手机游戏平台热更新服务器--一个实例学习笔记 GeekServer

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1 手机游戏平台热更新服务器--一个实例学习笔记

- 到现在为止, 基本上只找到了这一个自己可以运行的本地热更新服务器的框架. 所源码基本上都读了一遍, 但因为对自己来说服务器是完全陌生的领域, 它读起来甚至比 ET 框架难多了, 有不少不熟悉的概念与原理, 比如 Actor, TCP WebSocket 等。这个框架可能学习 curve 会稍微陡峭一点儿, 涉及到的尖端知识点比较多, 比如用的是 RocksDB 等, 很多原理自己会一一学习掌握
- 但因为它能够运行, 今天下午终于能够看进改掉 visual studio 2019 终端显示中文的问题. 就再从运行日志入手, 借助日志, 把这个本地服务器弄得再明白一点儿后, 准备开始着手写自己最简单的热更新服务器.
- 这里的本地热更新服务器, 与项目中游戏里的游戏客户端, 接下来会需要从两端都运行, 来分析学习源码. 先从服务器入手
- 现在才明白，这个框架更多的是支持服务器的热更新，与自己想要实现的最简单的相差狠远。我基本可以不需要热更新我的安卓平台客户端游戏的热更新服务器。
- 因为同自己的项目需要，还是相差得比较远，所以这个项目暂时也还是放一下。但任何时候都可以成为学习的资源再深化理解一下。
  - 热更思路: 这是关于服务器热更新的逻辑，我基本上用不到，我现在可以不用考虑服务器的热更新，只要客户端的游戏可以热更新就可以了

    * 游戏中的所有状态放在 App 工程中，始终存在于内存，不能热更。Actor 和 Component 的逻辑使用代理模式（Agent）放到 Hotfix 工程。热更时载入新的 dll（GeekServer.Hotfix.dll），清除所有老的 Agent，所有新逻辑重新从 Actor/Component 获取新的 Agent 汇入新 dll 中执行热更后的逻辑，达到热更目的。正在执行老 dll 逻辑的代码获取的 Agent 依然来自热更前的老 Dll 中，等待老 dll 中的逻辑执行完后清理掉内存中老的 dll。底层使用接口驱动热更 dll 中的逻辑。需要注意的是，热更时新的 dll 需要放在新的目录下面，然后再载入内存，因为老的 dll 可能正在运行，是无法直接覆盖的。参考代码 HotfixModule.Load
  - 可以热更部分
    * 位置：可以热更的逻辑都应该放在 GeekServer.Hotfix 工程中
    * 所有 Actor/Component 的 Agent，Agent 中只有逻辑没有状态，状态全部放到 Component 的 State
    * HttpHandler
    * TcpHandler
    * 协议
    * 配置表/配置表代码
  - 热更新流程
    * 游戏后台将新的 GeekServer.Hotfix.dll 及相关文件（对应 pdb，json 等）拷贝到游戏服特定目录下
    * 游戏后台向游戏服发送 http 命令，通知进行热更，并告知 dll 目录，md5 等信息
    * 游戏服中热更 HttpHandler 根据后台信息，验证热更 dll 完整性，合法性，修改 dllVersion.txt，发起热更调用

