

SOLID

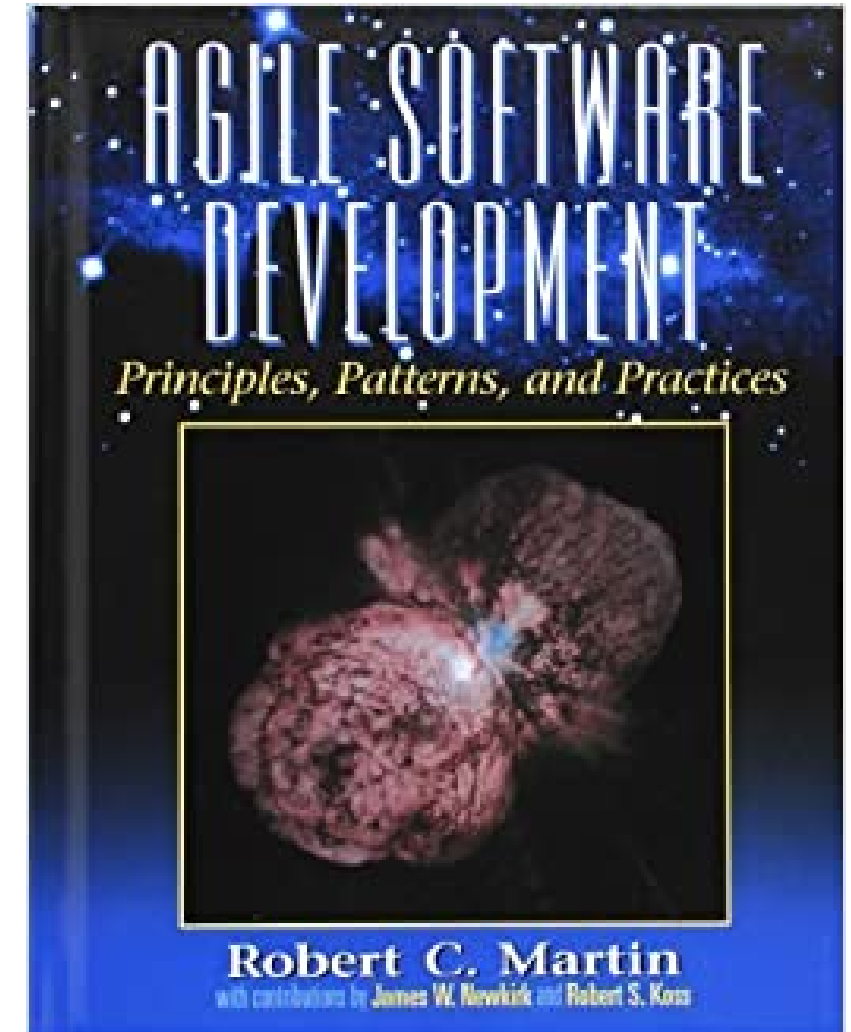
Single Responsibility Principle (SRP)

Single Responsibility Principle

■ ***"A class should only have one reason to change."*** [Robert C. Martin]

Why?

- Increase of Maintainability
- Decrease of Rigidity



Single Responsibility Principle

Probably first mentioned during the 1970's in:

David L. Parnas, *On the Criteria To Be Used in Decomposing Systems into Modules*. Commun. ACM 15(12): 1053-1058 (1972)

It means

- **Separate things...**
...which are likely to change because of *different reasons*.
- **Group things...**
...which are likely to change because of *the same reason*.

Reasons to change software/code

- **Fixing a bug**

Old requirements have not been met.

- **Adding a feature**

New requirements have not (yet) been met.

There exists only a single reason to change software: **Conformance to requirements.**

Where do requirements originate from?

Requirements and Responsibility

The origin of requirements and the meaning of responsibility are related:

Definitions of Responsibility:

"(1.) The state or fact of having a duty to deal with something or of having control over someone.

