

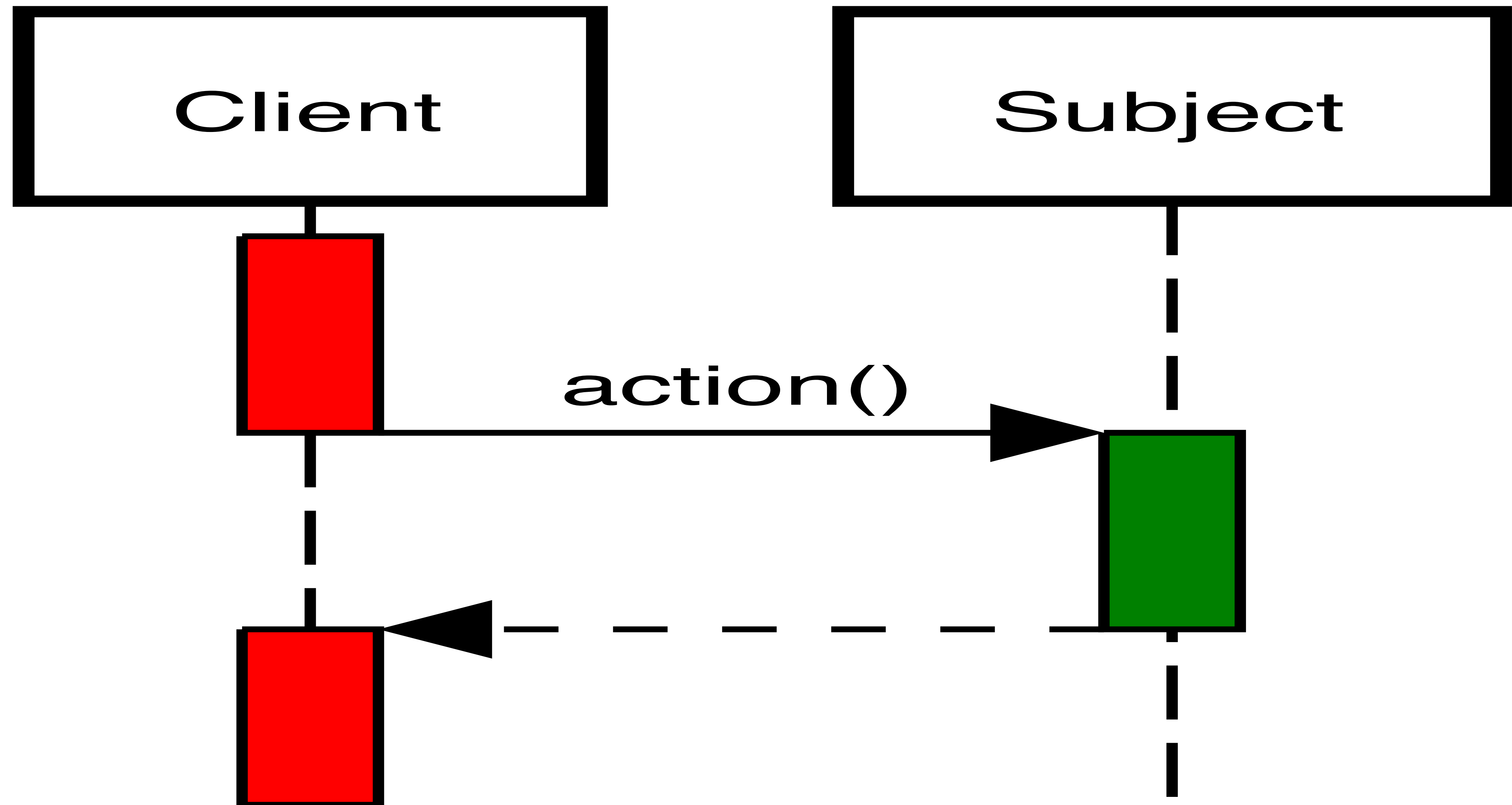
Object-Oriented Programming

Design Pattern Proxy

