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Lighting Up Real-time Web Communications with SignalR

Introduction

Microsoft

Jon Galloway | Technical Evangelist
Brady Gaster | Program Manager, Azure SDK & Tools

Meet Jon Galloway | @jongalloway

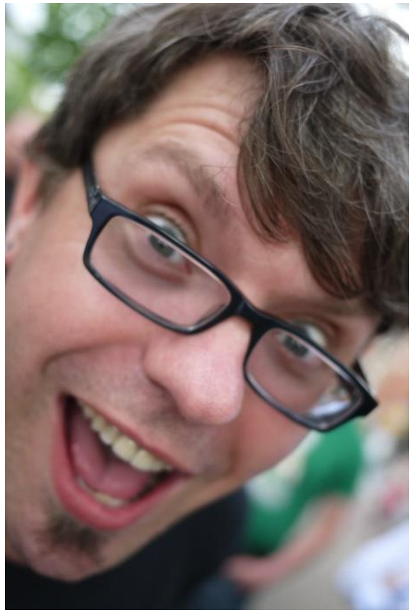
Azure Technical Evangelist

- Focused on ASP.NET MVC
- http://weblogs.asp.net/jongalloway
- Web development on Microsoft platform since late '90s
- Ex-submariner; Showcase Showdown winner “Price is Right”

Popular Author and Conference Speaker

- Wrox Professional MVC 5; MVC Music Store tutorial
- Virtual ASP.NET MVC Conference (mvcConf)
- World wide Web Camps speaker
- Herding Code podcast (http://herdingcode.com)

Meet Brady Gaster | @bradygaster



Program Manager, Azure SDK & Web Tools

- Focused on ASP.NET, Azure, and Visual Studio Web Tools
- http://www.bradygaster.com
- Web development on Microsoft platform since late '90s
- Musician, Father of 2 boys, NETMF tinkerer, ex-teacher

Speaker, Host, Blogger, Author

- Co-host of Channel 9’s Web Camps TV show
- Spoken at TechEd, //build/, and worldwide Web Camps events
- Azure Blog author http://blog.azure.com
- Organized AzureConf 2012 & 2013

Course Topics

Lighting Up Real-time Communications with SignalR

01 | Introduction to SignalR

02 | SignalR on the Web

03 | SignalR on the Client

04 | Scaling out SignalR

05 | Q&A and Advanced Demos with the SignalR Team

Setting Expectations

- Target Audience
  - HTML/.NET/JavaScript Developer
  - Basic knowledge of HTTP
  - Looking to fill knowledge gaps
- Suggested Prerequisites/Supporting Material
  - Visual Studio 2013 Express for Web

Join the MVA Community!

- Microsoft Virtual Academy
  - Free online learning tailored for IT Pros and Developers
  - Over 2.3M registered users
  - Up-to-date, relevant training on variety of Microsoft products
- “Earn while you learn!”
  - Get 50 MVA Points for this event!
  - Visit http://aka.ms/MVA-Voucher
  - Enter this code: 2WayCommSignalR (expires 10-24-2014)

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01 | Introduction to SignalR

Microsoft

Jon Galloway | Technical Evangelist
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Any sufficiently advanced technology is indistinguishable from magic – Arthur C. Clarke

What is SignalR?

SignalR is a series of abstractions around various methods of providing persistent HTTP connections distributed as open-source code

[Can I get that in English?]

SignalR makes real-time HTTP so easy it seems like magic

SignalR Core Concepts

Connection

- Represents a simple endpoint for sending single-recipient, grouped, or broadcast messages

Hub

- A more high-level pipeline built upon the Connection API that allows your client and server to call methods on each other directly

Backplane

- A backplane allows you to scale your application to multiple servers. With a backplane enabled, each application instance sends messages to the backplane, and the backplane forwards them to the other application instances.

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Installing SignalR and Getting Started

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(we promise to minimize the use of chat demos today!)

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DEMO

Creating a Real-time Hit Counter

No applets or controls required!