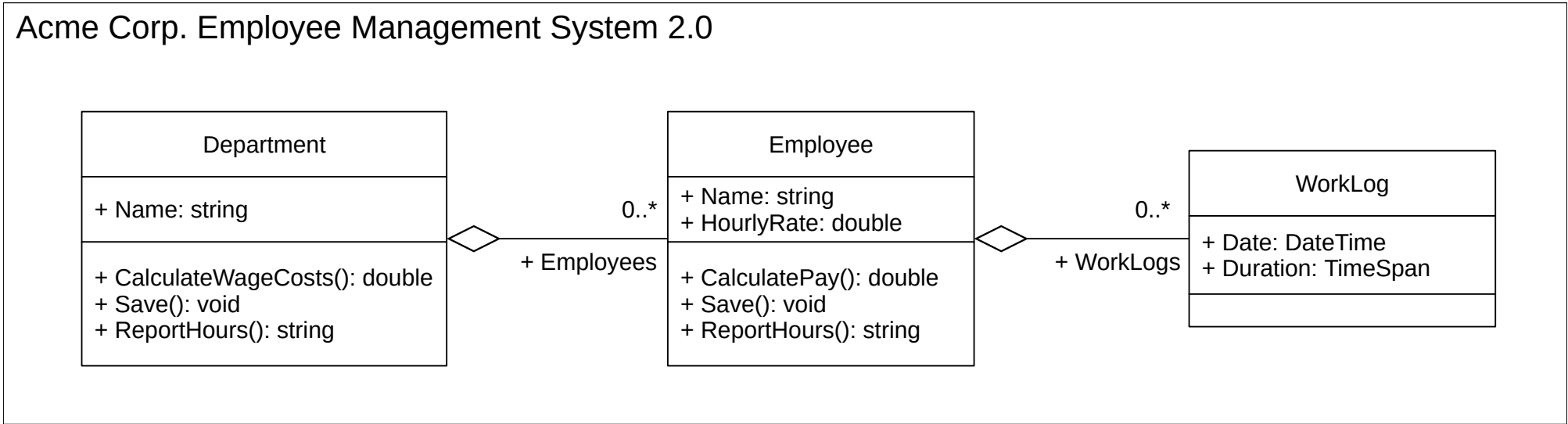
(2.) The state or fact of being accountable or to blame for something.

(3.) The opportunity or ability to act independently and take decisions without authorization."

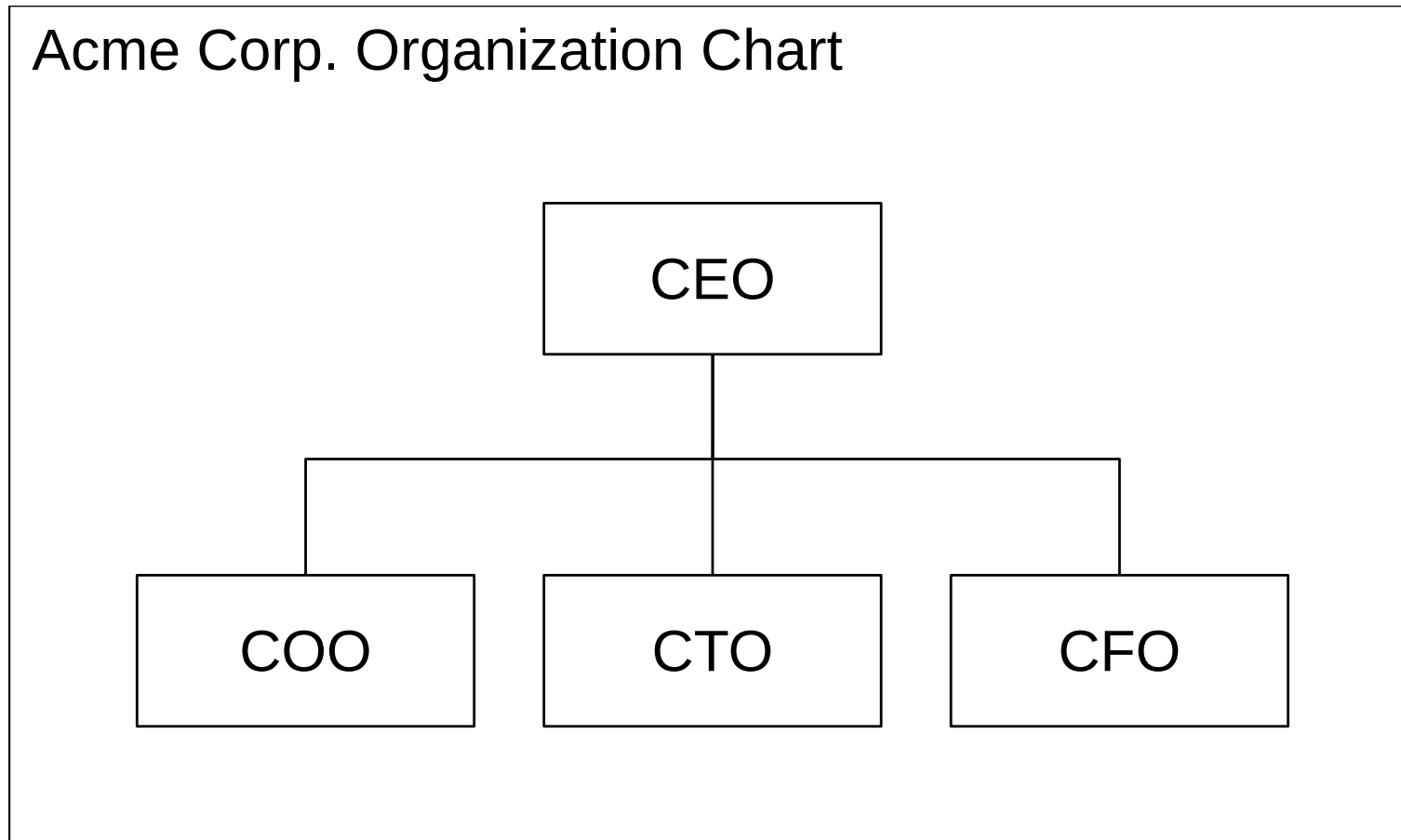
[<https://www.lexico.com/definition/responsibility>]