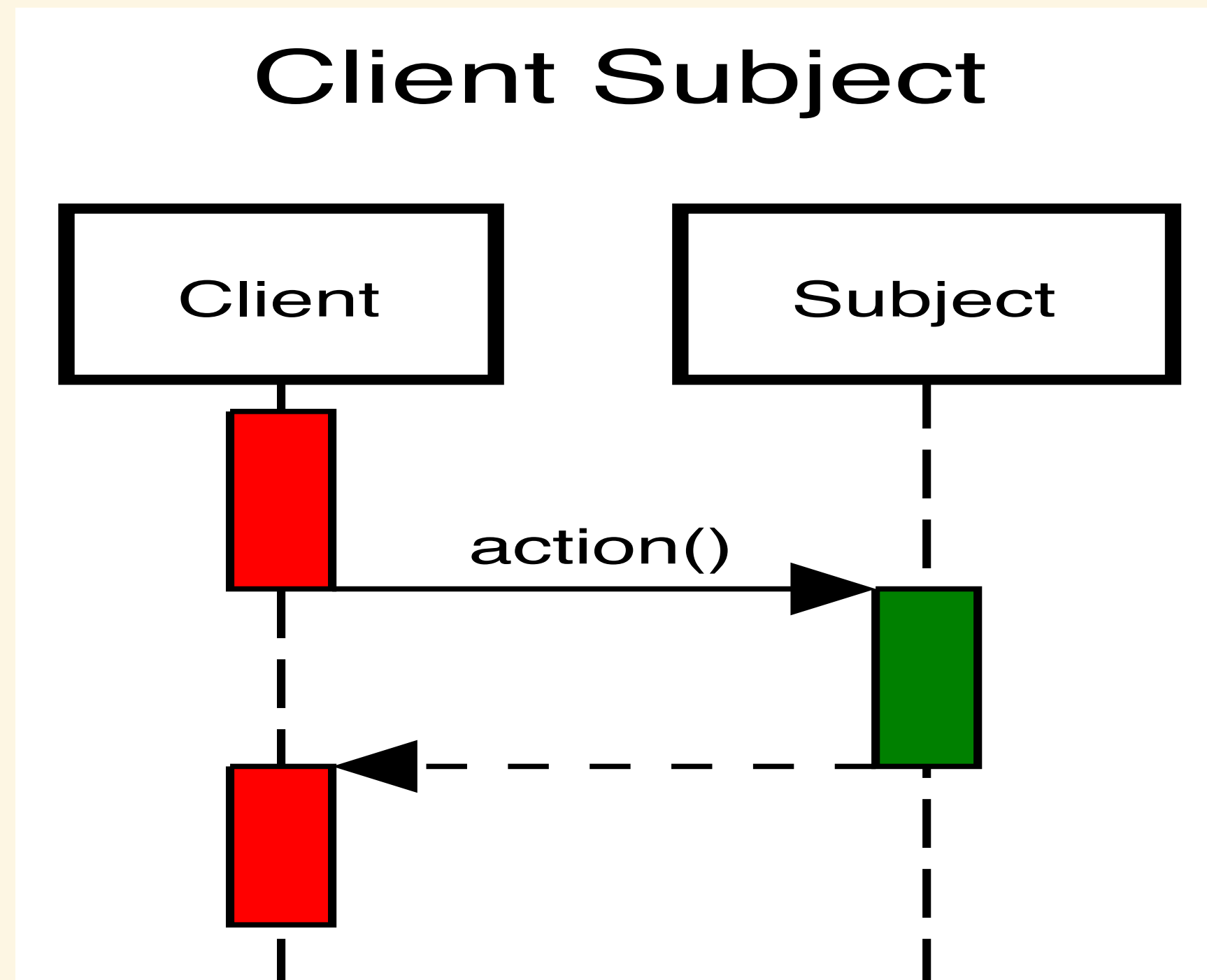
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Client Subject



