

Build Event Driven Applications with Windows Communications Foundation (aka Indigo)

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About Brian

- Chief Architect, IDesign Inc. (www.idesign.net)
- Microsoft MVP in ASP.NET
- Writing
 - Data Binding in Windows Forms 2.0, Addison Wesley, January 2006
 - Smart Client Deployment with ClickOnce, Addison Wesley, Summer 2006
 - MSDN Magazine, MSDN Online, CoDe Magazine, The Server Side .NET, asp.netPRO, Visual Studio Magazine
- Speaking
 - Microsoft TechEd US, Europe, Malaysia, Visual Studio Connections, DevTeach, INETA Speakers Bureau, MSDN Webcasts
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Agenda

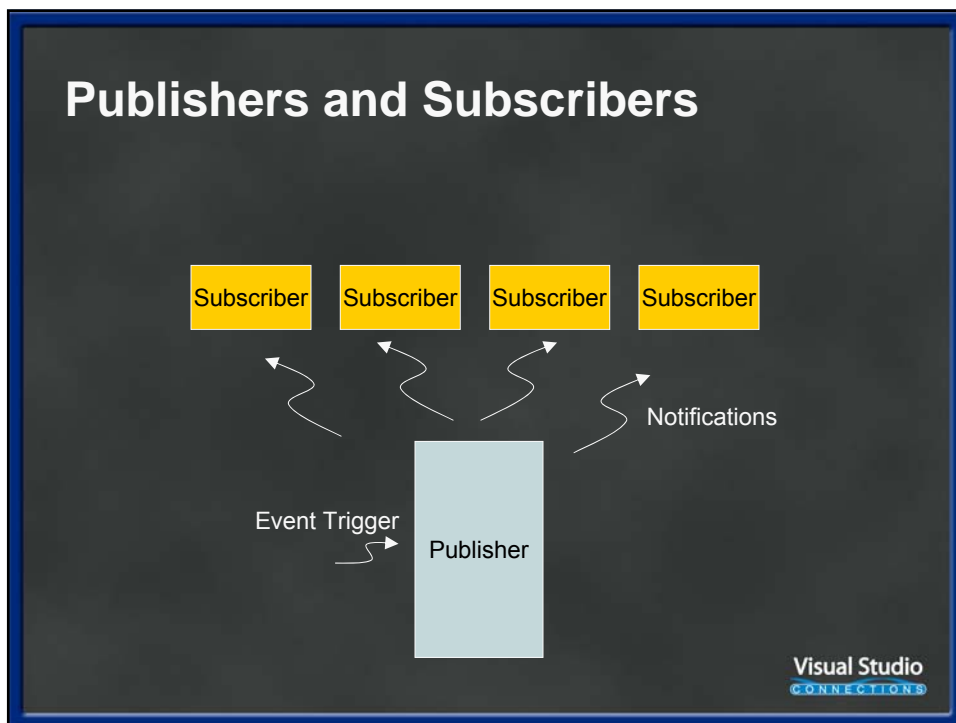
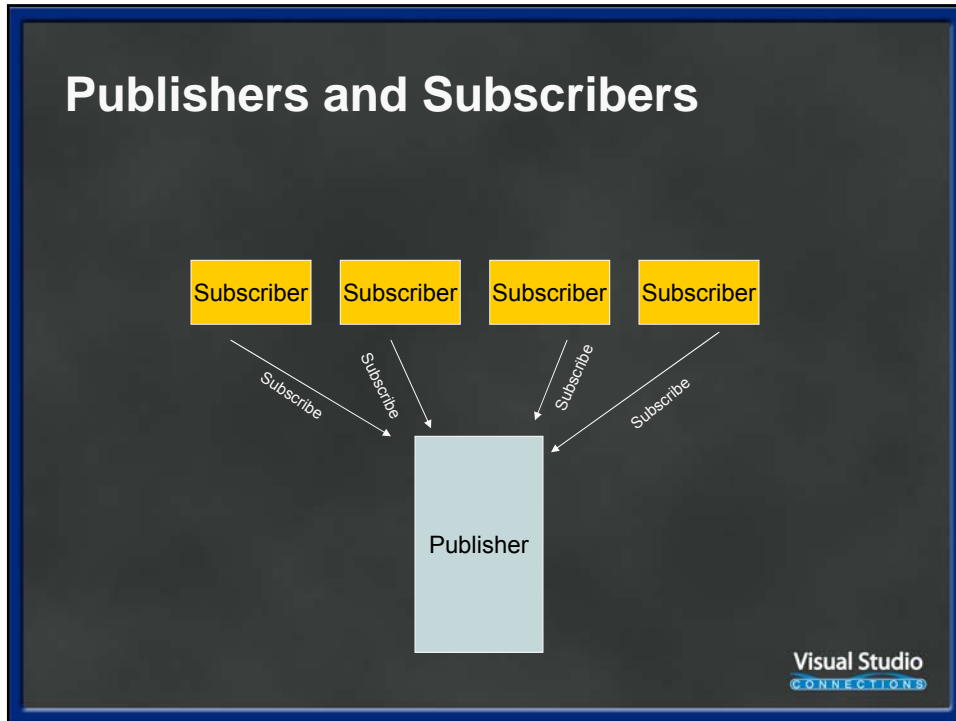
- Event Driven Architecture Overview
- Eventing Patterns
- List-Based Subscribers
- Duplex Subscriptions
- Loosely Coupled Events

