
'06
JAVAPOLIS
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Unitils

Make unit testing easy and maintainable

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Goal of this Quicky

Unitils can help your team to implement maintainable unit tests.

Origin of the project

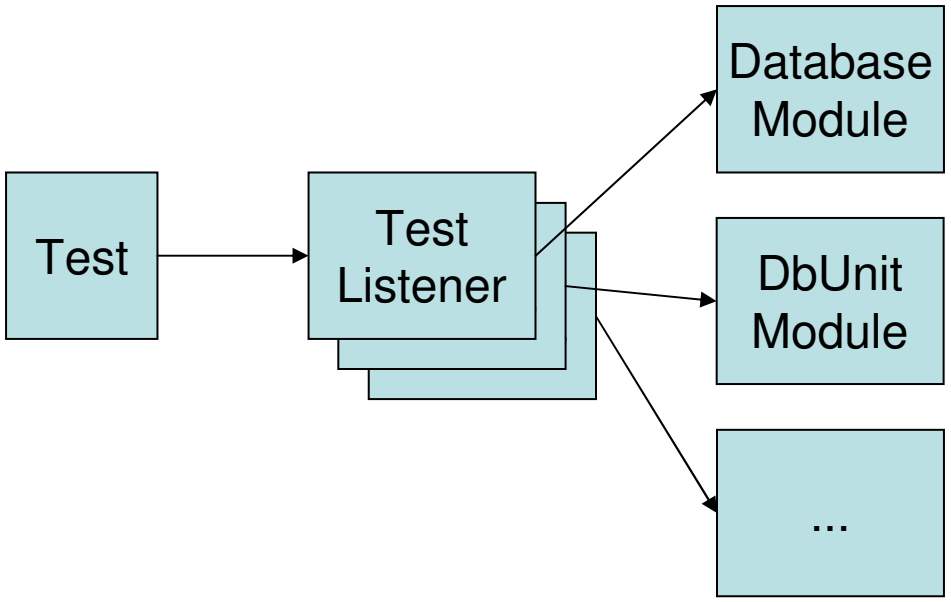
- Ordina unit testing workgroup
  - Guidelines
  - Supporting code
    - → Unitils

Unitils Features

- Database testing
  - Test data management
    - DBUnit
  - Test database maintenance
  - Testing with Hibernate
- Assertion utils
- Mock objects
  - Mock creation and setting expectations
    - EasyMock
  - Mock injection

Open & extensible architecture

- Module system
  - Listener hooks up modules into tests



  - Support for JUnit 3 / 4 + TestNG

Database testing

- Control over test data
  - Unit test database without data
  - Small test data sets
- Limited sharing of data sets
  - Test class or method level

Class-level data file

UserDAOTest.java

```
@DatabaseTest
public void UserDAOTest extends UnitilsJUnit4 {

    @Test public void testFindByName {
        User johnDoe = userDao.findByName("doe",
                    "john");
        assertEquals("jdoe", johnDoe.getUserName());
    }

}
```

UserDAOTest.xml

```
<?xml version='1.0' encoding='UTF-8'?>
<dataset>
  <user userName="jdoe" name="doe" firstName="john" />
</dataset>
```

Method-level data file

UserDAOTest.java

```
@DatabaseTest
public void UserDAOTest extends UnitilsJUnit4 {

    @Test public void testFindByName {
        User johnDoe = userDao.findByName("doe",
                    "john");
        assertEquals("jdoe", johnDoe.getUserName());
    }

}
```

UserDAOTest.testFindByName.xml

```
<?xml version='1.0' encoding='UTF-8'?>
<dataset>
  <user userName="jdoe" name="doe" firstName="john" />
</dataset>
```

Specify file name explicitly

UserDAOTest.java

```
@DatabaseTest
@DataSet(fileName = "userdata.xml")
public void UserDAOTest extends UnitilsJUnit4 {

    @Test
    @DataSet(fileName = "userdata-specific.xml")
    public void testFindByName {
        User johnDoe = userDao.findByName("doe",
                    "john");
        assertEquals("jdoe", johnDoe.getUserName());
    }

}
```

Result data file

UserDAOTest.java

```
@DatabaseTest
public void UserDAOTest extends UnitilsJUnit4 {

    @ExpectedDataSet
    @Test public void testDisableInactiveAccounts {
        userDao.disableInactiveAccounts();
    }

}
```

