

# Real-time Communication with SignalR



[thriveconf.com](http://thriveconf.com)



# Professional C# and .NET 2021 Edition

Christian Nagel

## Christian Nagel

- Training
- Coaching
- Consulting
- Development
  
- Microsoft MVP
- <https://www.cninnovation.com>
- <https://charp.christiannagel.com>
- <https://www.linkedin.com/in/cnagel/>
- <https://www.twitter.com/christiannagel>



# Topics

- What's SignalR
- Creating a Server and Client
- Using Microsoft Azure
- Asynchronous Streaming



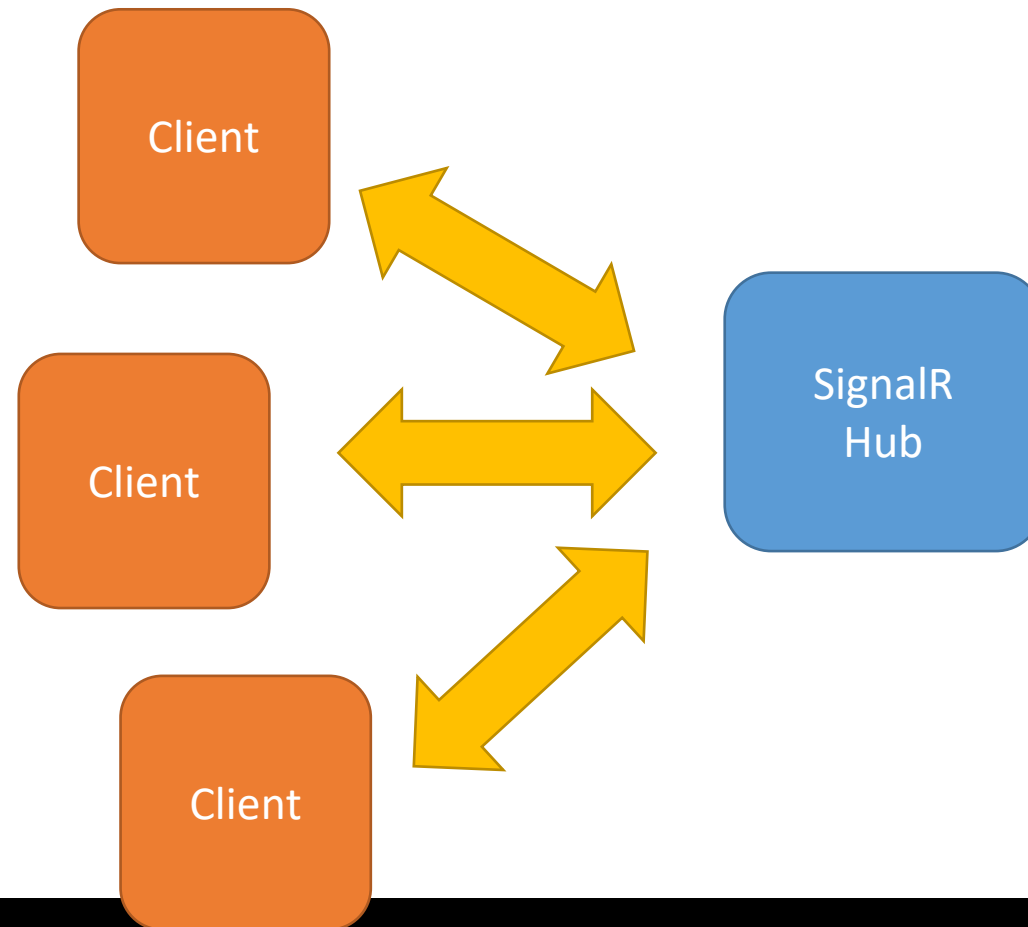
# Intro to SignalR

# What's SignalR?

Real-time functionality  
for applications

Push content to clients

# Overview



# Transports

## HTML 5 transports

- WebSocket
- Server Sent Events (EventSource)

## Comet transports

- Forever frame (IE only)
- Ajax long polling





# Serialization

- JSON
  - Enabled by default
- MessagePack
  - Binary and compact
  - Smaller messages than JSON