- Who to respond to?
- Accountable to whom?

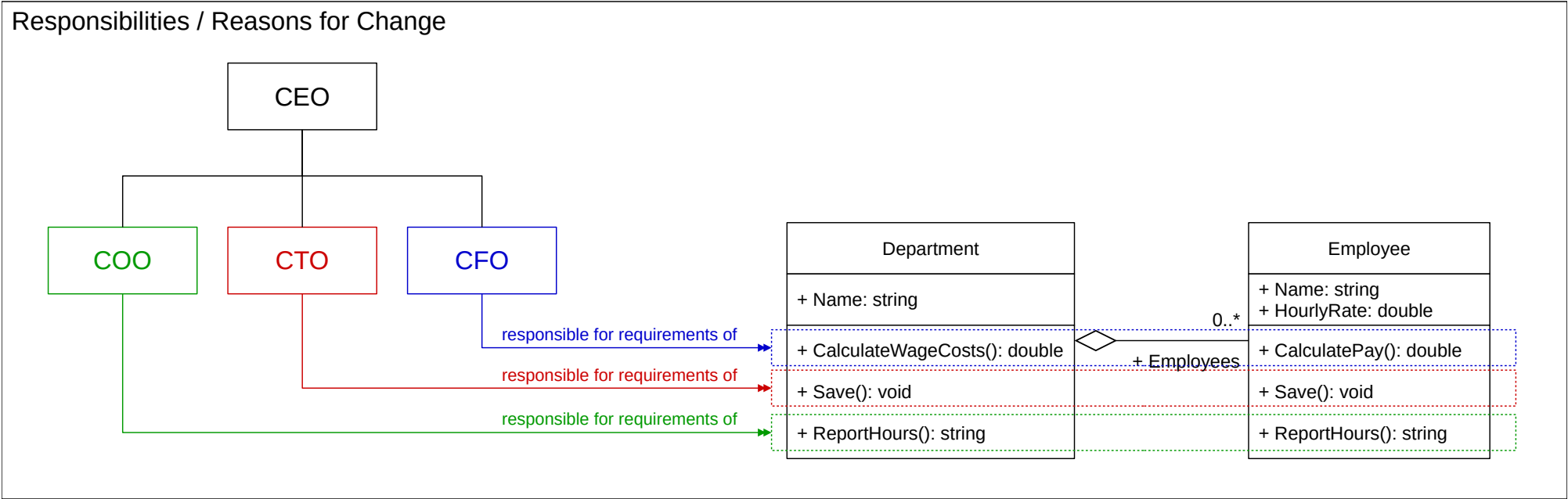
Example: Employee Management System



Example: Stakeholders



Example without SRP



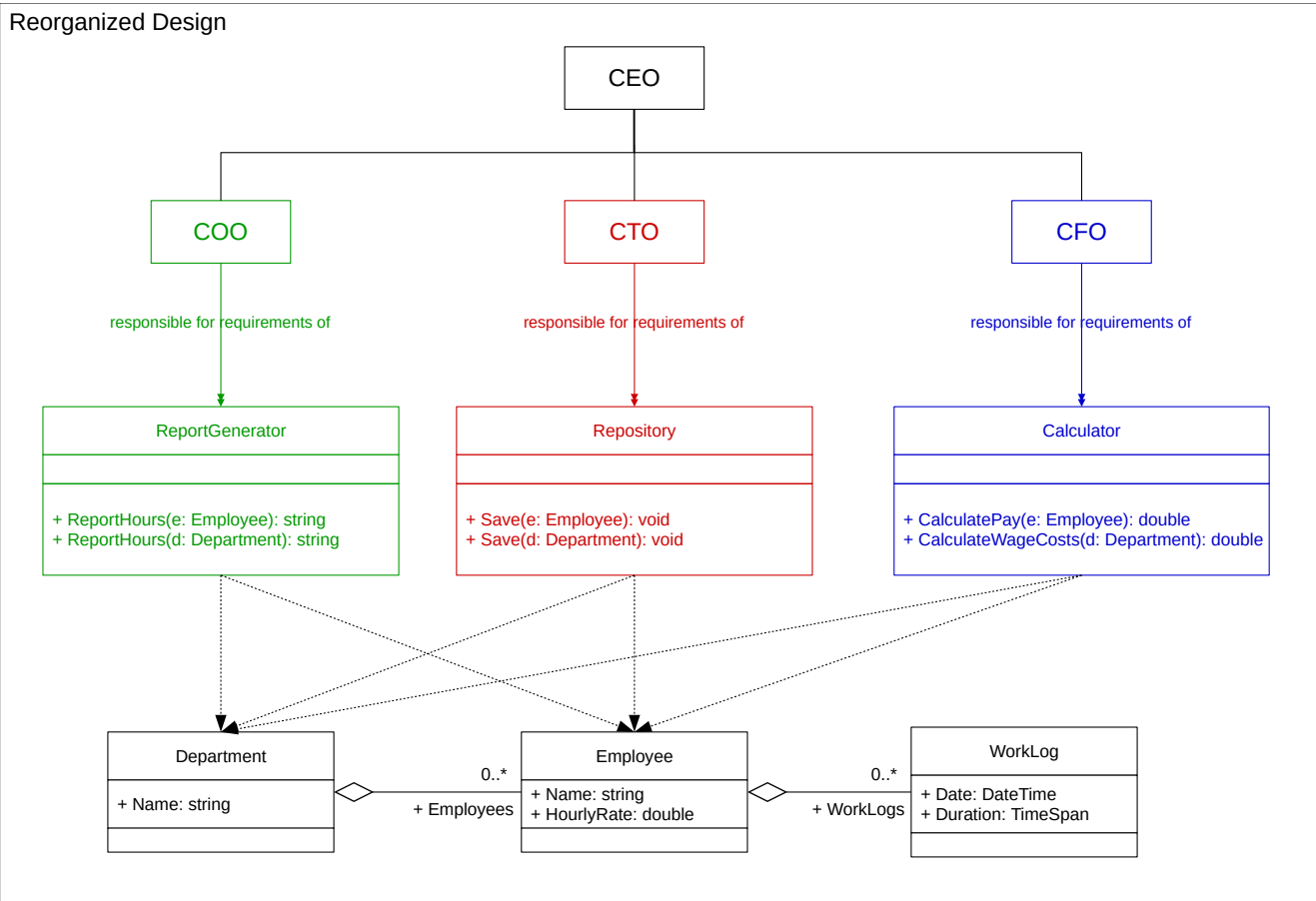
Stakeholders may create *axis of change*.

Problem: Coincidental Cohesion

```
class Employee
{
    public double CalculatePay()
    {
        ...
        HelperMethod();
        ...
    }
    public string ReportHours()
    {
        ...
        HelperMethod();
        ...
    }
    private void HelperMethod()
    {
        ... // CHANGES HERE MAY HAVE UNPREDICTABLE EFFECTS OUTSIDE THE AXIS OF CHANGE!
    }
}
```

