Module 10: "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!

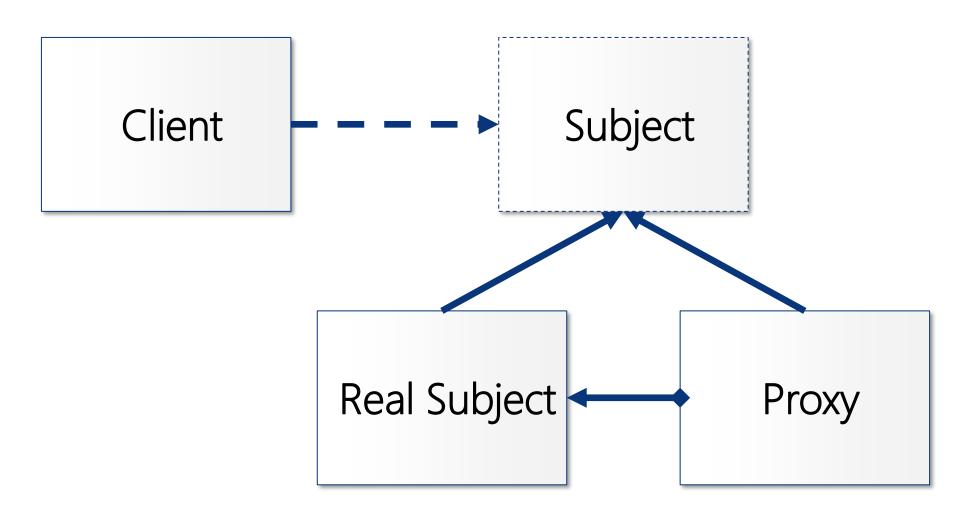


Pattern: Proxy

- 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



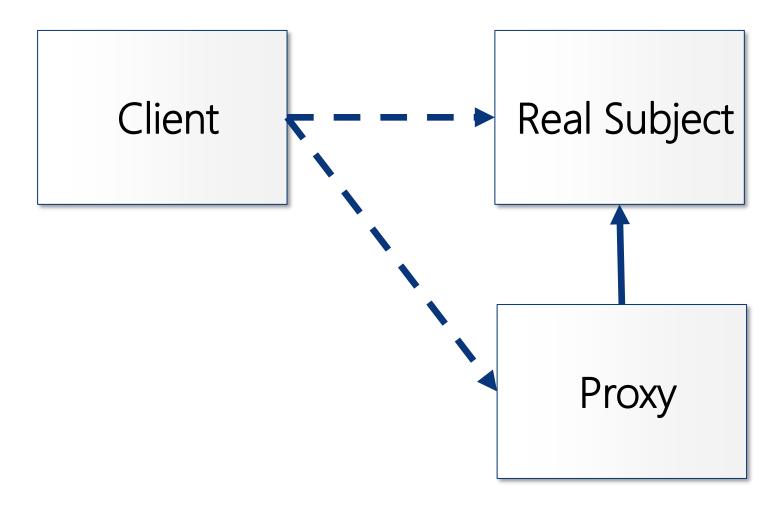


Overview of Proxy Pattern

- 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



