

Delegates And Events in c#

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Objectives

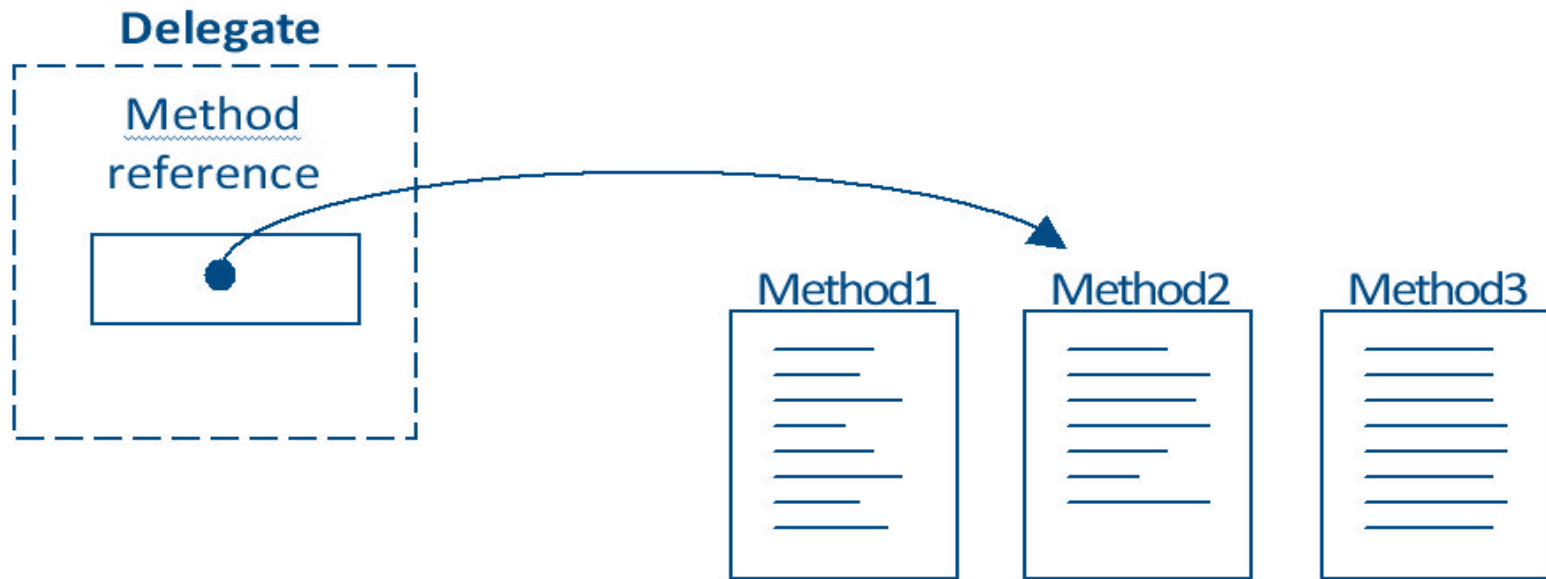
- ▶ Understand the concept of a delegate.
- ▶ Understand how to declare a delegate, assign it to a method and invoke it.
- ▶ Understand Multicast Delegates and its uses.



Delegates

- ▶ A delegate is a reference type that defines a method signature
- ▶ A delegate instance holds one or more methods
 - Essentially an “object-oriented function pointer”
 - Methods can be static or non-static
 - Methods can return a value
- ▶ Provides polymorphism for individual functions
- ▶ Foundation for event handling