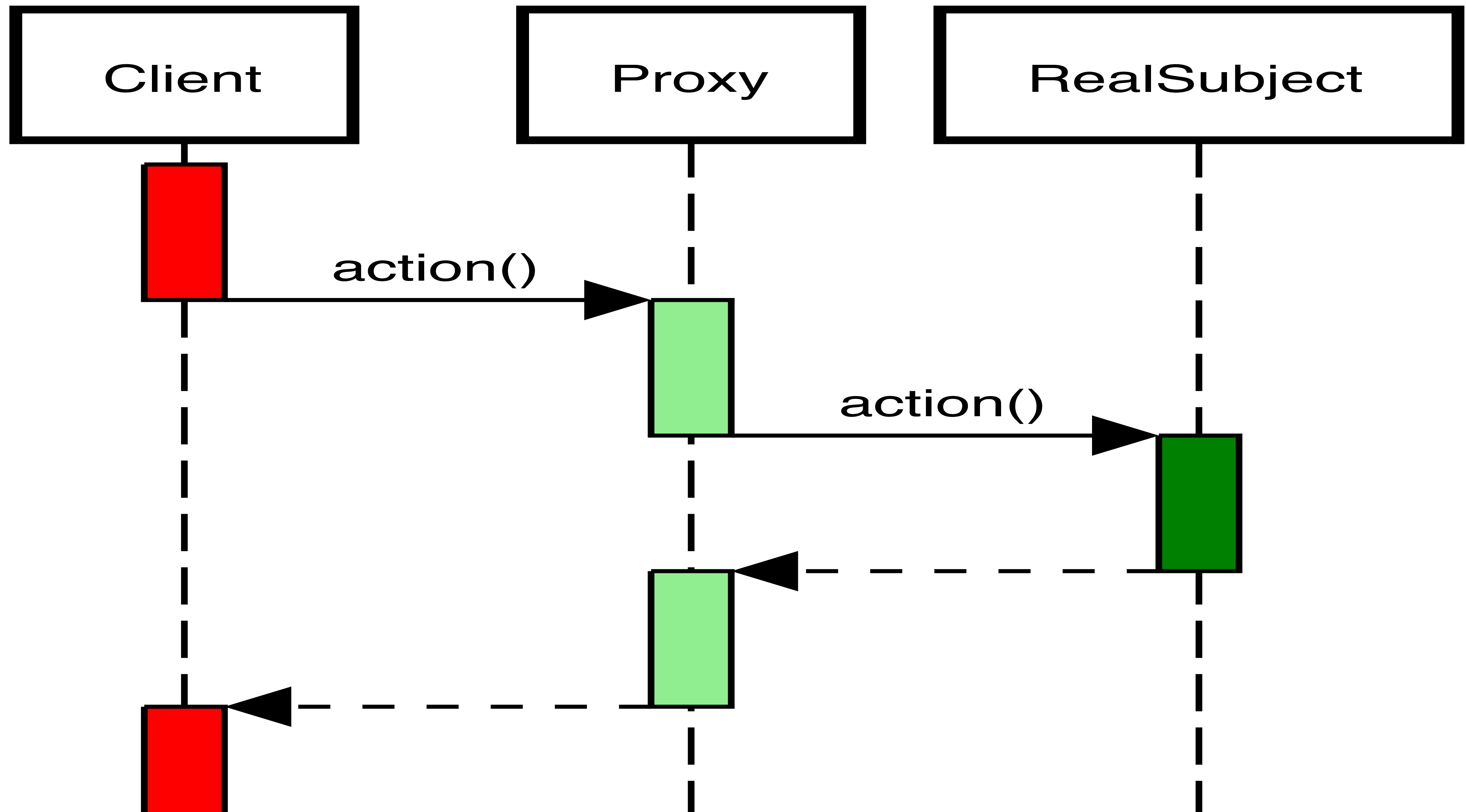
Problem



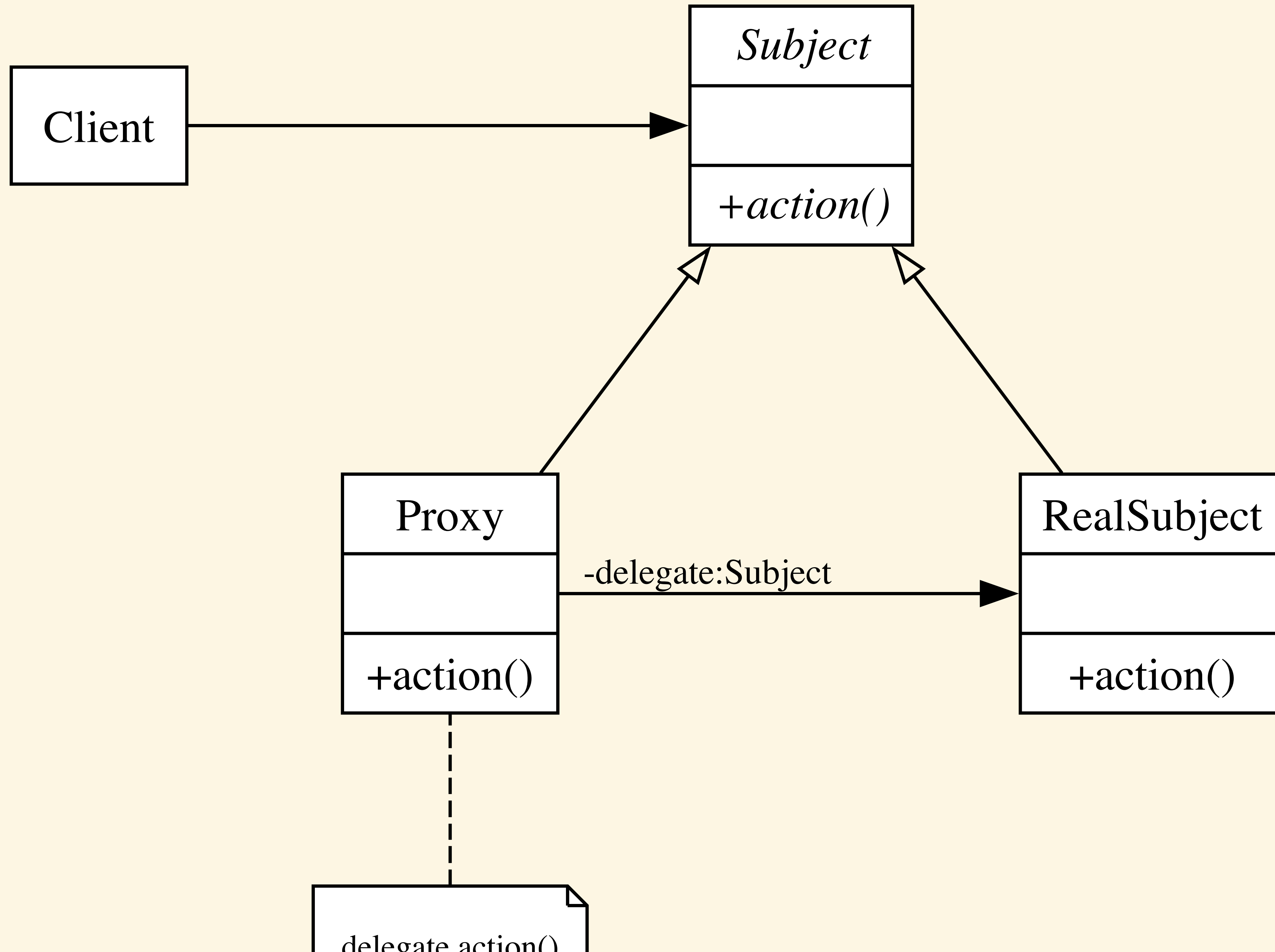
- Don't want to change the functionality of the `action()`
- But you may want to change some of the non-functional features of it
- Adding additional features means changing the *Subject*
- Want to do so flexibly, i.e., opportunistically add additional features on how the functionality is delivered
- This may mean caching, protection, etc.