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SignalR – How it Works

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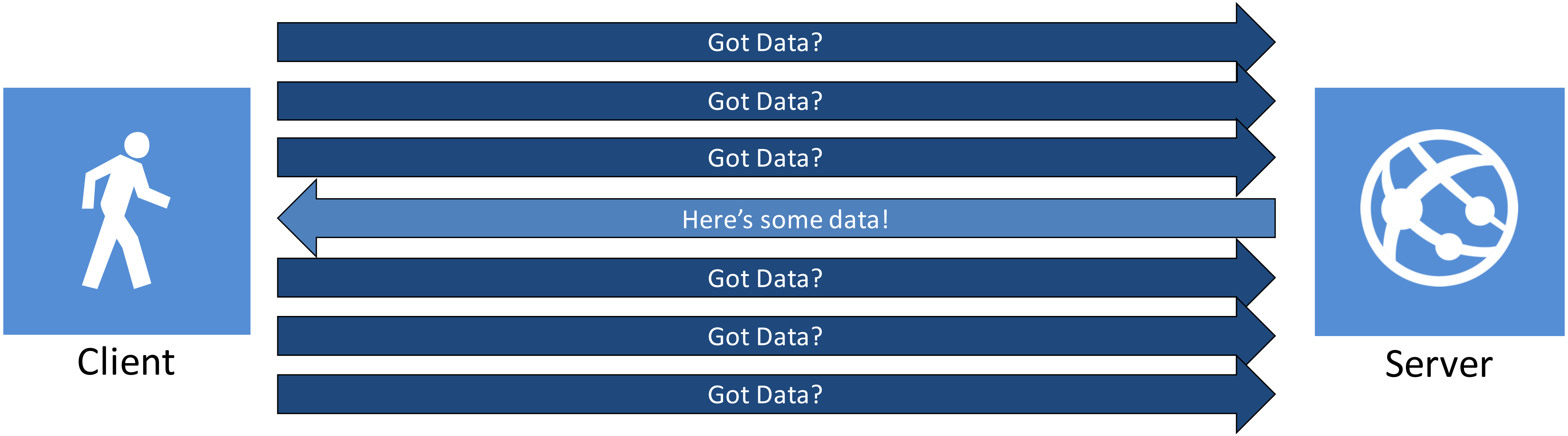
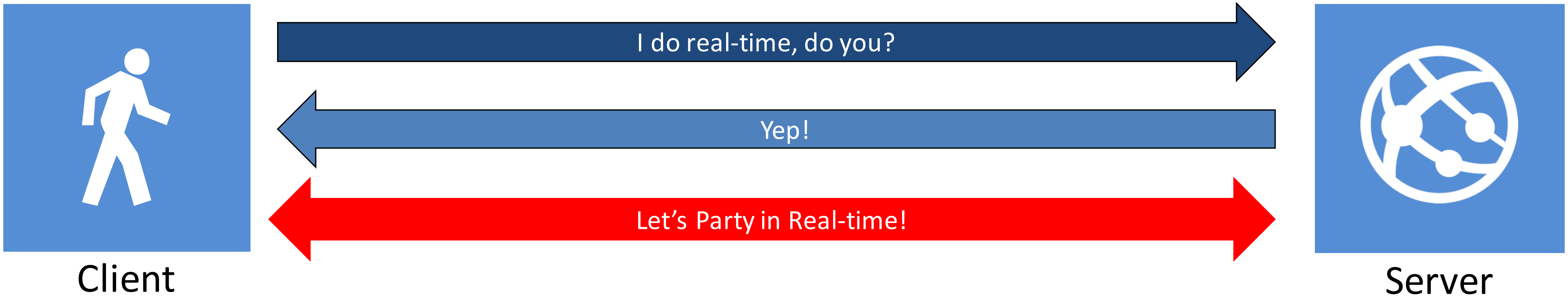
SignalR on Older Servers or Clients



SignalR on Modern Servers or Clients



I do real-time, do you?

Yep!

Let’s Party in Real-time!