#+END_SRC

- 所以是，一不小心，读了一个好难的服务器热更新的框架源码！虽然明确感受到 learning curve 一下子猛增，但还是收获狠多的。以后爬爬源码什么的会感觉轻松无压力。。。。。爱表哥，爱生活!!!

```
init NLog config...
***PolymorphicRegister Init***
 INFO  launch embedded db...h`
 INFO  regist comps...
 INFO  初始化组件注册完成
 INFO  load hotfix module
LoadHotfixModule: reload = False
 INFO  hotfix dll init success: F:\unityGamesExamples\GeekServer\bin\app_debug\hotfix/Geek.Server.Hotfix.dll
HotfixMgr (module.HotfixBridge != null) = True

// <<<<<<<<<< 我找不到下面这些是从哪里来，不知道是不是什么第三方库的.dll 程序集里出来的，又或者是数据库 ? .NET Core WEB ?

// 感觉这是 TcpServer WebApplication 创建时，内部生成的，其内部创建实现原理不是很懂
 DEBUG  Hosting starting
 INFO  Now listening on: http://[::]:8899
 DEBUG  Loaded hosting startup assembly Geek.Server.App
 INFO  Application started. Press Ctrl+C to shut down.
 INFO  Hosting environment: Production
 INFO  Content root path: F:\unityGamesExamples\GeekServer\bin\app_debug\
 DEBUG  Hosting started
 INFO  tcp 服务启动完成... 这里，这一行可以找到
HotfixBridge tcp 服务启动完成...

// 感觉这是 HttpServer WebApplication 创建时，内部生成的，其内部创建实现原理不是很懂
 DEBUG  Hosting starting
 INFO  Now listening on: http://[::]:20000
 DEBUG  Loaded hosting startup assembly Geek.Server.App
 INFO  Application started. Press Ctrl+C to shut down.
 INFO  Hosting environment: Production
 INFO  Content root path: F:\unityGamesExamples\GeekServer\bin\app_debug\
```

```
 DEBUG  Hosting started

 INFO  load config data
 INFO  初始化全局定时完成
 INFO  下次定时回存时间 1/2/2023 11:10:09 AM
 INFO  激活全局 Actor: Server
 INFO  激活全局组件并检测组件是否都包含 Agent 实现完成

 INFO  进入游戏主循环...
        *** 进入游戏主循环 ***

// 下面这两行日志好像又找不到了
 DEBUG  ServerCompAgent.TestScheduleTimer. 延时 1 秒执行. 每隔 30 秒执行
 DEBUG  ServerCompAgent.TestDelayTimer. 延时 3 秒执行. 执行一次
 DEBUG  Connection id "0HMNCUJ22HQ5P" accepted.
 DEBUG  Connection id "0HMNCUJ22HQ5P" started.
 DEBUG  [::ffff:127.0.0.1]:62275 链接成功
 DEBUG  PetCompAgent.OnGotNewPet 监听到了获得宠物的事件, 宠物 ID:1000 当前世界等级:1

 DEBUG  ServerCompAgent.TestScheduleTimer. 延时 1 秒执行. 每隔 30 秒执行
 DEBUG  ServerCompAgent.TestScheduleTimer. 延时 1 秒执行. 每隔 30 秒执行
 DEBUG  ServerCompAgent.TestScheduleTimer. 延时 1 秒执行. 每隔 30 秒执行
 INFO  定时回存完成 耗时: 6.4955ms
 INFO  下次定时回存时间 1/2/2023 11:15:09 AM
 DEBUG  ServerCompAgent.TestScheduleTimer. 延时 1 秒执行. 每隔 30 秒执行
 DEBUG  ServerCompAgent.TestScheduleTimer. 延时 1 秒执行. 每隔 30 秒执行
 DEBUG  ServerCompAgent.TestScheduleTimer. 延时 1 秒执行. 每隔 30 秒执行
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 DEBUG  ServerCompAgent.TestScheduleTimer. 延时 1 秒执行. 每隔 30 秒执行
 INFO  定时回存完成 耗时: 0.0761ms
 INFO  下次定时回存时间 1/2/2023 11:20:09 AM

// 当客户端断开连接之后
 DEBUG  Connection id "0HMNCUJ22HQ5P" received FIN.
 DEBUG  [::ffff:127.0.0.1]:62275 断开链接
 DEBUG  Connection id "0HMNCUJ22HQ5P" stopped.
 DEBUG  Connection id "0HMNCUJ22HQ5P" sending FIN because: "The Socket transport's send loop completed gracefully."
 DEBUG  ServerCompAgent.TestScheduleTimer. 延时 1 秒执行. 每隔 30 秒执行

// 当服务端关掉之后
F:\unityGamesExamples\GeekServer\bin\app_debug\Geek.Server.App.exe (process 13744) exited with code -1.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the console 
Press any key to close this window . . .
```
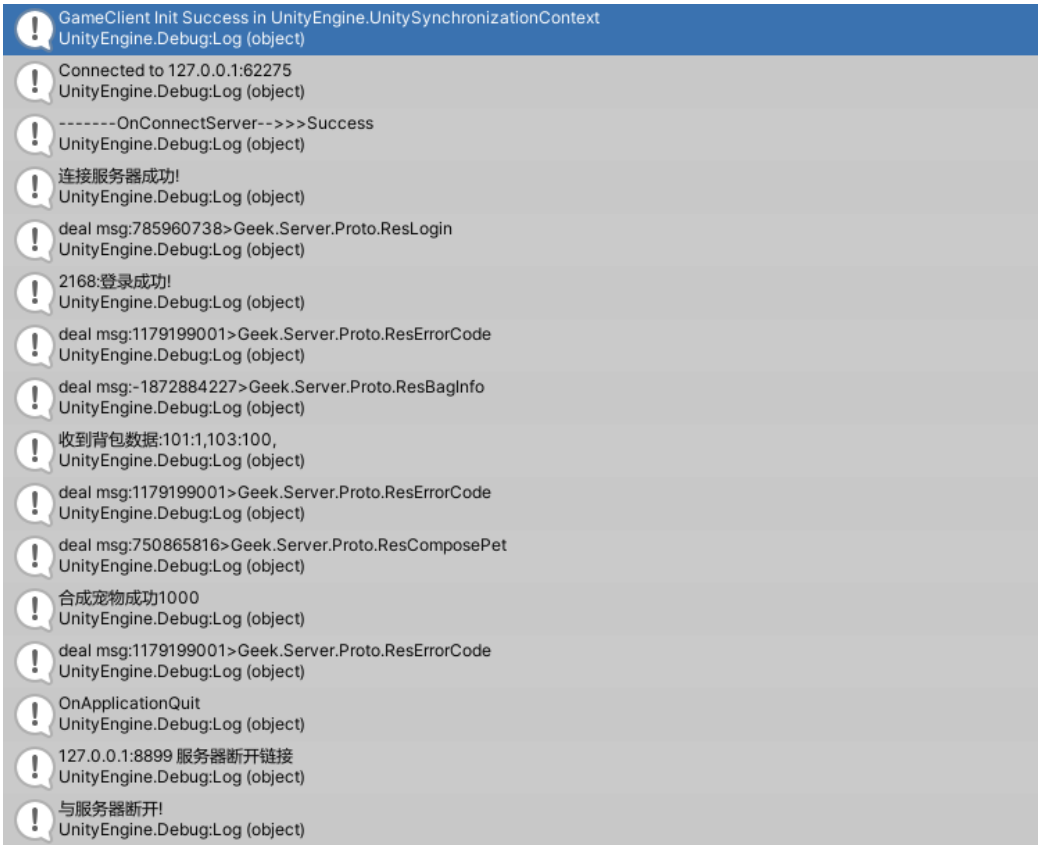