Proxy

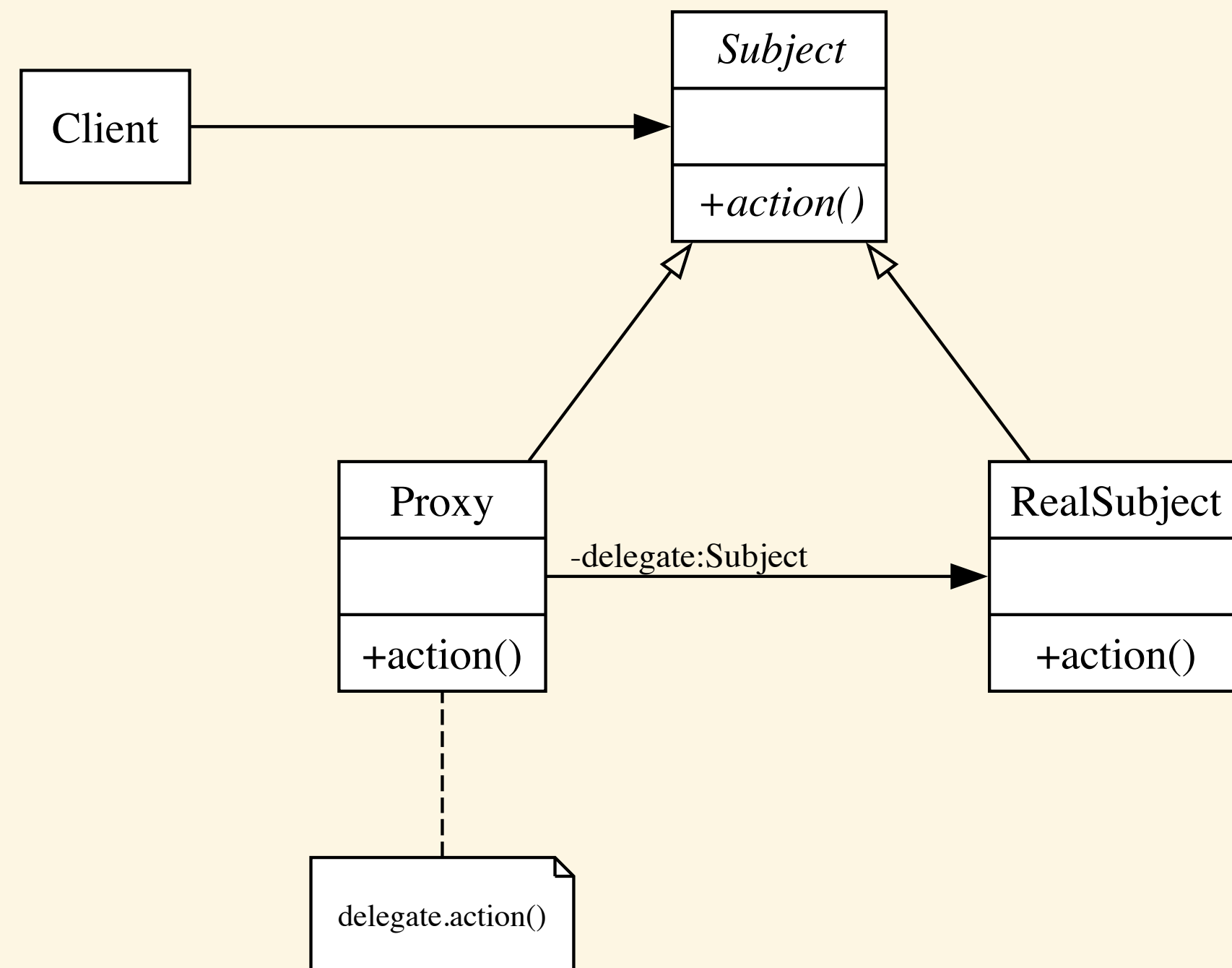
Proxy



Proxy Pattern

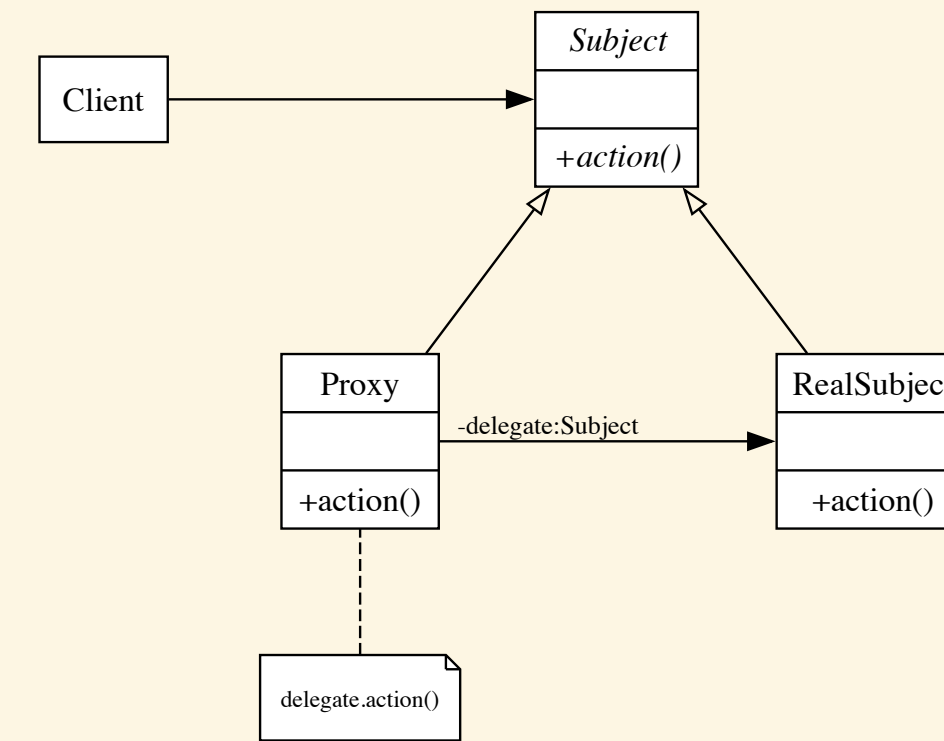
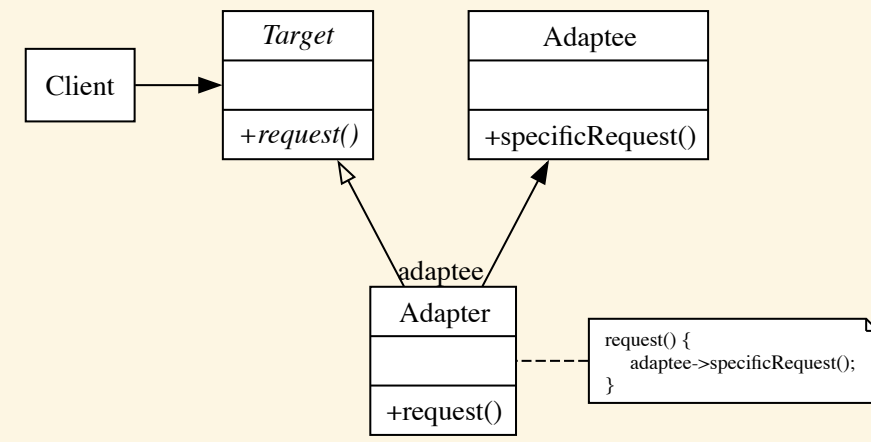


Proxy Pattern