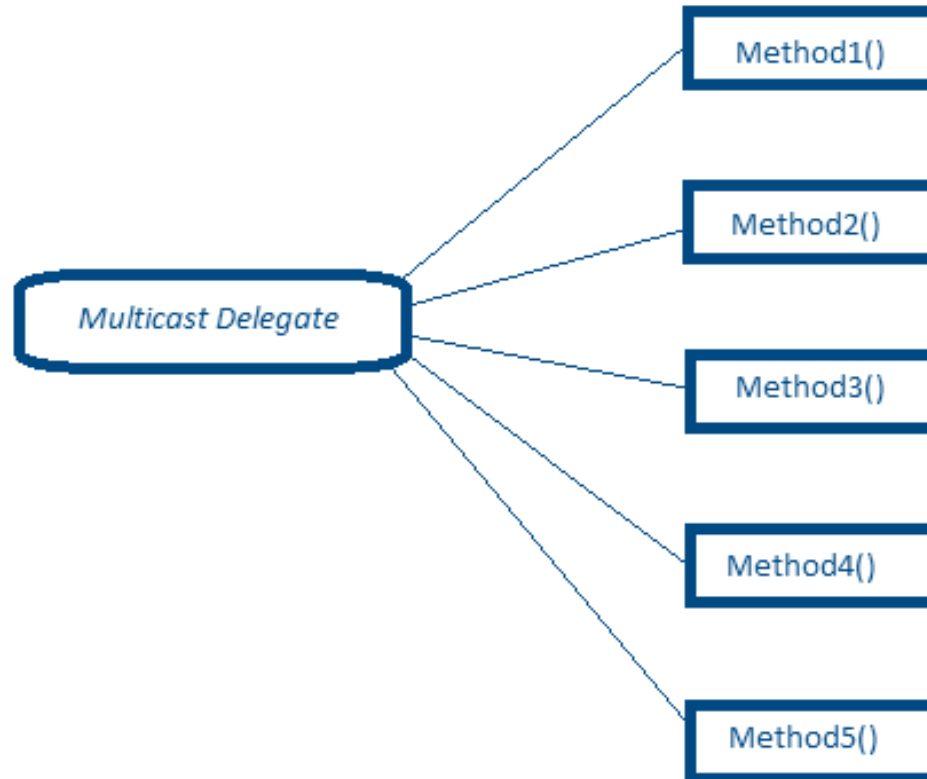
Singlecast Delegate



Multicast Delegates

- ▶ A delegate can hold and invoke multiple methods
 - Multicast delegates must contain only methods that return void, else there is a run-time exception
- ▶ Each delegate has an invocation list
 - Methods are invoked sequentially, in the order added
- ▶ The += and -= operators are used to add and remove delegates, respectively
- ▶ += and -= operators are thread-safe

