# Module 4.2: "Proxy"





### Agenda

- ▶ Introductory Example: Web Shop Products
- Challenges
- ▶ Implementing the Proxy Pattern
- Pattern: Proxy
- Overview of Proxy Pattern
- Variation: Simple Proxy
- Use Cases for Proxy



## Introductory Example: Web Shop Products

```
interface IProductRepository
{
    Product GetById( int id );
    IEnumerable<Product> GetAll();
    void Add( Product product );
}
```



### Challenges

- How can we control that only administrators can add new products?
  - Cannot change the source code of the web shop library component!

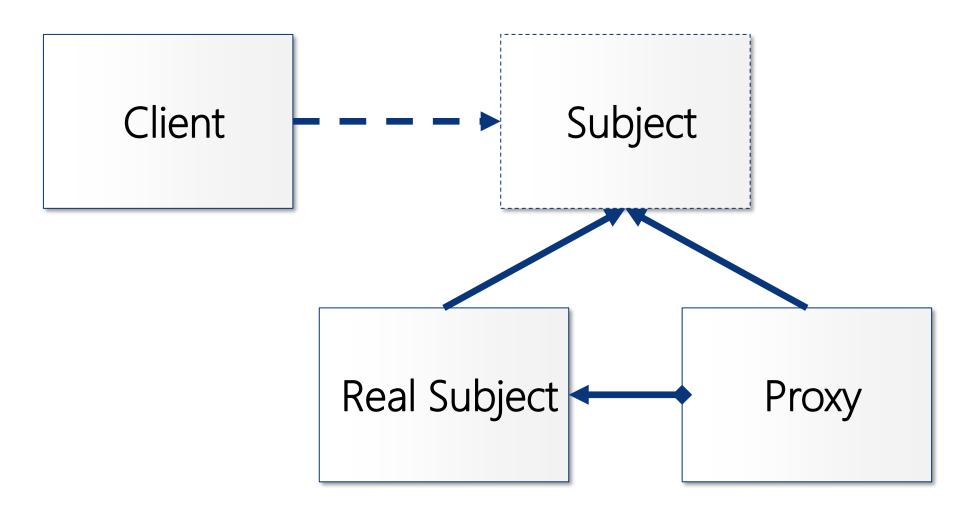


#### Pattern: Proxy

- Provide a surrogate or place-holder for another object to control access to it.
- Outline
  - Define a substitute object with the same interface
  - Implement additional functionality or restriction in substitute object
  - Clients cannot tell whether they interact with the real object or a proxy
- Origin: Gang of Four



#### Overview of Proxy Pattern



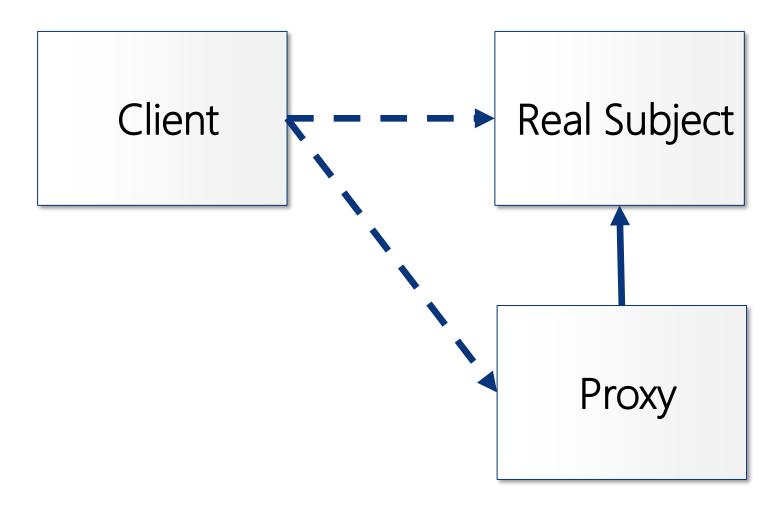


#### Overview of Proxy Pattern

- Client
  - Interacts with any Subject through a general interface
- Subject
  - Interface or base class to subject functionality
- Real Subject
  - Concrete subject class implementing Subject interface
  - Provides concrete functionality
- Proxy
  - Substitute subject class implementing Subject interface
  - Implements added functionality or control restrictions to underlying Real Subject being controlled



#### Variation: Simple Proxy





#### Simple Proxy Pros and Cons

- Simple to implement
- Easier to maintain
- Only works when Real Subject is suitably "open"
- Violates Single Responsibility Principle of SOLID
- Uses inheritance instead of composition
- ▶ Fits well when there is no general interface to proxy



#### Proxy vs. Adapter

- Proxy
  - Simple, nice and clean to implement
  - Can be a slight burden to maintain if not autogenerated
  - Satisfies SOLID principles Fits beautifully with Dependency Injection
  - Keeps same interface
- Adapter
  - Changes the interface



#### Use Cases for Proxy

- Use cases include
  - Virtual proxies
    - Lazy loading
    - Caching
  - Remote proxies
    - Distributed communication
  - Protection proxies
- Very frequently used