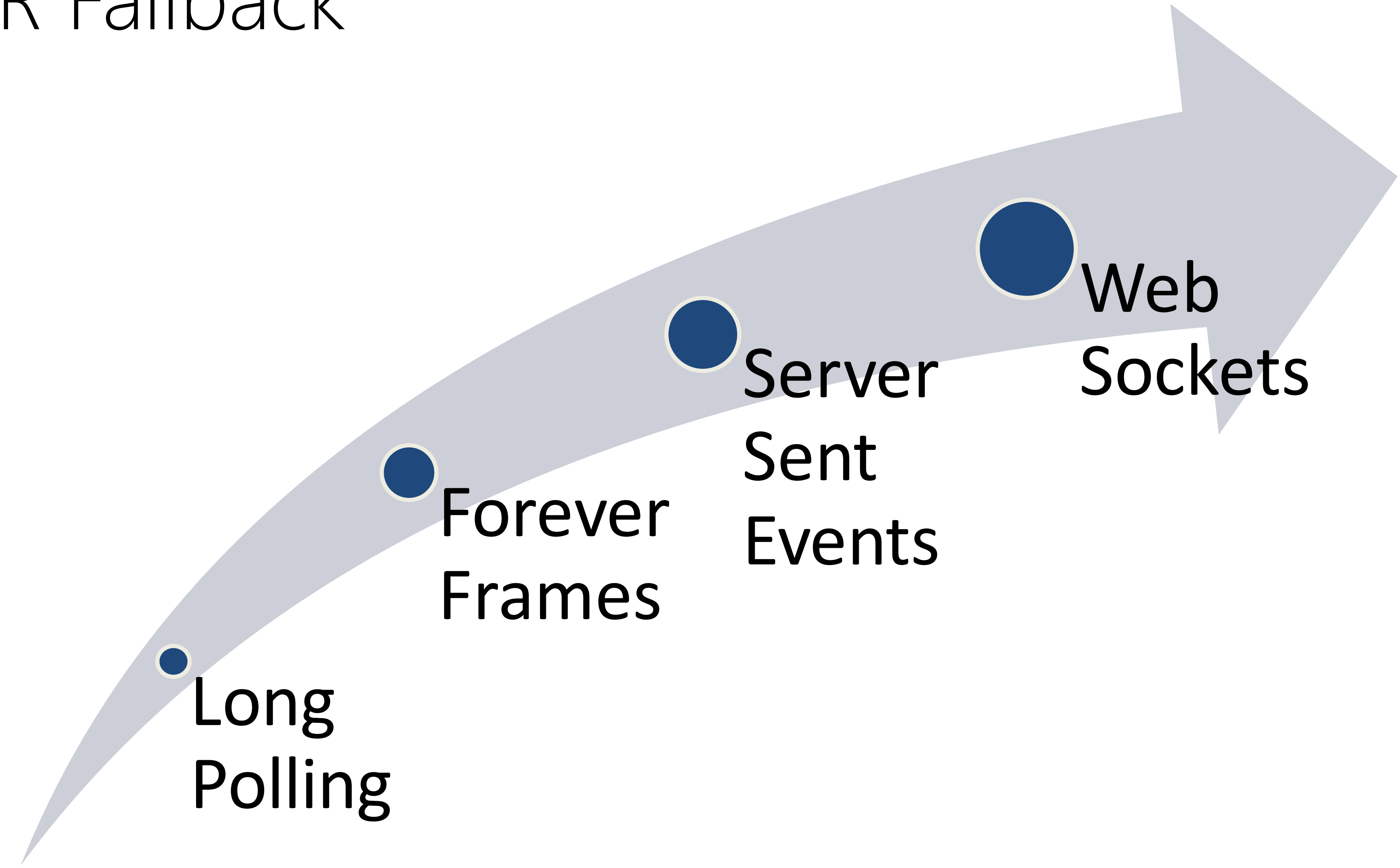
DEMO

How support for WebSockets changes network behavior

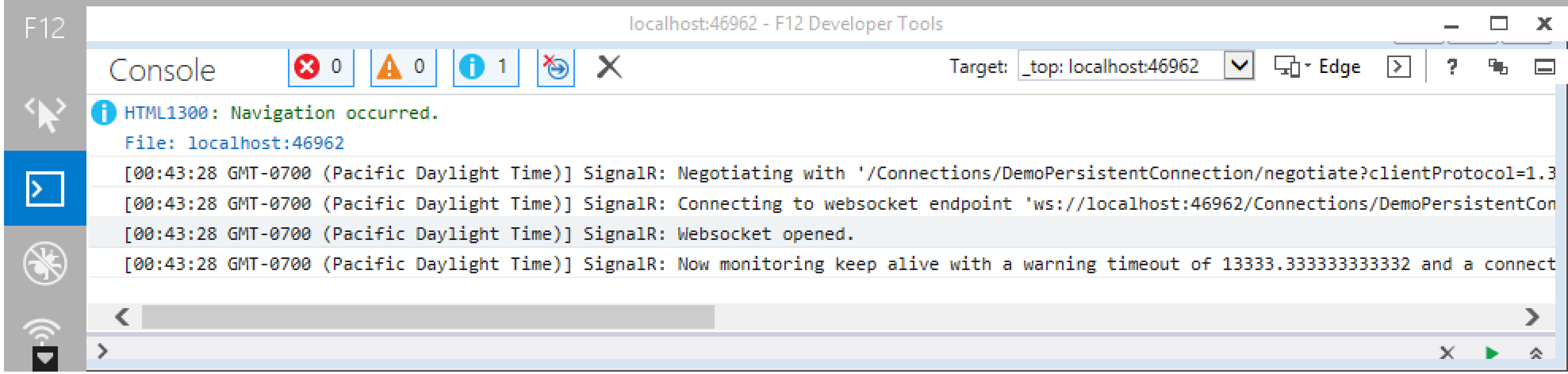
So how can SignalR know which methodology to use on both sides of the *persistent HTTP connection?

* ..and don’t think this drastic overhaul in your expectations of HTTP is abnormal. Everyone freaks out the first time they see it.

SignalR Fallback

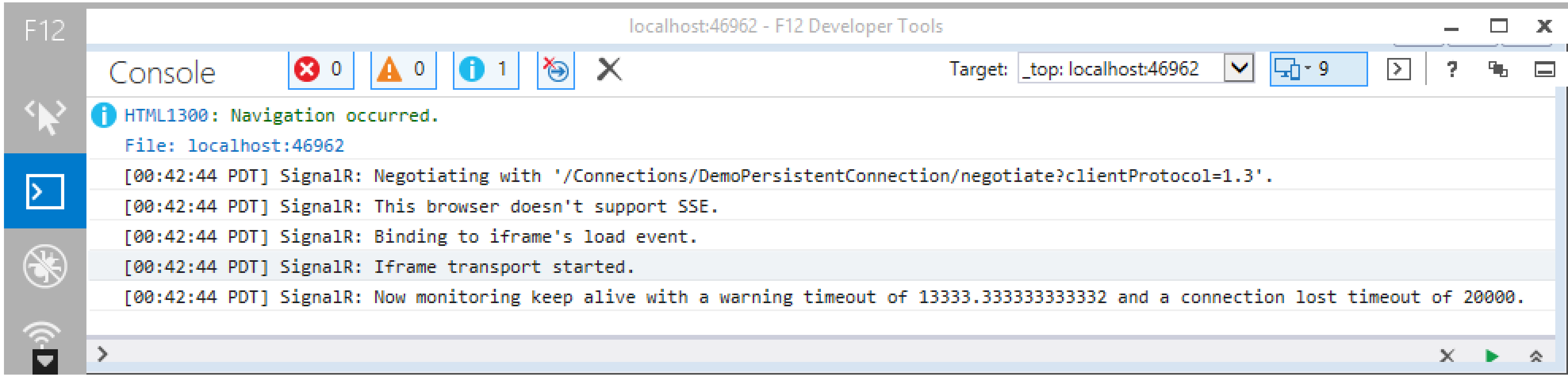


Let’s try
Websockets!