- unity 游戏客户端的部分




```
GameClient Init Success in UnityEngine.UnitySynchronizationContext
UnityEngine.Debug:Log (object)
Geek.Client.GameClient:Init () (at Assets/Scripts/Framework/Net/GameClient.cs:33)
Logic.GameMain/<Start>d__7:MoveNext () (at Assets/Scripts/Logic/GameMain.cs:28)

Connected to 127.0.0.1:62275 // 这里感觉是服务器里的日志, 找不到
UnityEngine.Debug:Log (object)
Geek.Client.GameClient/<Connect>d__23:MoveNext () (at Assets/Scripts/Framework/Net/GameClient.cs:60)
UnityEngine.UnitySynchronizationContext:ExecuteTasks ()

-------OnConnectServer-->>>Success
UnityEngine.Debug:Log (object)
Logic.DemoService:OnConnectServer (Geek.Client.Event) (at Assets/Scripts/Logic/DemoService.cs:83)

连接服务器成功!
UnityEngine.Debug:Log (object)
Logic.DemoService:OnConnectServer (Geek.Client.Event) (at Assets/Scripts/Logic/DemoService.cs:86)

deal msg:785960738>Geek.Server.Proto.ResLogin   // <<<<<<<<<<<<<<<<<<< 这里是从哪里来的
UnityEngine.Debug:Log (object)
Logic.DemoService:GetCurMsg<Geek.Server.Proto.ResLogin> (int) (at Assets/Scripts/Logic/DemoService.cs:51)

2678: 登录成功!// 这个号不知道哪里来的
UnityEngine.Debug:Log (object)
Logic.DemoService:OnResLogin (Geek.Client.Event) (at Assets/Scripts/Logic/DemoService.cs:99)

deal msg:1179199001>Geek.Server.Proto.ResErrorCode
UnityEngine.Debug:Log (object)
Logic.DemoService:GetCurMsg<Geek.Server.Proto.ResErrorCode> (int) (at Assets/Scripts/Logic/DemoService.cs:51)

deal msg:-1872884227>Geek.Server.Proto.ResBagInfo
UnityEngine.Debug:Log (object)
Logic.DemoService:GetCurMsg<Geek.Server.Proto.ResBagInfo> (int) (at Assets/Scripts/Logic/DemoService.cs:51)

收到背包数据:101:1,103:100,
UnityEngine.Debug:Log (object)
Logic.DemoService:OnResBagInfo (Geek.Client.Event) (at Assets/Scripts/Logic/DemoService.cs:110)
```

```
deal msg:1179199001>Geek.Server.Proto.ResErrorCode
UnityEngine.Debug:Log (object)
Logic.DemoService:GetCurMsg<Geek.Server.Proto.ResErrorCode> (int) (at Assets/Scripts/Logic/DemoService.cs:51)

deal msg:750865816>Geek.Server.Proto.ResComposePet
UnityEngine.Debug:Log (object)
Logic.DemoService:GetCurMsg<Geek.Server.Proto.ResComposePet> (int) (at Assets/Scripts/Logic/DemoService.cs:51)

合成宠物成功 1000
UnityEngine.Debug:Log (object)
Logic.DemoService:OnResComposePet (Geek.Client.Event) (at Assets/Scripts/Logic/DemoService.cs:116)

deal msg:1179199001>Geek.Server.Proto.ResErrorCode
UnityEngine.Debug:Log (object)
Logic.DemoService:GetCurMsg<Geek.Server.Proto.ResErrorCode> (int) (at Assets/Scripts/Logic/DemoService.cs:51)

OnApplicationQuit
UnityEngine.Debug:Log (object)
Logic.GameMain:OnApplicationQuit () (at Assets/Scripts/Logic/GameMain.cs:70)

127.0.0.1:8899 服务器断开链接
UnityEngine.Debug:Log (object)
Geek.Client.NetChannel:ConnectionClosed () (at Assets/Scripts/Framework/Net/NetChannel.cs:26)
Geek.Client.ClientNetChannel:ConnectionClosed () (at Assets/Scripts/Framework/Net/ClientNetChannel.cs:19)

与服务器断开!
UnityEngine.Debug:Log (object)
Logic.DemoService:OnDisconnectServer (Geek.Client.Event) (at Assets/Scripts/Logic/DemoService.cs:94)
```