UserDAOTest.testDisableInactiveAccounts-result.xml

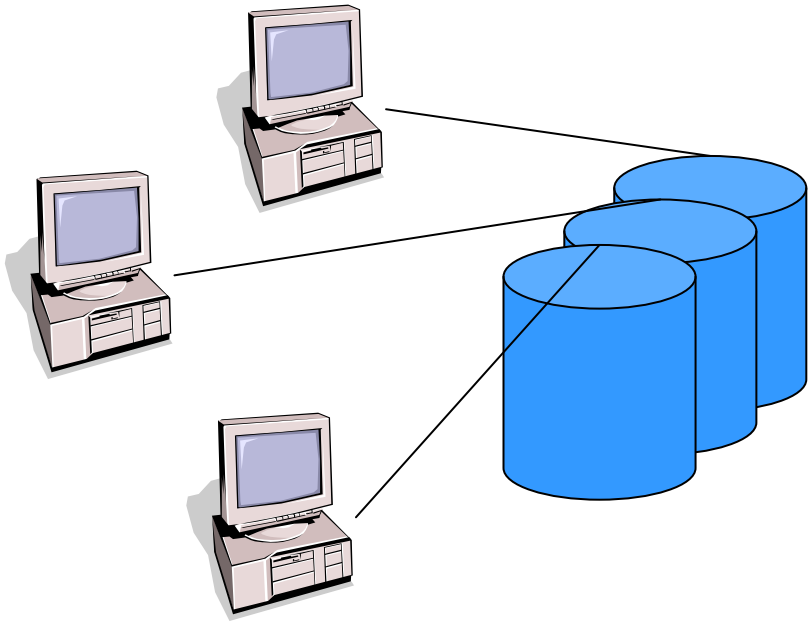
```
<?xml version='1.0' encoding='UTF-8'?>
<dataset>
    <user userName="jack" enabled="true" />
    <user userName="jim" enabled="false" />
</dataset>
```

Keeping tests maintainable

- Data files must be small
  - Few records
  - Only join & where clause columns
    - →Disable FK & NOT NULL constraints

Execute unit tests anytime

- Database schema per developer

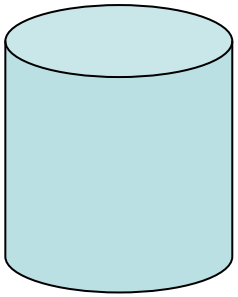


Database schema maintenance

- Update unit test schema
  - Incrementally
  - From scratch
- Disable constraints
  - Foreign key
  - NOT NULL
- Set sequences to value 1000
  - Don’t interfere with test data

Database schema maintenance

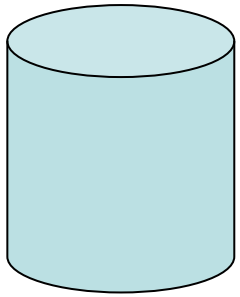
```
DbScripts/
        001_initial_structure.sql
        002_add_user_table.sql
        003_add_version_column.sql
```



DB_VERSION	INDEX	TS
	3	510894628

Incremental updates

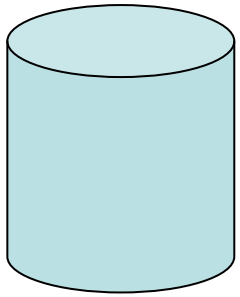
```
DbScripts/
        001_initial_structure.sql
        002_add_user_table.sql
        003_add_version_column.sql
        004_drop_age_column.sql
```



DB_VERSION	INDEX	TS
	3	510894628

Incremental updates

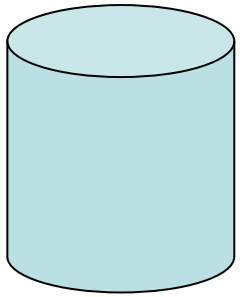
```
DbScripts/
        001_initial_structure.sql
        002_add_user_table.sql
        003_add_version_column.sql
        004_drop_age_column.sql
```



DB_VERSION	INDEX	TS
	4	613874226

Recreation from scratch

```
DbScripts/
        001_initial_structure.sql
        002_add_user_table.sql
        003_add_version_column.sql
        004_drop_age_column.sql
```