# Libraries

- Server
  - ASP.NET Core
- Client
  - JavaScript
  - .NET
  - Java
  - C++ (unsupported)
  - Swift (unsupported)



# Demo – Chat Application

---



# Implementing a Server

---

- Configure DI
- Configure Middleware
- Create a Hub

```
var builder = WebApplication.CreateBuilder(args);
builder.Services.AddSignalR();
var app = builder.Build();

app.MapHub<ChatHub>("/chat");

app.MapGet("/", () => "Use a SignalR client");

app.Run();
```

# Hub

---

- Hub base class
- Overrides on connect, disconnect of clients
- Hub operations
- Access the SignalR context
- Send message to all clients, a group of clients, or one client (*IHubCallerClients*)



# Client App

- HubConnectionBuilder
  - Configure client proxy
- On method
  - Implementation to receive messages
- SendAsync
  - Send messages to Hub

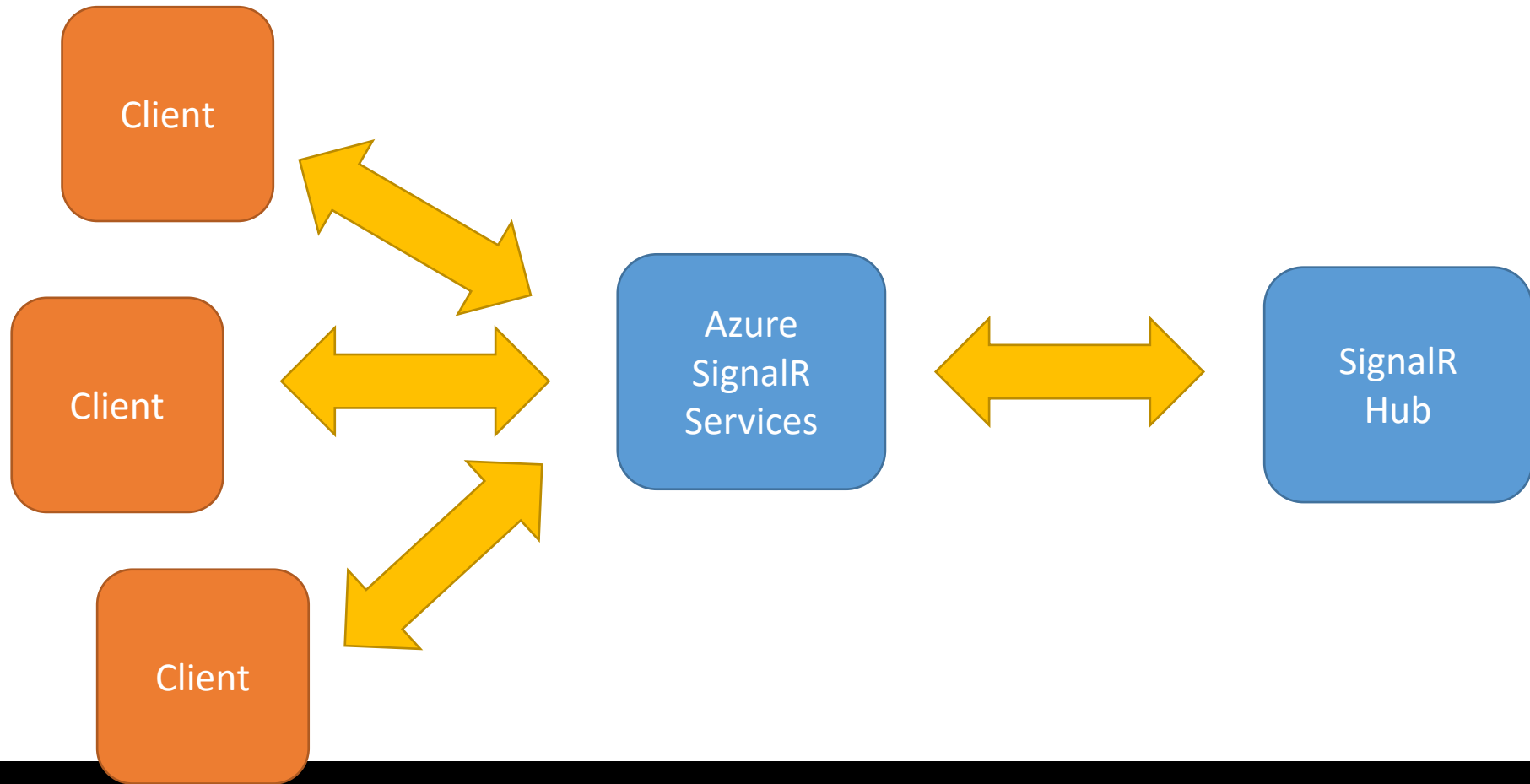
# Hosting SignalR

- Azure App Services
- Azure Container Apps

The background features a dark gray gradient with several green speech bubbles of varying sizes and orientations. A white wavy line is positioned horizontally across the middle of the image, just below the main text.