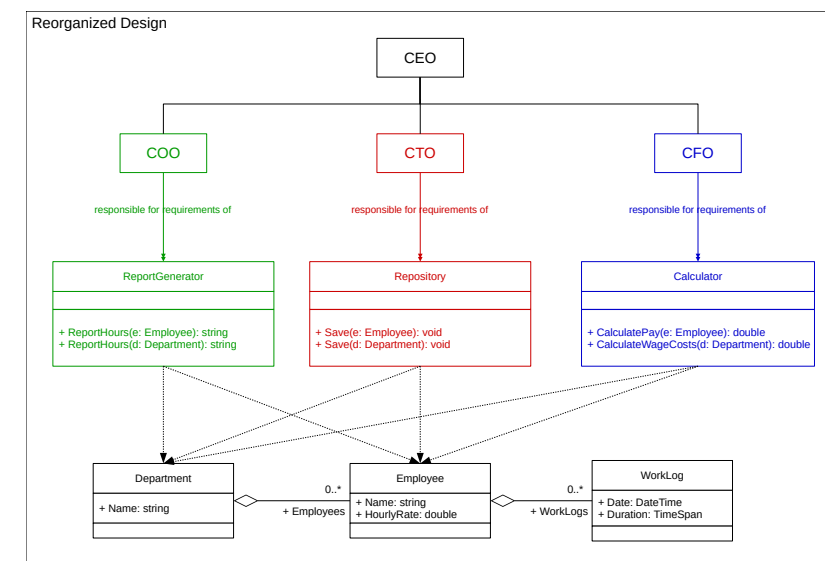
A change to `HelperMethod` caused by requirements of the COO stakeholders may break requirements of CFO stakeholders.

Example with SRP



Example with SRP

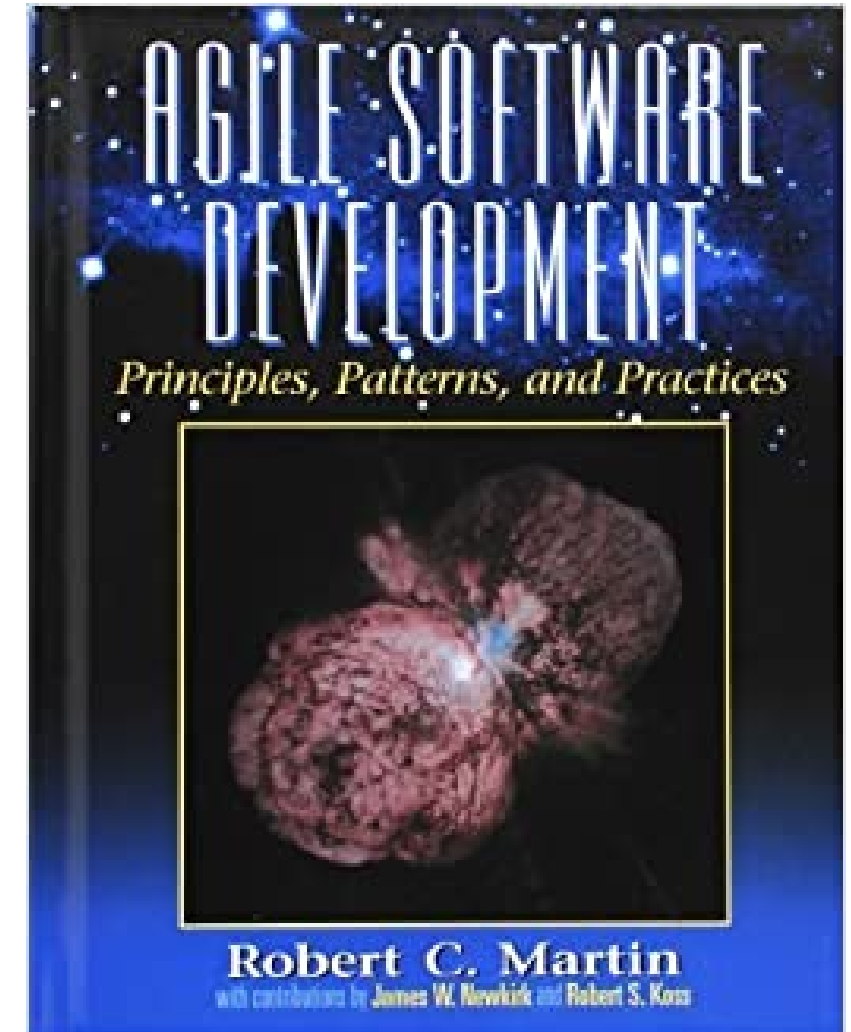
- ReportGenerator
Responds to COO stakeholders.
- Repository
Responds to CTO stakeholders.
- Calculator
Responds to CFO stakeholders.



A Word of Warning

■ *"An axis of change is an axis of change only if the changes actually occur."* [Robert C. Martin]

The SRP should not be applied without good cause!



Thanks!