DB_VERSION	INDEX	TS
	4	510894628

Hibernate support

- Simplify configuration
- Automatically check consistency of mapped classes with database

```
junit.framework.AssertionFailedError:
Found mismatches between Java classes and database tables.
Applying following DDL statements to the database should resolve
the problem:

alter table PRODUCT add column barCode varchar(255);
```

Assertion utils

```
Expected

jdoeExp
        userName=jdoe
        first=john
        last=doe
        age=20
```

```
Actual

jdoeAct
        userName=jdoe
        first=john
        last=doe
        age=20
```

Assertion utils

```
Expected

jdoeExp
        userName=jdoe
        first=john
        last=doe
        age=20
```

```
Actual

jdoeAct
        userName=jdoe
        first=john
        last=doe
        age=20
```

```
assertEquals(jdoeExp, jdoeAct);
```

Assertion utils

Expected	*Actual*
jdoeExp userName=jdoe first=john last=doe age=20	jdoeAct userName=jdoe first=john last=doe age=20

```
assertEquals(jdoeExp, jdoeAct);
```

```
assertEquals(jdoeExp.getUsrName(), jdoeAct.getUsrName());
assertEquals(jdoeExp.getFirst(), jdoeAct.getFirst());
assertEquals(jdoeExp.getLast(), jdoeAct.getLast());
assertEquals(jdoeExp.getAge(), jdoeAct.getAge());
```

Assertion utils

```
Expected

jdoeExp
        userName=jdoe
        first=john
        last=doe
        age=20
```

```
Actual

jdoeAct
        userName=jdoe
        first=john
        last=doe
        age=20
```

```
assertEquals(jdoeExp, jdoeAct);
```

```
assertEquals(jdoeExp.getUsrName(), jdoeAct.getUsrName());
assertEquals(jdoeExp.getFirst(), jdoeAct.getFirst());
assertEquals(jdoeExp.getLast(), jdoeAct.getLast());
assertEquals(jdoeExp.getAge(), jdoeAct.getAge());
```

```
ReflectionAssert.assertRefEquals(jdoeExp, jdoeAct);
```

Maintainability

- Only check what's essential
  - Ignore type of numbers
  - Ignore certain properties
  - Ignore order and type of collections

Ignore certain properties

- Leniency option: Ignore defaults

```
Expected

jdoeExp
        userName=jdoe
        first=null
        last=null
        age=0
```

```
Actual

jdoeAct
        userName=jdoe
        first=john
        last=doe
        age=20
```

```
ReflectionAssert.assertLenEquals(jdoeExp, jdoeAct);
```

Ignore order and type of collections

- Leniency option: collections

Expected	*Actual*
`expPersons: Person[]`	`actPersons: HashSet<Person>`
`[john, jane]`	`[jane, john]`

```
ReflectionAssert.assertLenEquals(expPersons, actPersons);
```

Ignore order and type of collections

- Leniency option: collections

Expected	*Actual*
`expPersons: Person[]`	`actPersons: HashSet<Person>`
`[john, jane]`	`[jane, john]`

```
ReflectionAssert.assertLenEquals(expPersons, actPersons);
```

```
ReflectionAssert.assertPropertyLenEquals("firstName",
      Arrays.asList("jane", "john"), actPersons);
```

Mock object support

```
public void UserServiceTest extends UnitilsJUnit4 {

    @Mock
    private UserDao mockUserDao;

    @Mock
    private AccountService mockAccountService;

    private UserService userService;

    @Test testDisableInActiveAccounts() {
        expect(mockUserDao.getAccountsNotAccessedAfter(null))
            .andReturn(accounts);
        mockAccountService.disableAccount(accounts.get(0));
        mockAccountService.disableAccount(accounts.get(1));
        replay();

        userService.disableInActiveAccounts();
    }
}
```

Mock injection

```
public void UserServiceTest extends UnitilsJUnit4 {

    @Mock @Inject(property = "userDao")
    private UserDao mockUserDao;

    @Mock @AutoInject
    private AccountService mockAccountService;

    @TestedObject
    private UserService userService;

    @Test testDisableInActiveAccounts() {
        expect(mockUserDao.getAccountsNotAccessedAfter(null))
            .andReturn(accounts);
        mockAccountService.disableAccount(accounts.get(0));
        mockAccountService.disableAccount(accounts.get(1));
        replay();

        userService.disableInActiveAccounts();
    }
}
```