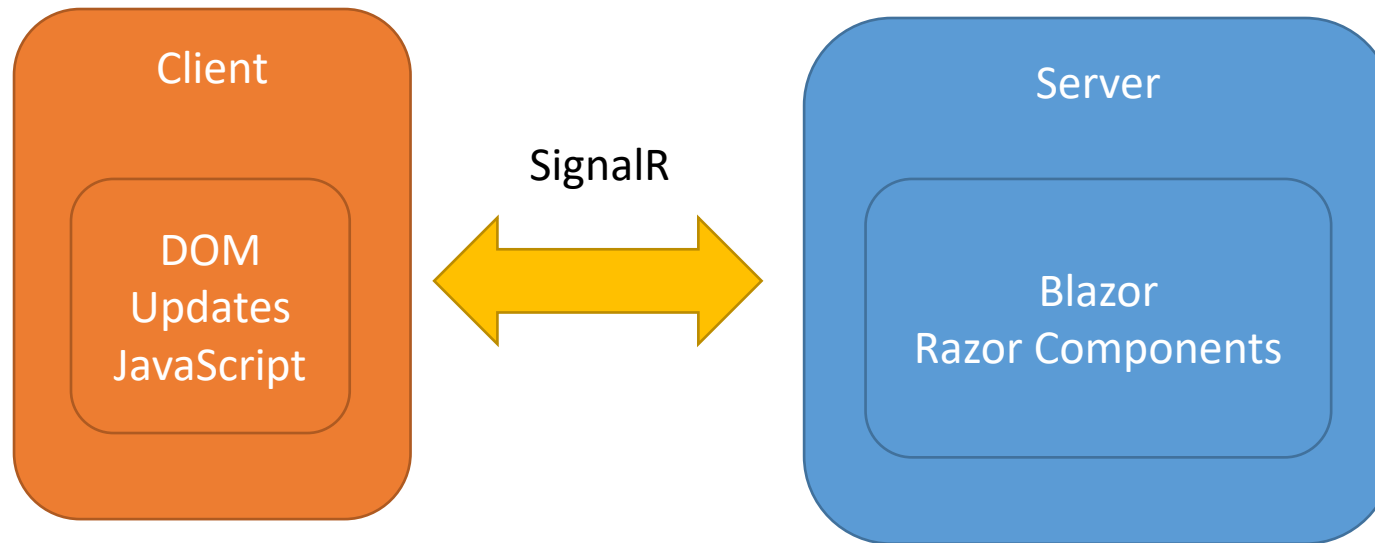
# Demo – Chat with Groups

# Reduce the load of your server



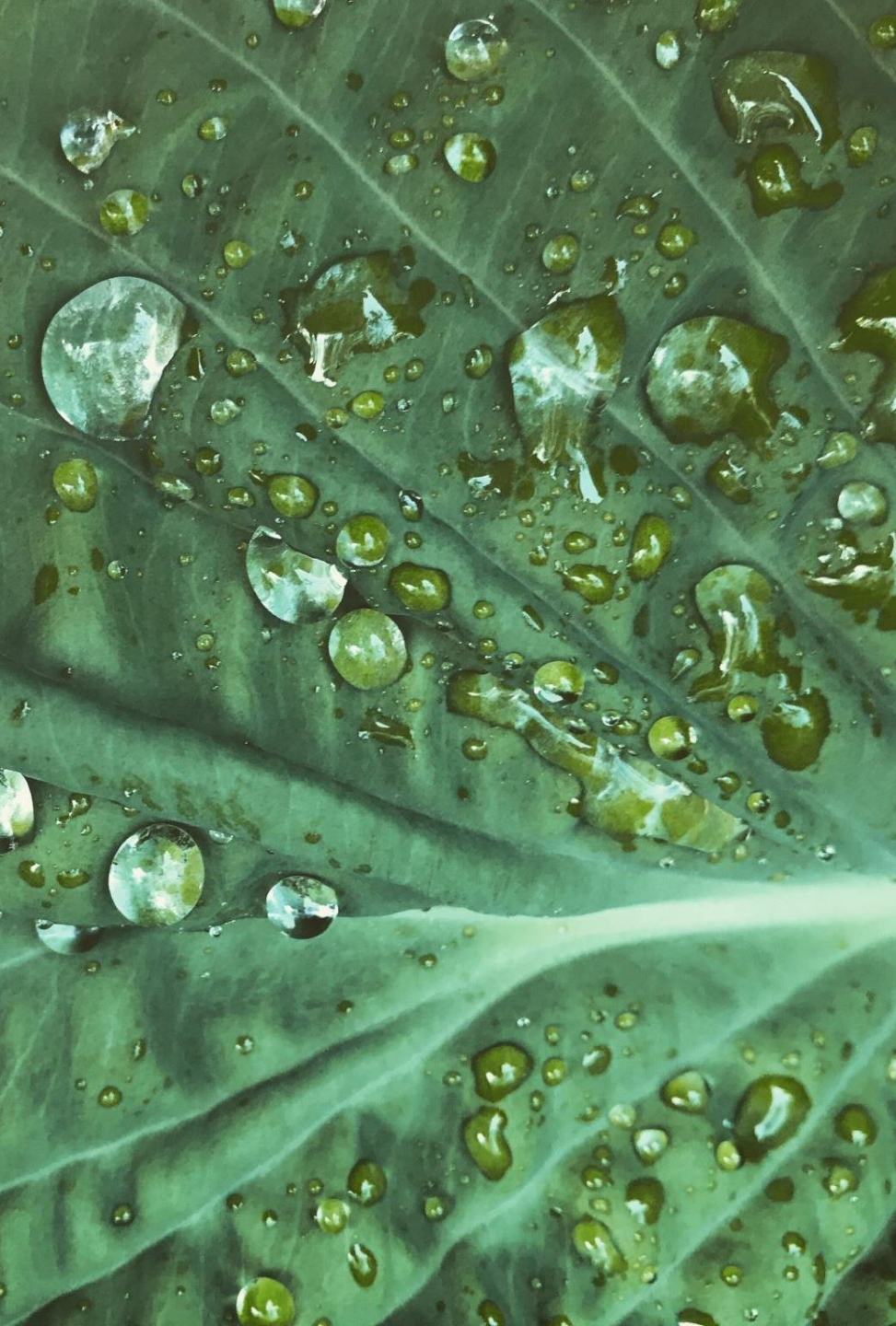


# Blazor Server – Based on SignalR





# Asynchronous Streaming



# .NET Asynchronous Streaming

---

- Stream a list of asynchronous results
- `IAsyncEnumerable<T>`
- `IAsyncEnumerator<T>`
- `IAsyncDisposable`
- Enhancements with `yield` and `foreach`



# Async Streaming with SignalR

- Server (without async streams)
    - Create Channel
    - Return ChannelReader
    - Send data using ChannelWriter
  - Client
    - StreamAsChannelAsync
    - TryRead to read from the channel
- Server (with async streams)
    - Return IEnumerable
    - Use yield statement
  - Client
    - StreamAsync
    - await foreach





The background of the slide is a black field filled with numerous translucent, glass-like spheres of varying sizes. These spheres are highly reflective, showing bright highlights and dark shadows that give them a three-dimensional appearance. They are scattered across the frame, with some appearing in the foreground and others receding into the background, creating a sense of depth. The overall effect is reminiscent of a microscopic view of bubbles or a collection of polished beads.