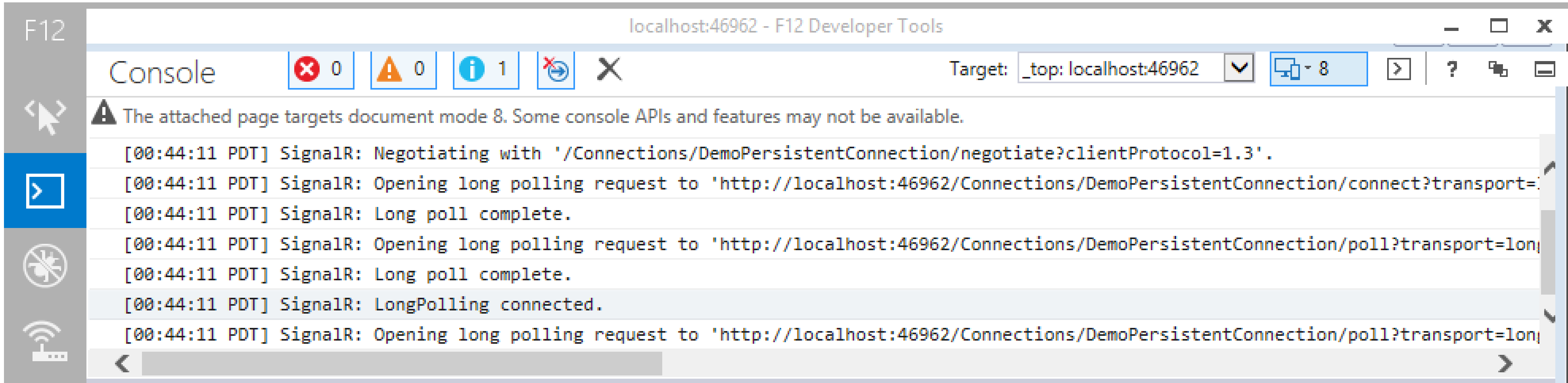
```
HTML1300: Navigation occurred.
File: localhost:46962
[00:43:28 GMT-0700 (Pacific Daylight Time)] SignalR: Negotiating with '/Connections/DemoPersistentConnection/negotiate?clientProtocol=1.3
[00:43:28 GMT-0700 (Pacific Daylight Time)] SignalR: Connecting to websocket endpoint 'ws://localhost:46962/Connections/DemoPersistentCon
[00:43:28 GMT-0700 (Pacific Daylight Time)] SignalR: Websocket opened.
[00:43:28 GMT-0700 (Pacific Daylight Time)] SignalR: Now monitoring keep alive with a warning timeout of 13333.333333333332 and a connect
```

No?
How about SSE?
No?
Forever Frames?



```
HTML1300: Navigation occurred.
File: localhost:46962
[00:42:44 PDT] SignalR: Negotiating with '/Connections/DemoPersistentConnection/negotiate?clientProtocol=1.3'.
[00:42:44 PDT] SignalR: This browser doesn't support SSE.
[00:42:44 PDT] SignalR: Binding to iframe's load event.
[00:42:44 PDT] SignalR: Iframe transport started.
[00:42:44 PDT] SignalR: Now monitoring keep alive with a warning timeout of 13333.333333333332 and a connection lost timeout of 20000.
```

Okay, then.
Long Polling!



The attached page targets document mode 8. Some console APIs and features may not be available.

```
[00:44:11 PDT] SignalR: Negotiating with '/Connections/DemoPersistentConnection/negotiate?clientProtocol=1.3'.
[00:44:11 PDT] SignalR: Opening long polling request to 'http://localhost:46962/Connections/DemoPersistentConnection/connect?transport=
[00:44:11 PDT] SignalR: Long poll complete.
[00:44:11 PDT] SignalR: Opening long polling request to 'http://localhost:46962/Connections/DemoPersistentConnection/poll?transport=lon
[00:44:11 PDT] SignalR: Long poll complete.
[00:44:11 PDT] SignalR: LongPolling connected.
[00:44:11 PDT] SignalR: Opening long polling request to 'http://localhost:46962/Connections/DemoPersistentConnection/poll?transport=lon
```

Jon, add slide(s) here walking the customer through the way SignalR determines what the client (and if possible, the server) does to up/downgrade the connection based on client/server capabilities

See here: https://github.com/SignalR/SignalR/blob/master/src/Microsoft.AspNet.SignalR.Client.JS/jquery.signalR.core.js

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Persistent SignalR Connections

Microsoft

Persistent SignalR Connections

- Low level
- Work on top of transport abstraction
- Pass untyped messages using Send() and Broadcast()
- Client must parse message and understand what to do

Choosing a communication model

Most applications should use the Hubs API. The Connections API could be used in the following circumstances:

- The format of the actual message sent needs to be specified.
- The developer prefers to work with a messaging and dispatching model rather than a remote invocation model.
- An existing application that uses a messaging model is being ported to use SignalR.

http://www.asp.net/signalr/overview/signalr-20/getting-started-with-signalr-20/introduction-to-signalr