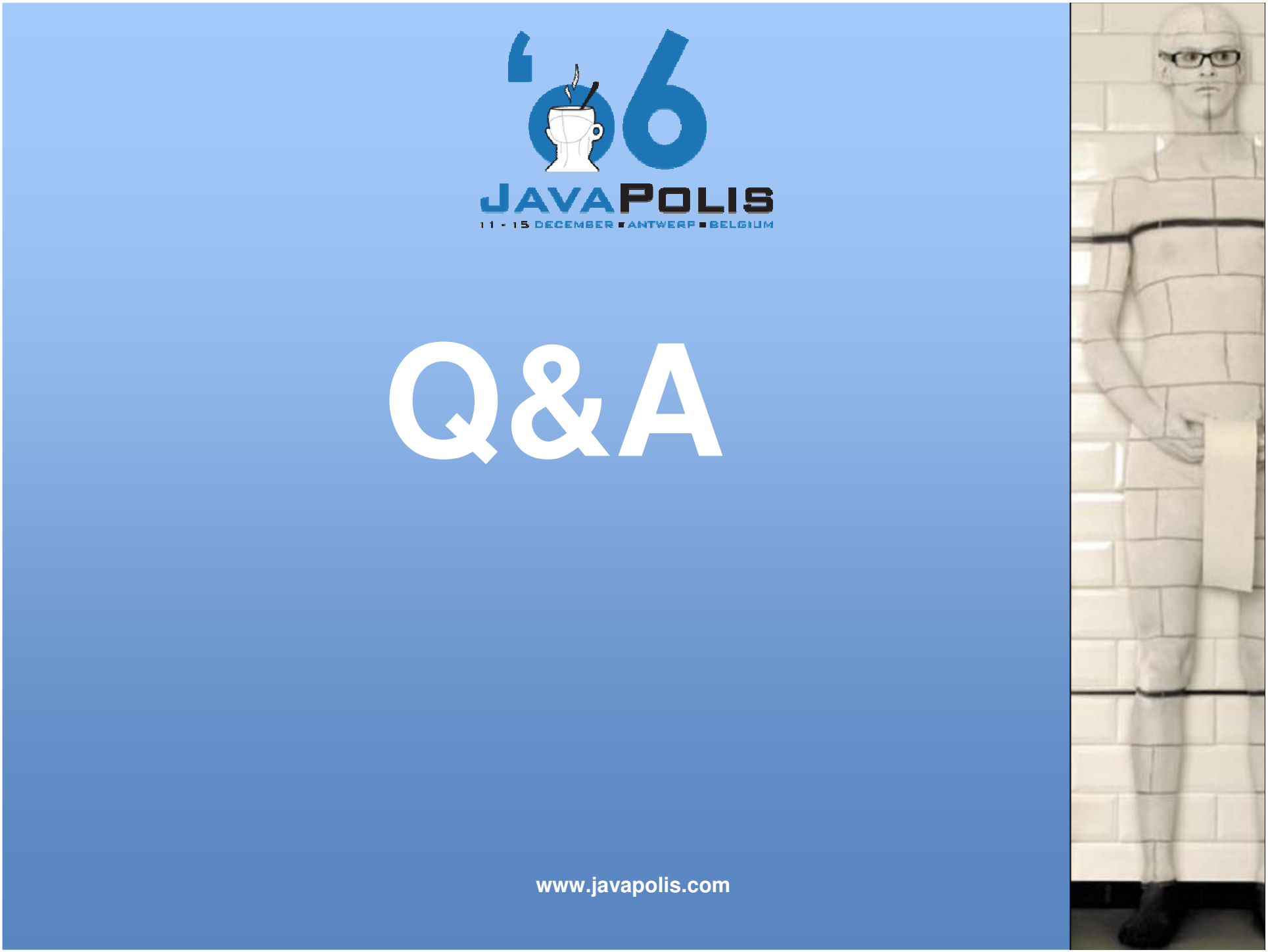
Links

Unitils website:

http://unitils.sourceforge.net

Unit testing guidelines:

http://unitils.sourceforge.net/guidelines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