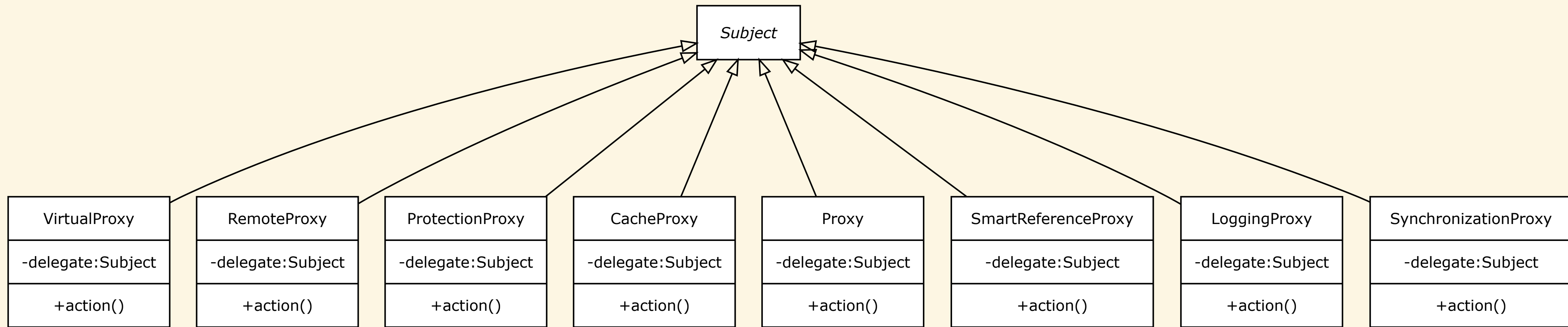


- Changes the behavior of the service but preserves the interface
- Delegate action to another class
- Client uses the proxy just like it was the real thing (in general)