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Event Driven Architecture

- Loosely coupled communications pattern
- Publish-subscribe metaphor
 - Subscribers are notified when an event of interest occurs at the publisher
 - Subscribers must register/subscribe to indicate their interest in events of a given type
- Past implementations:
 - COM – connection points
 - .NET – built-in events
 - COM+ / Enterprise Services – Loosely coupled events

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Observer

- Gang of Four
- Not tied to any specific technology
- Does not require built-in events
- Publisher (Subject) knows its observers and provides an interface for attaching and detaching
- Subscriber (Observer) provides an interface for notification
- Decoupling is minimal

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Publisher-Subscriber

- POSA, Enterprise Integration Patterns
- Message oriented
- Publish-Subscribe Channel
 - One input channel
 - Multiple output channels
- Requires multicast capability to be effective
 - Avoid flooding network with duplicate messages

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.NET Events

- Delegate based
 - Maintains list of subscriber delegates
- Declared as a member of a class
- Invokes each delegate in turn when event is fired
- Synchronous and not fault-tolerant by default
- Can be made asynchronous and fault tolerant
 - See Programming .NET Components, Juval Löwy
- Subscriber needs reference to publisher to subscribe
- Publisher maintains implicit reference to subscriber
- Lifetimes of publisher and subscriber are coupled

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Indigo and Events

- Early efforts to integrate WS-Eventing
- Goal: Implement true Pub-Sub message-based design pattern
- De-scoped out of V1
- Can still do event-like callbacks
 - List based - hook things up yourself, loop through subscribers
 - Duplex messaging – tightly coupled callback mechanism on each individual subscriber
 - Loosely coupled Pub-Sub – sure, just... have at it... you'll figure it out...
- Understanding service instance lifetime becomes very important

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List Based Subscribers

- Brute force approach
- Service exposes registration operation
- Clients provide callback addresses
- Service calls each client endpoint when event occurs
- Client is service, service is client for events

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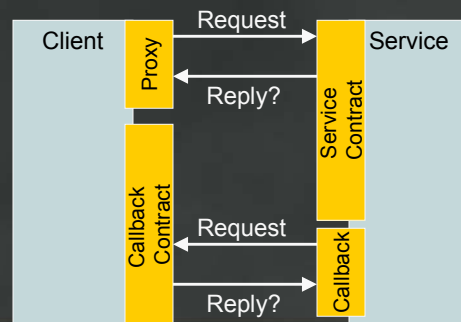
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Duplex Client Channel with Callback

- Built-in support for callback registration
- Use Duplex client channel
- Specify client callback contract in service contract
- Requires reliable sessions



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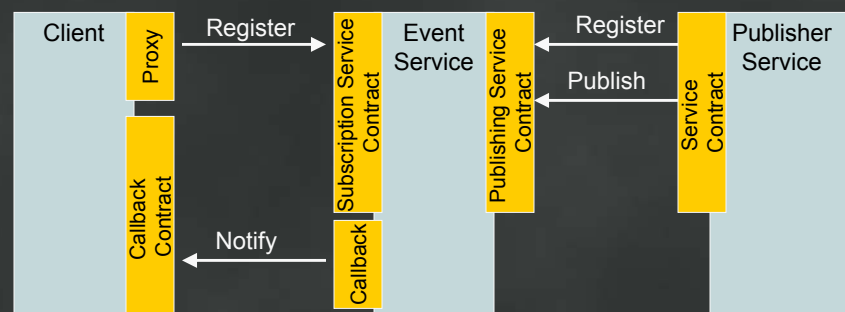
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Loosely Coupled Events

- Implemented in COM+/Enterprise Services
- Fully decouples subscribers and publishers
 - No direct knowledge of each other
 - Lifetimes not tied
- Need middleman event service

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Loosely coupled events



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Event Driven Apps and WinWF

- Windows Workflow Foundation
- Part of WinFx
- Build process-oriented applications in a declarative way through the designer

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Resources

- *Programming Indigo*, David Pallman, Microsoft Press, 2005.
- *Windows Communications Foundation Jumpstart*, Michele Leroux Bustamante, O'Reilly & Associates, March 2006
- *Programming .NET Components 2nd Edition*, Juval Löwy, O'Reilly & Associates, 2005.
- *Enterprise Integration Patterns*, Gregor Hohpe & Bobby Woolf, Addison Wesley, 2004.
- *Pattern-Oriented Software Architecture*, Buschmann et. al., Wiley, 1996.
- *Design Patterns*, Gamma et. al. (*Gang of Four*), Addison Wesley, 1995
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