DEMO

Persistent Connections

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SignalR Hubs

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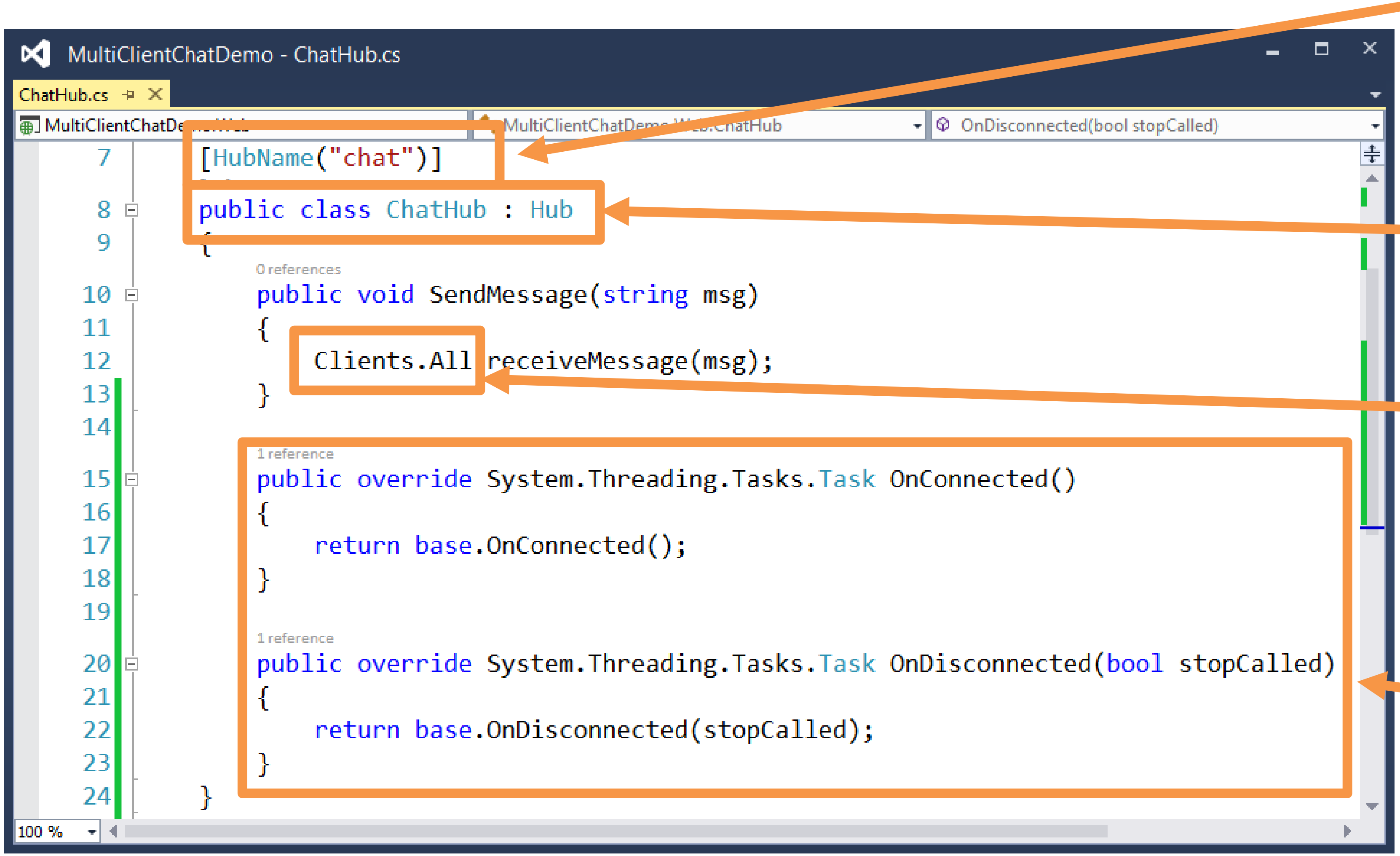
SignalR Hubs



MultiClientChatDemo - ChatHub.cs
ChatHub.cs
MultiClientChatDe...
MultiClientChatDemo.Web.ChatHub
OnDisconnected(bool stopCalled)
100 %

```
[HubName("chat")]
public class ChatHub : Hub
{
    0 references
    public void SendMessage(string msg)
    {
        Clients.All.receiveMessage(msg);
    }

    1 reference
    public override System.Threading.Tasks.Task OnConnected()
    {
        return base.OnConnected();
    }

    1 reference
    public override System.Threading.Tasks.Task OnDisconnected(bool stopCalled)
    {
        return base.OnDisconnected(stopCalled);
    }
}
```

Since Hubs are called on the client by name, the name can be customized if needed