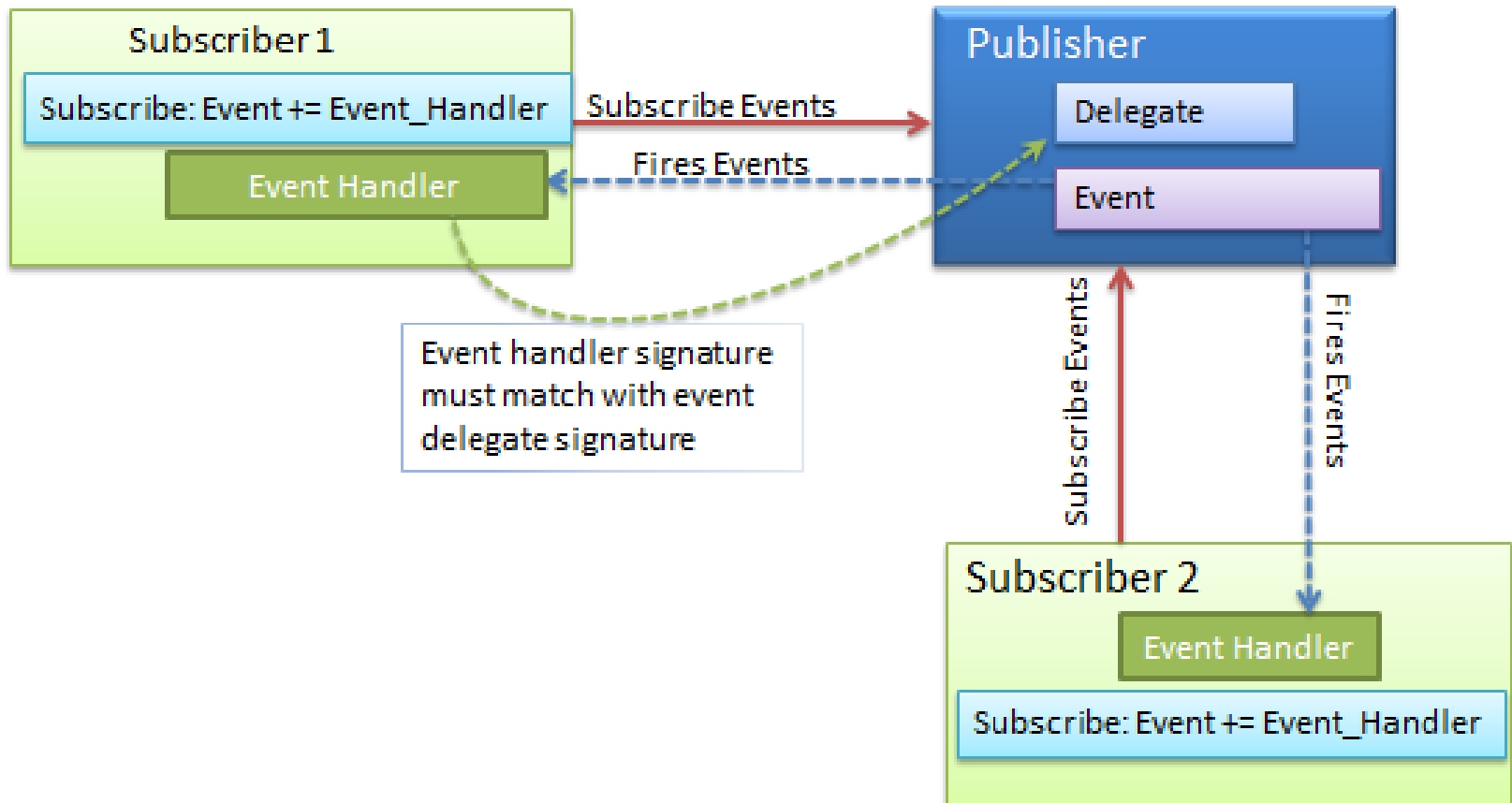
Multicast Delegates



Events-Overview

- ▶ Event handling is a style of programming where one object notifies another that something of interest has occurred
 - A publish-subscribe programming model
- ▶ Events allow you to tie your own code into the functioning of an independently created component. Events are a type of “callback” mechanism
- ▶ Events are well suited for user-interfaces
 - The user does something (clicks a button, moves a mouse, changes a value, etc.) and the program reacts in response
- ▶ Many other uses, e.g.
 - Time-based events
 - Asynchronous operation completed
 - Email message has arrived
 - A web session has begun

Events Overview(Cont..)



Events Overview(Cont..)

- ▶ C# has native support for events
- ▶ Based upon delegates
- ▶ An event is essentially a field holding a delegate
- ▶ However, public users of the class can only register delegates
 - They can only call += and -=
 - They can't invoke the event's delegate
- ▶ Multicast delegates allow multiple objects to register with the same event

Anonymous Methods

- ▶ Even though only a single statement is executed in response to the button's Click event, that statement must be extracted into a separate method with a full parameter list, and an EventHandler delegate referencing that method must be manually created.
- ▶ Using an anonymous method, the event handling code becomes significantly more succinct.

Events Example

- ▶ Define the event signature as a delegate
- ▶ Define the event and event raising logic.
- ▶ Raise the event.

Quick Recap

- ▶ The concept of a delegate
- ▶ How to declare and use a delegate
- ▶ The concept of Multicast Delegate
- ▶ Concept of Anonymous Methods



Thank You

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