Build Real Time Software with ASP.NET SignalR 2.0

Rachel Appel
Appel Consulting
http://rachelappel.com
rachel@rachelappel.com

Agenda

• Overview of SignalR
• Configure SignalR and Visual Studio
• Hubs
• Connections
• Deployment
Overview: What is SignalR?

- Simplifies real time web development
- ASP.NET Server and JavaScript Client Libraries
- Real-time persistent connection abstraction over HTTP
- Simplicity
- Reach
- Performance

"Incredibly simply real-time web for .NET"
– Damian Edwards, SignalR team

Overview: What is SignalR?

- OWIN http://owin.org/
- Katana https://katanaproject.codeplex.com/

From xkcd.com
Overview: Why Use SignalR?

- Types of Apps
  - Games, leaderboards
  - Social Applications
  - Business Collaboration
  - Stocks
  - Chat, messaging
  - Dashboards
  - Real time forms
  - Auctions
- Anything that needs live data
Overview: Where you can use SignalR

- HTML & ASP.NET apps
- Windows Store & Phone
- Any JavaScript client

Overview: SignalR in Action

http://shootr.signalr.net
http://JabbR.net
Configure SignalR & Visual Studio

- [http://www.asp.net/signalr](http://www.asp.net/signalr)
- NuGet package
  - OWIN References
  - Scripts
- GitHub download

SignalR Startup

```csharp
using Owin;
using Microsoft.Owin;
[assembly: OwinStartup(typeof(SR3.Startup))]
namespace SR3
{
    public class Startup
    {
        public void Configuration(IAppBuilder app)
        {
            app.MapSignalR();
        }
    }
}
DEMO

• SignalR setup

Overview: SignalR Namespaces

• Microsoft.AspNet.SignalR.Hub
Hubs

- Microsoft.AspNet.SignalR.Hub class
- Server Side Library
- Allows for duplex connectivity
Hubs

- Declare public methods on a hub so that clients can call them.
- Use the `Microsoft.AspNet.SignalR.Hub.Clients` property to access all clients connected to this hub.
- Call a function on the client
- Use the HubName and HubMethod attributes to match case

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Hub Events

```csharp
public override Task OnConnected()
{
    var id = Context.ConnectionId;
    return base.OnConnected();
}
```
Hubs: Transports

- A full duplex, TCP based protocol
- Is not HTTP
- Standardized RFC in 2011

Hubs: Transports

- Transports
  - WebSockets is the only transport that establishes a true persistent, two-way connection between client and server.
  - SSE/Events
  - AJAX Long Polling
  - Forever Frame (IE only)
- Transport selection process
- $.connection.hub.logging = true; // to determine transport
From this SO thread

From this SO user, Thomasw
http://stackoverflow.com/users/2207506/thomaswr

DEMO

• Hubs
SignalR Client Script Libraries

SignalR depends on jQuery

```javascript
@Scripts.Render("~/bundles/jquery")

SignalR script references

```html
<script src="~/Scripts/jquery.signalR-2.0.2.min.js"></script>
<script src="~/signalr/hubs"></script>
```

Connections

- Client Side
- PersistentConnection
- $.connection
Connections: Communications

- Hub to Connection
- Connection to Hub
- Connection to Connection
- Specific Connections

SignalR Lifecycle

- http://www.asp.net/signalr/overview/guide-to-the-api/handling-connection-lifetime-events#connectiontimeout
DEMO

• Connecting to Hubs

Clients.All.sendMessage(message);

Clients.Client(Context.ConnectionId).sendMessage(message);

Clients.Caller.sendMessage(name, message);

Clients.Others.sendMessage(name, message);

Clients.AllExcept(conn1, conn2).sendMessage(message);

Clients.Group(groupName).sendMessage(message);
DEMO

• Connecting to specific Hubs

Session State

• Nope nope nope it doesn't support it
• It bypasses ASP.NET
• No HttpContext object
Send data via QueryString

- Context.Request
  - Headers
  - QueryString

// .NET client
var connection = new HubConnection("http://localhost:8080/", "data=12345");

// JavaScript client
$.connection.hub.qs = "data=12345";

// Hub server code
var qs = Context.Request.QueryString["myInfo"].ToString();

Connection Status

- Notify the client of slow or unavailable connectivity

$.connection.hub.connectionSlow(function () {
    notifyUserOfConnectionProblem();
});

$.connection.hub.reconnecting(function () {
    notifyUserOfReconnection();
});
Security

- Integrate SignalR into existing authentication
- ASP.NET Forms
- Authorize attribute
Securing Hubs

[Authorize]

[Authorize(Roles = "Admin")]
public class AdminAuthHub : Hub { }

[Authorize(Users = "User1, User2")]
public class AdminAuthHub : Hub { }

// try to avoid securing individuals
Require Authentication for all Hubs

```csharp
public partial class Startup {
    public void Configuration(IAppBuilder app) {
        app.MapSignalR();
        GlobalHost.HubPipeline.RequireAuthentication();
    }
}
```

Pass Authentication to Client

```csharp
var user = Context.User;
var name = user.Identity.Name;
```
SignalR Deployment

• Azure SDK
• Deployment To-Do’s
  • Enable WebSockets
  • Enable V 4.5
• Multiple Azure instances
Thank You!

Rachel's Website
http://rachelappel.com

MSDN Modern Apps Column

WintellectNOW training videos