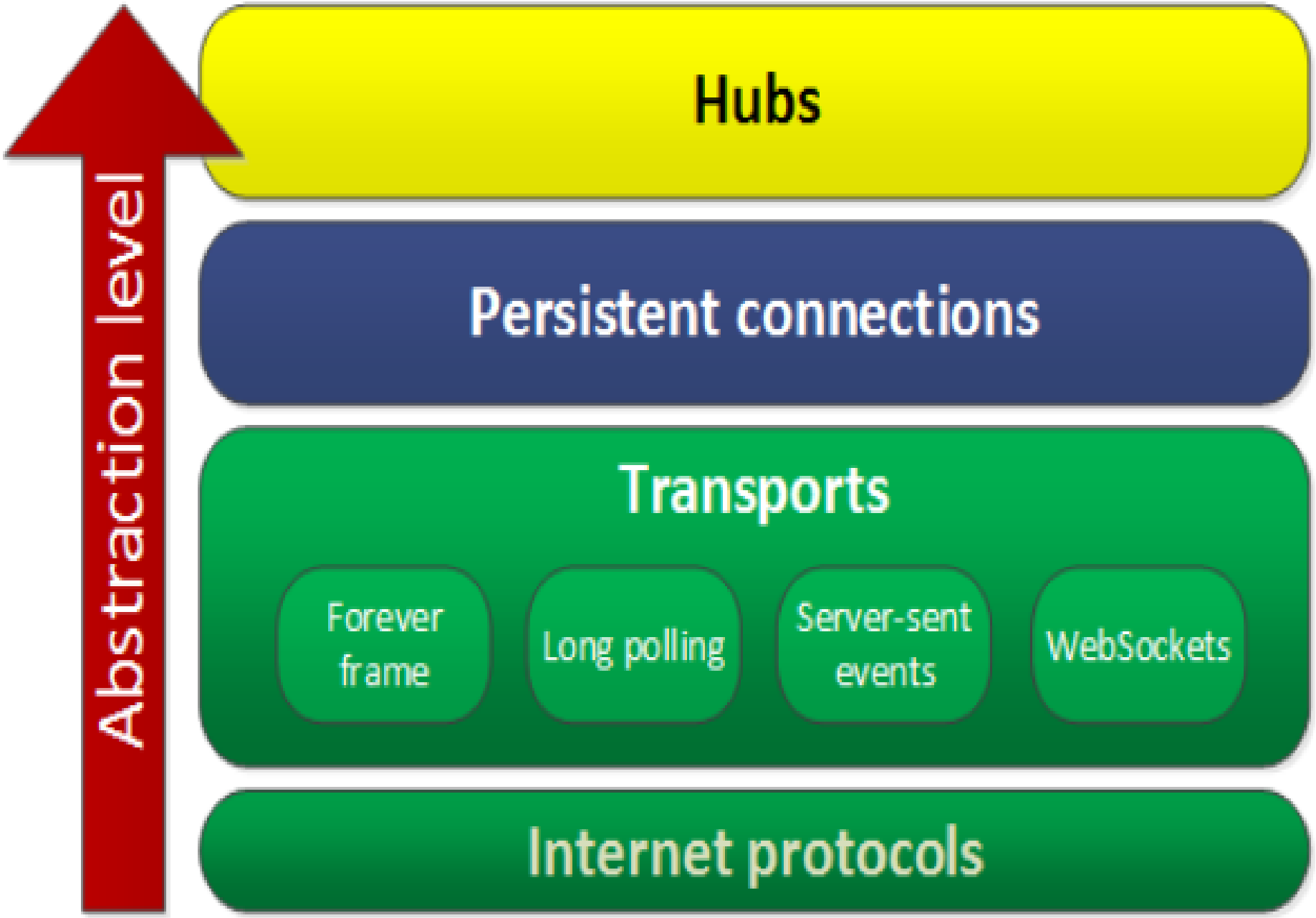
Hub

SignalR


Abstraction level
Hubs
Persistent connections
Transports
Forever frame
Long polling
Server-sent events
WebSockets
Internet protocols

SignalR Hubs

- The SignalR Hubs API enables you to call methods on connected clients from the server.
- In the server code, you define methods that are called by client.
- In the client code, you define methods that are called from the server.
- SignalR takes care of everything behind the scenes that makes real-time client-to-server and server-to-client communications possible.