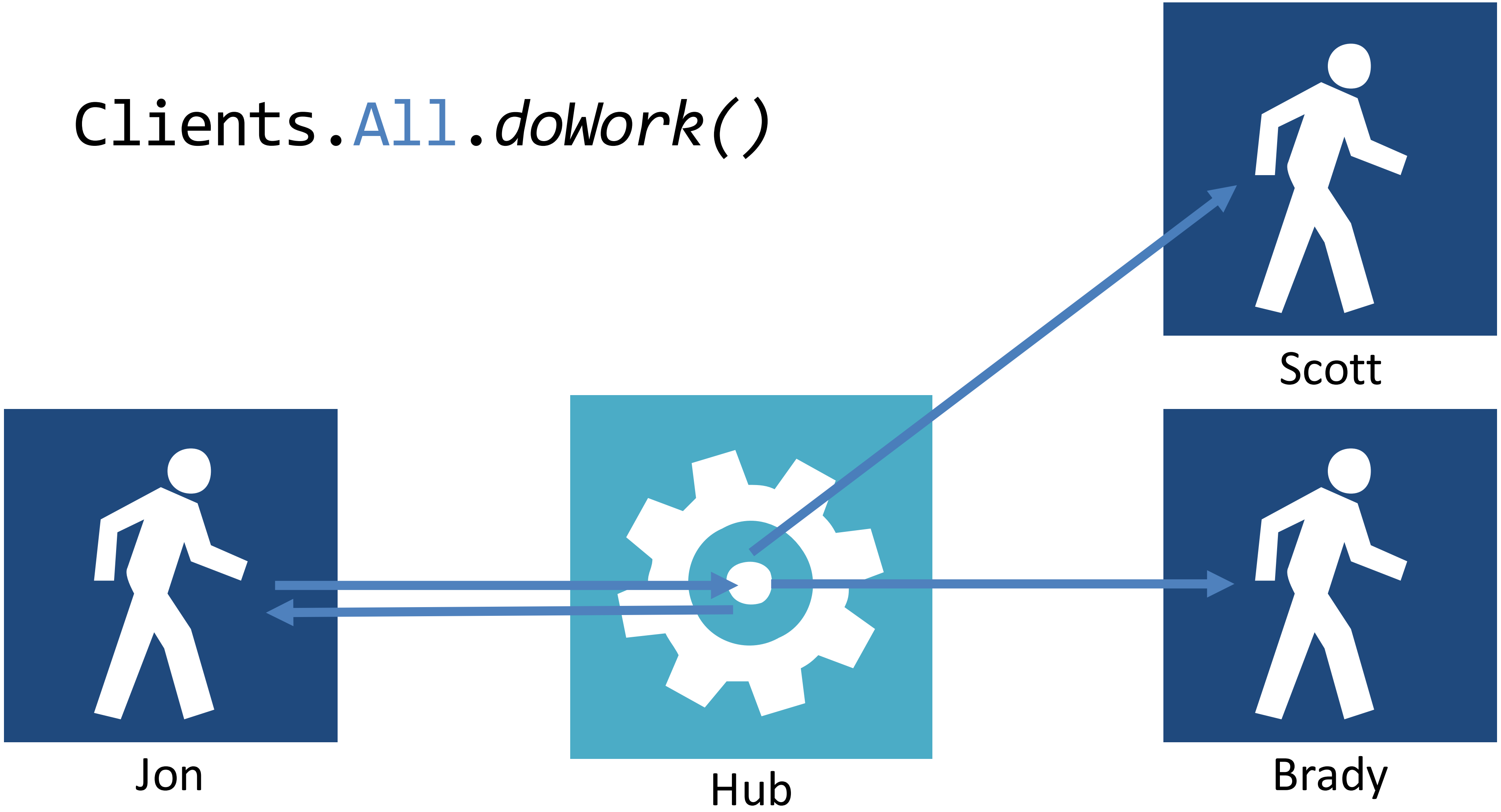
A hub is a .NET class that inherits from Microsoft.AspNet.SignalR.Hub

The Clients property of a Hub class exposes dynamic properties useful for targeting specific clients

Hub classes also have virtual methods useful for responding to connected/disconnected events