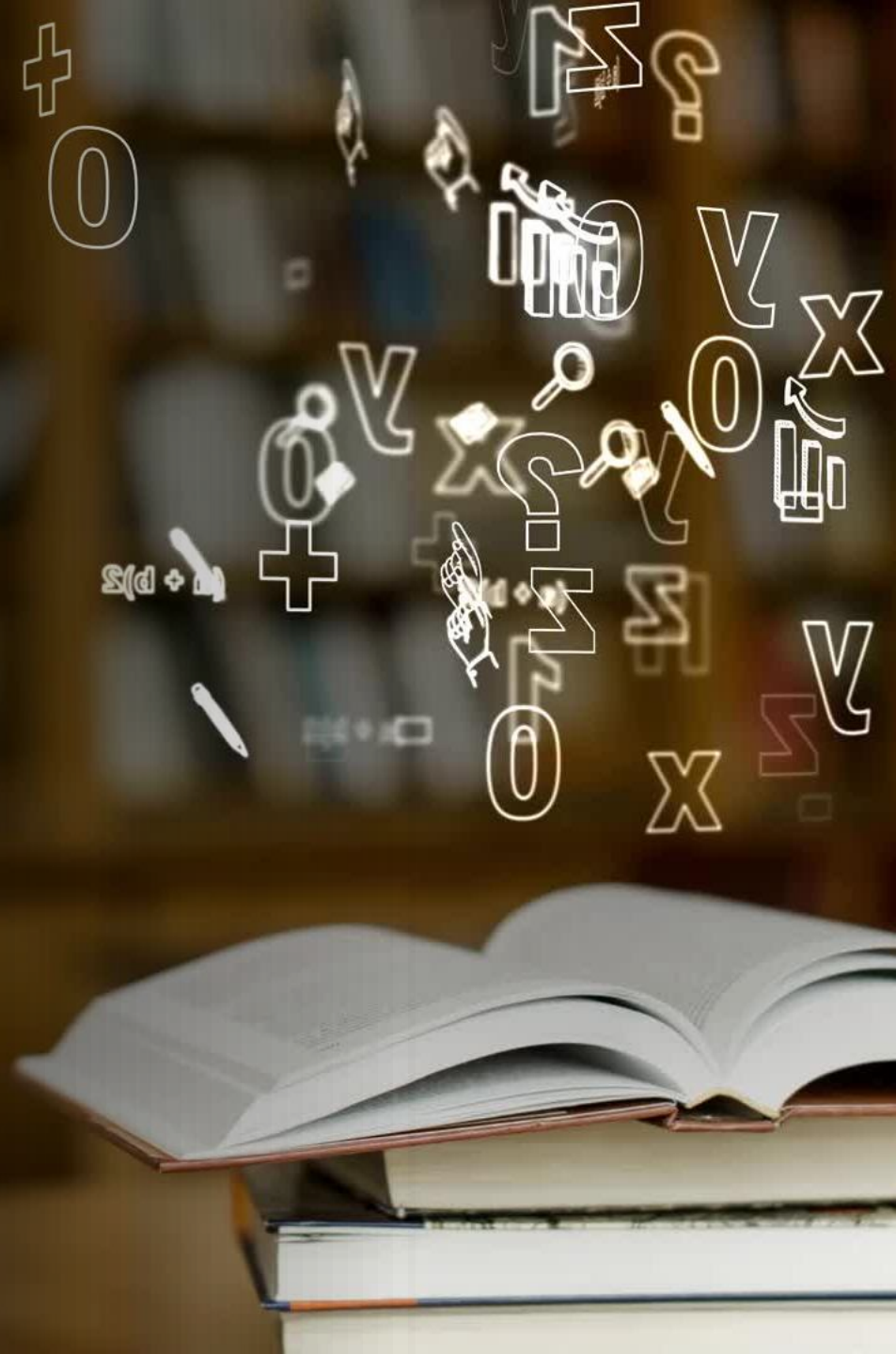
# Demo – Async Streaming



## Summary

---

- Easy to use library for real-time communication
- Asynchronous streaming



# More Information

- <https://csharp.christiannagel.com>
- <https://github.com/ProfessionalCSharp>
- <https://github.com/cnilearn/thrive2022>



# THANK YOU



Sponsors



INTELLITY

