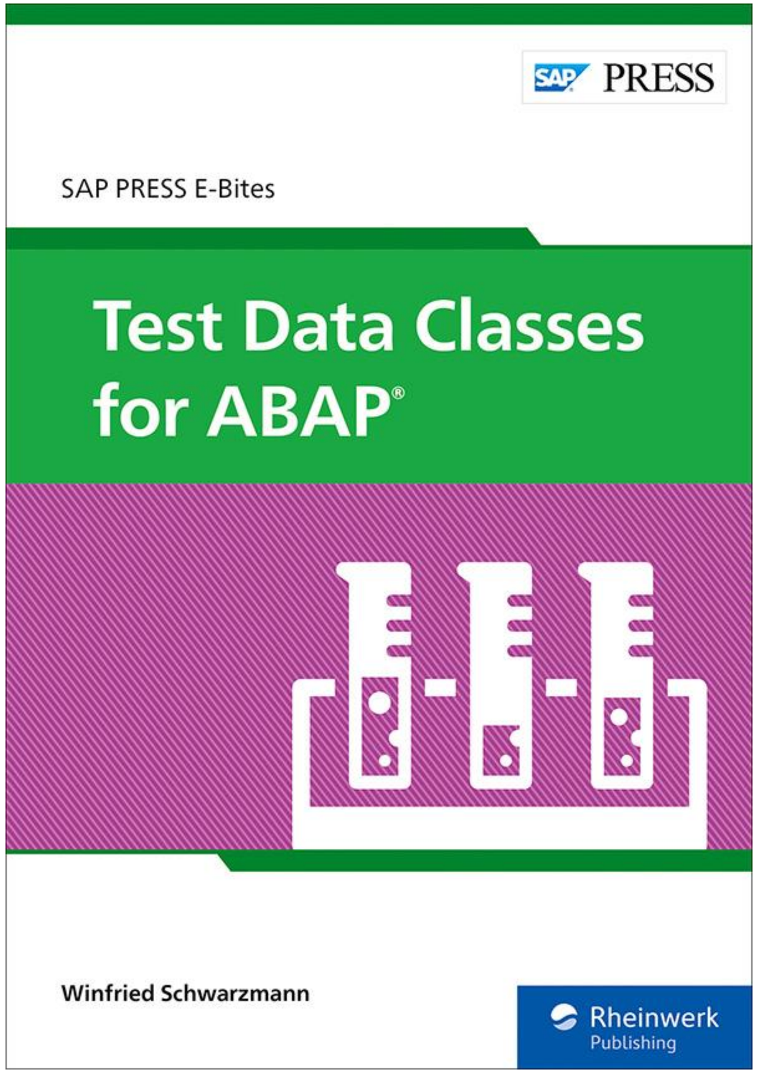
Part I: Theory

- Classes
- Test Classes
- Packages
- BAdIs

Part II: Training

Exercises with solutions for individuals and teams

Test Data Classes



E-Book
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2021

Content:

Part I: Theory

- Designing and implementing test data classes

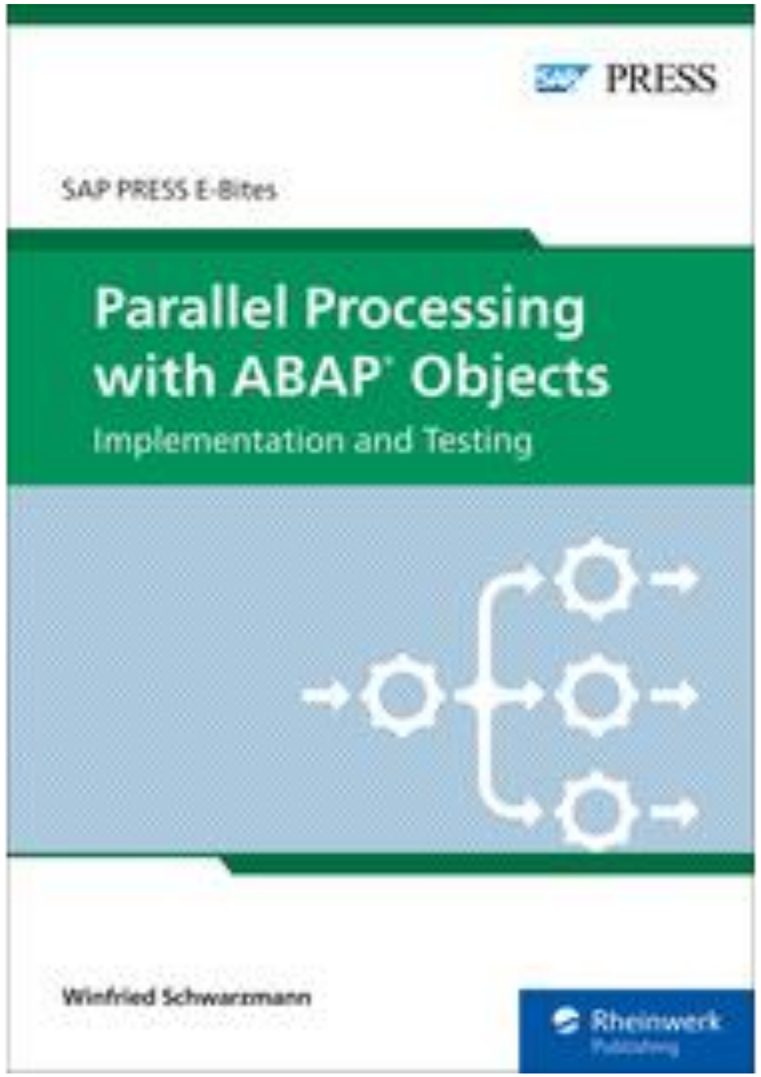
- Using test data classes for the entire test pyramid

- Using test message classes for verifying error handling

Part II: Training

Exercises with solutions
for individuals and teams

Parallel Processing



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Content:

Implementing and testing parallel processes

Inheriting test data classes from productive data classes

Implementing, refactoring, and enhancing package design

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