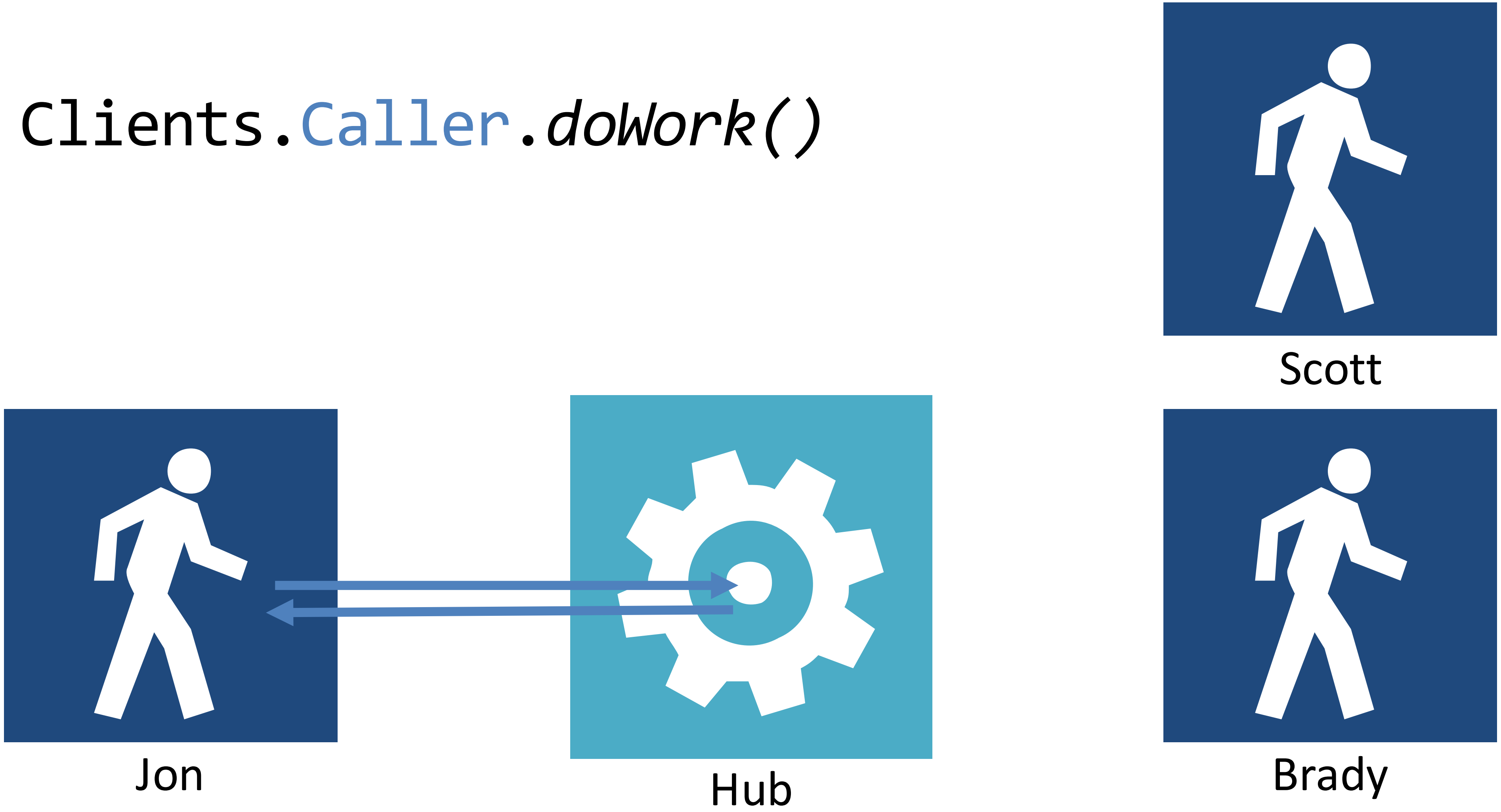
Sending messages to all connected clients

```
Clients.All.doWork()
```



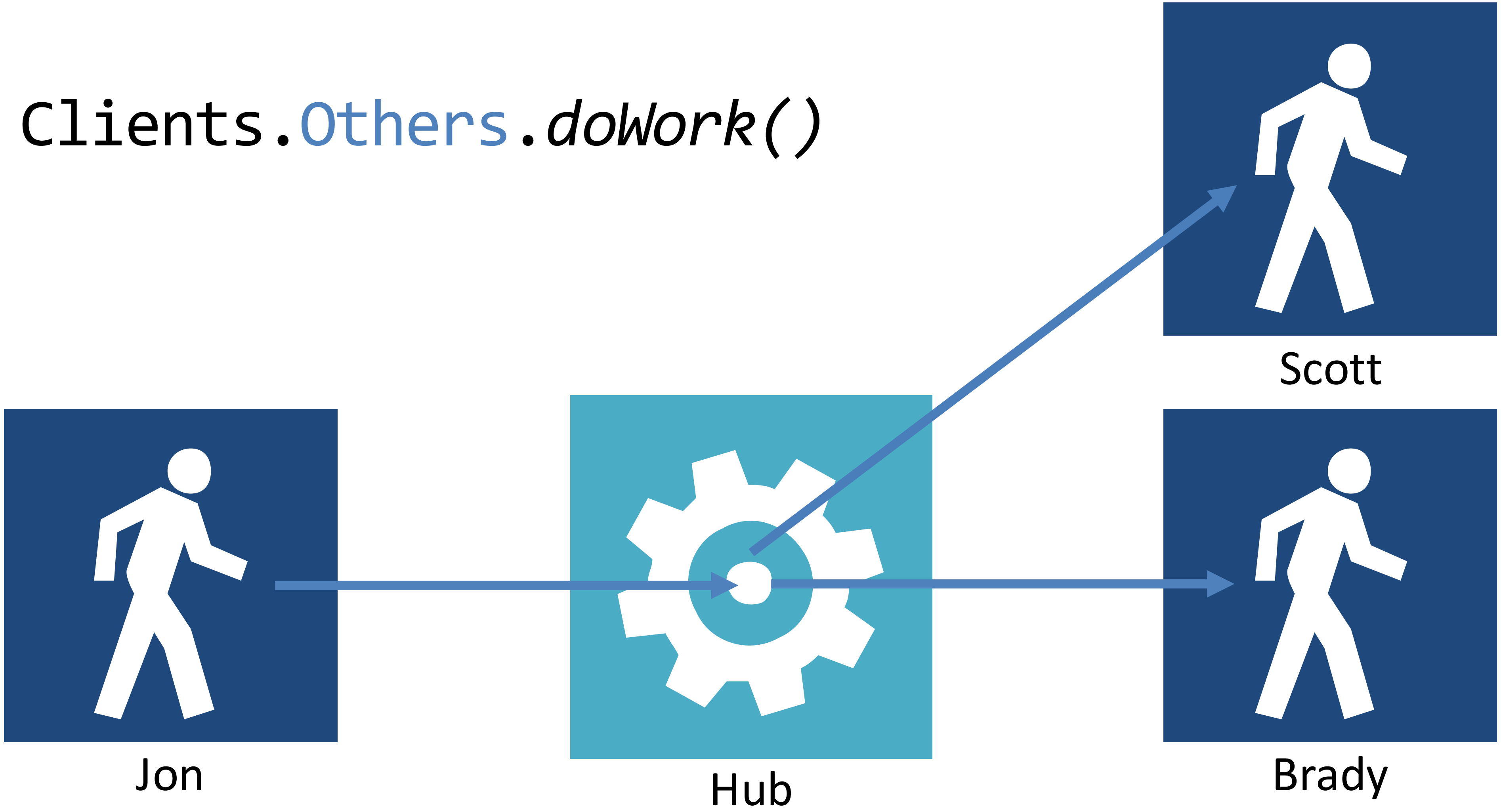
Sending messages to the calling client

```
Clients.Caller.doWork()
```