Hubs

- Provide a higher level RPC framework over PersistentConnection
- ***remote procedure call*** : is a mechanism that enables methods on a system/computer/component to be called by an external or independent system/ computer/ component
- Hubs are per call, that is , each call from the client to hub will create a **new hub instance**
- recommended when we need to send different types of messages with various structures between the client and the server.

Configure SignalR hubs

- Add SignalR Middleware in Configure Method

```
app.UseRouting();
app.UseEndpoints(endpoints =>
{
    endpoints.MapHub<ChatHub>("/chathub");
});
```

- The SignalR middleware requires some services, which are configured by calling services.AddSignalR.

```
services.AddSignalR();
```

Create and use hubs

```
public class ChatHub : Hub
{
    public Task SendMessage(string user, string message)
    {
        return Clients.All.SendAsync("ReceiveMessage", user, message);
    }
}
```

The Clients object

- The Hub class has a Clients property that contains the following properties for communication between server and client:

Property	Description
All	Calls a method on all connected clients
Caller	Calls a method on the client that invoked the hub method
Others	Calls a method on all connected clients except the client that invoked the method

Hub.Clients Methods

Method	Description
AllExcept	Calls a method on all connected clients except for the specified connections
Client	Calls a method on a specific connected client
Clients	Calls a method on specific connected clients
Group	Calls a method on all connections in the specified group
GroupExcept	Calls a method on all connections in the specified group, except the specified connections
Groups	Calls a method on multiple groups of connections
OthersInGroup	Calls a method on a group of connections, excluding the client that invoked the hub method
User	Calls a method on all connections associated with a specific user
Users	Calls a method on all connections associated with the specified users

Demo

```
public Task SendMessage(string user, string message)
{
    return Clients.All.SendAsync("ReceiveMessage", user, message);
}

public Task SendMessageToCaller(string user, string message)
{
    return Clients.Caller.SendAsync("ReceiveMessage", user, message);
}

public Task SendMessageToGroup(string user, string message)
{
    return Clients.Group("SignalR Users").SendAsync("ReceiveMessage", user, mess
}
```

ASP.NET Core SignalR JavaScript client

Install the SignalR client package

- npm installs the package contents in the *node_modules\@microsoft\signalr\dist\browser* folder.
- Create The *wwwroot/lib/signalr* folder.
- Copy the *signalr.js* file to the *wwwroot/lib/signalr* folder.

```
npm install @microsoft/signalr
```

Using Script file

- Link to local script files

```
<script src="~/lib/signalr/signalr.js"></script>
```

- Or Using CDN

<script src="https://cdnjs.cloudflare.com/ajax/libs/microsoft-signalr/3.1.7/signalr.min.js"></script>

```
const connection = new signalR.HubConnectionBuilder()
    .withUrl("/chathub")
    .configureLogging(signalR.LogLevel.Information)
    .build();

async function start() {
    try {
        await connection.start();
        console.log("SignalR Connected.");
    } catch (err) {
        console.log(err);
        setTimeout(start, 5000);
    }
};

connection.onclose(async () => {
    await start();
});

// Start the connection.
start();
```

```
var connection = new signalR.HubConnectionBuilder().withUrl("/chatHub").build();

//Disable send button until connection is established
document.getElementById("sendButton").disabled = true;

connection.on("ReceiveMessage", function (user, message) {
    var li = document.createElement("li");
    document.getElementById("messagesList").appendChild(li);
    // We can assign user-supplied strings to an element's textContent because it
    // is not interpreted as markup. If you're assigning in any other way, you
    // should be aware of possible script injection concerns.
    li.textContent = `${user} says ${message}`;
});

connection.start().then(function () {
    document.getElementById("sendButton").disabled = false;
}).catch(function (err) {
    return console.error(err.toString());
});

document.getElementById("sendButton").addEventListener("click", function (event) {
    var user = document.getElementById("userInput").value;
    var message = document.getElementById("messageInput").value;
    connection.invoke("SendMessage", user, message).catch(function (err) {
        return console.error(err.toString());
    });
    event.preventDefault();
});
```

THANK YOU