Adapter vs. Proxy



Proxy Examples

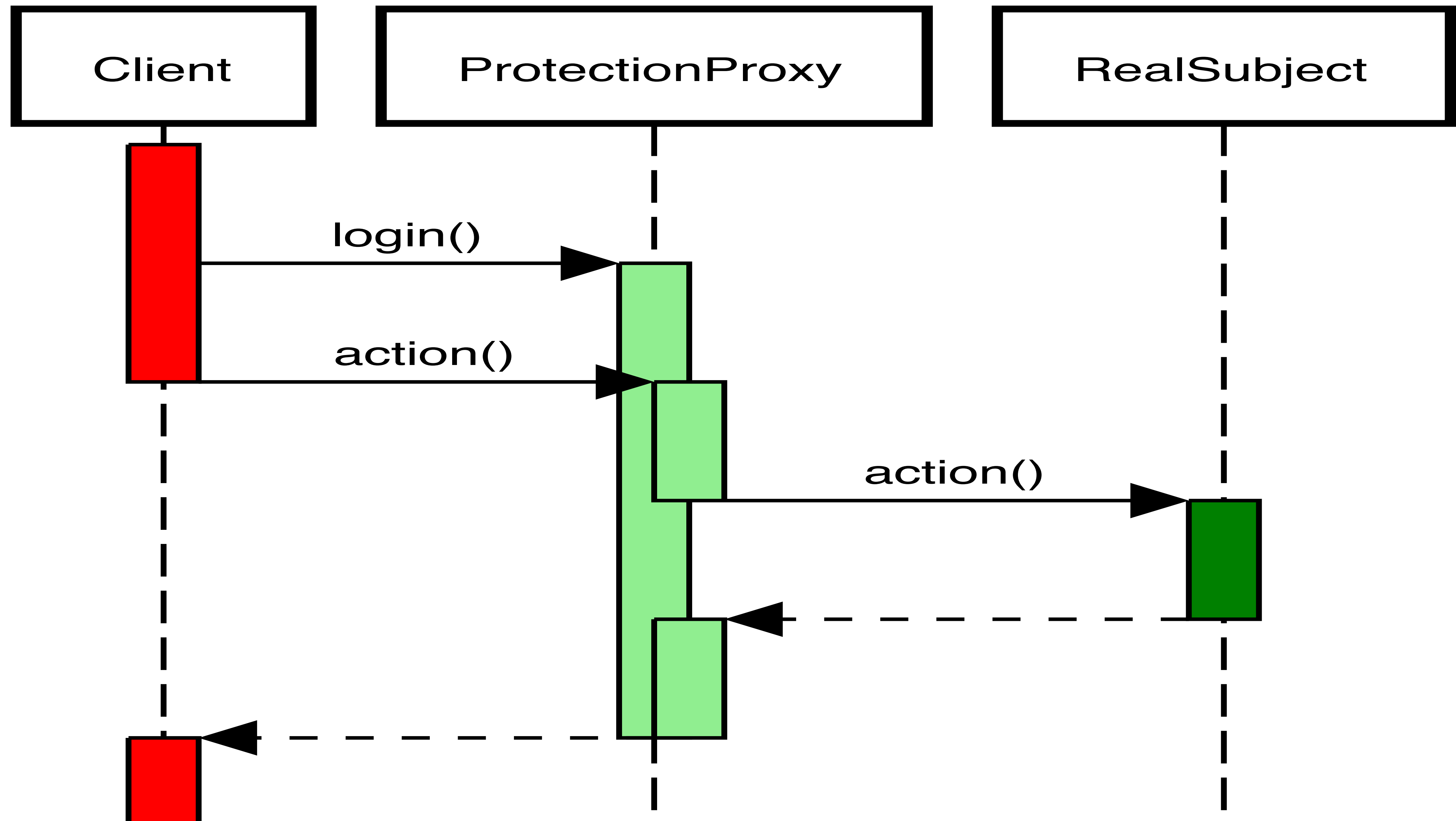


Proxy Examples

Proxy Type	Description
Virtual Proxy	Provide a placeholder for an expensive object and delay its instantiation until it is needed
Remote Proxy	Represent an object in a different address space, e.g., access a remote database through a remote proxy
Protection Proxy	Control access to the original object based on specific permissions or authentication, e.g., check user access rights before granting access
Cache Proxy	Store the result of an expensive operation and return cached results, e.g., cache frequently accessed web pages
Firewall Proxy	Protect a network from unauthorized access by filtering incoming and outgoing traffic, e.g., filtering packets
Smart Reference Proxy	Add extra behavior when an object is accessed, like reference counting, e.g., keep track of the number of times an object is accessed
Logging Proxy	Add logging to an object for debugging or auditing, e.g., log requests made to a web service
Synchronization Proxy	Provide thread-safe access to a shared resource, e.g., ensure only one thread can access a shared data structure at a time

Protection Proxy

Protection Proxy



Chains of Proxies

Protection Cache Proxy