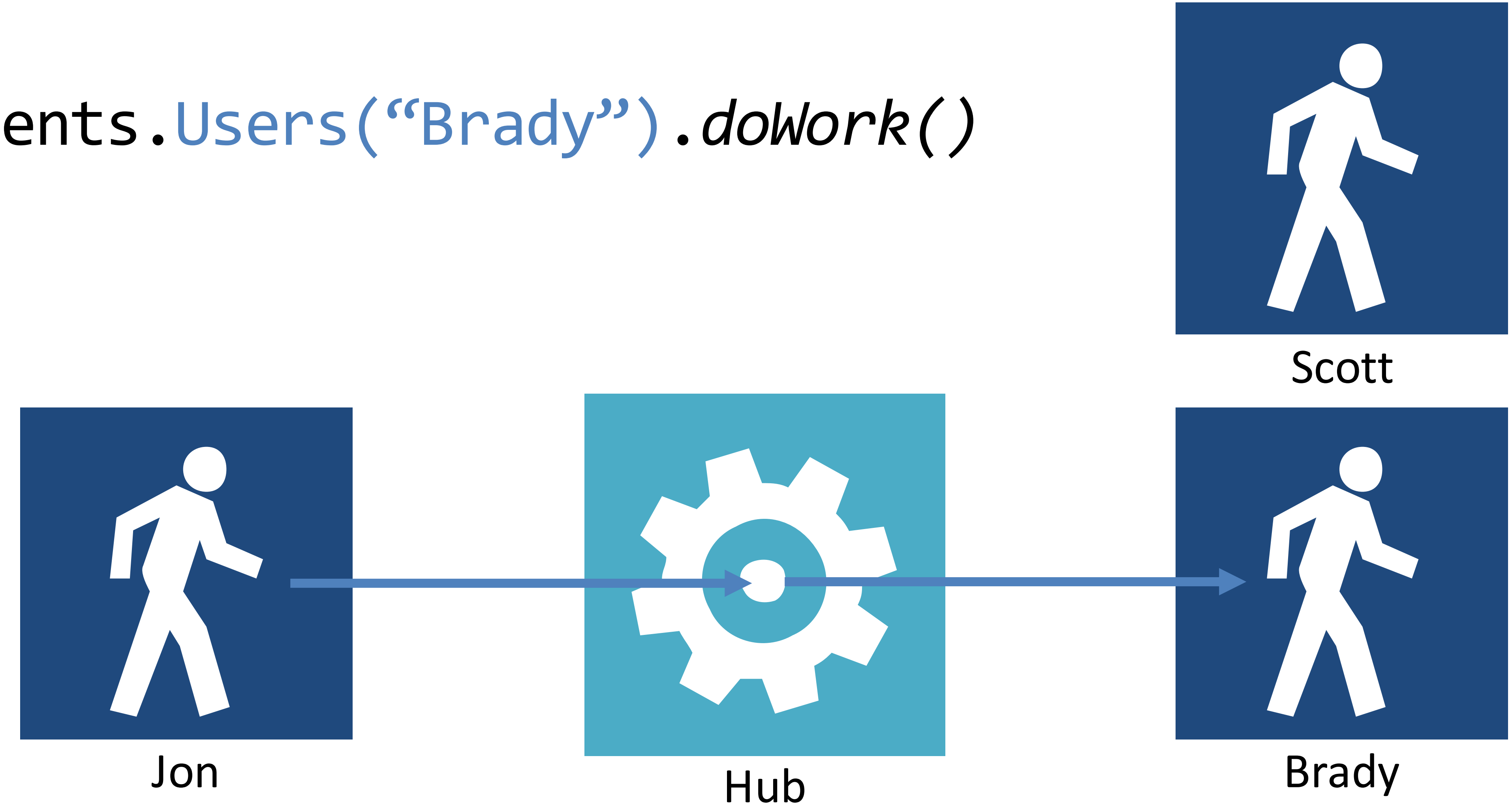
Sending messages to other connected clients

```
Clients.Others.doWork()
```



Sending messages to specific users

```
Clients.Users("Brady").doWork()
```



DEMO

Damian’s MoveShape Demo

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Next Module – SignalR on the Web

Microsoft

Microsoft