- HotfixBridge.cs: 服务器端：这里分两块初始化的代码主要来自于服务器热更新中的代码:

```
namespace Server.Logic.Common {

    internal class HotfixBridge : IHotfixBridge {
        private const string TAG = "HotfixBridge";

        private static readonly Logger Log = LogManager.GetCurrentClassLogger();
        public ServerType BridgeType => ServerType.Game;

        public async Task<bool> OnLoadSuccess(bool reload) { // 当程序集启动完成之后 的回调
            Console.WriteLine(TAG + "OnLoadSuccess() reload = " + reload);
            if (reload) {
                ActorMgr.ClearAgent();
                return true;
            }
            PolymorphicTypeMapper.Register(this.GetType().Assembly);
            HotfixMgr.SetMsgGetter(MsgFactory.GetType);

// <<<<<<<<<<<<<<<<<<<<
            // await TcpServer.Start(Settings.TcpPort);
            await TcpServer.Start(Settings.TcpPort, builder => builder.UseConnectionHandler<AppTcpConnectionHandler>());
            Log.Info("tcp 服务启动完成...");

// <<<<<<<<<<<<<<<<<<<<
            await HttpServer.Start(Settings.HttpPort);

// <<<<<<<<<<<<<<<<<<<<
            Log.Info("load config data");
            (bool success, string msg) = GameDataManager.ReloadAll();
            if (!success)
                throw new Exception($" 载入配置表失败... {msg}");
            GlobalTimer.Start();
            await CompRegister.ActiveGlobalComps();
            return true;
        }

        public async Task Stop() {
            // 断开所有连接
            await SessionManager.RemoveAll();
            // 取消所有未执行定时器
            await QuartzTimer.Stop();
            // 保证 actor 之前的任务都执行完毕
            await ActorMgr.AllFinish();
            // 关闭网络服务
```

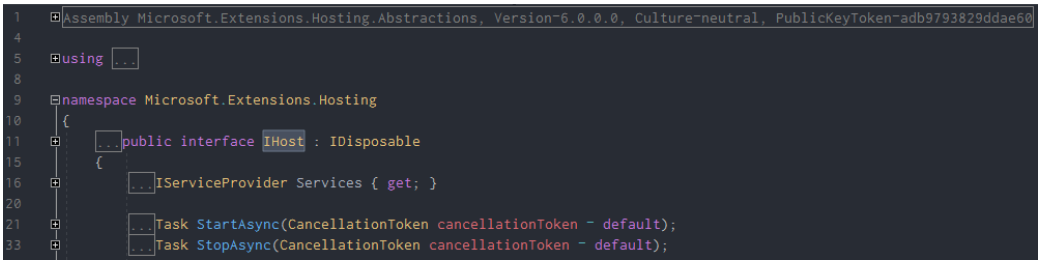
```
            await HttpServer.Stop();
            await TcpServer.Stop();
            // 存储所有数据
            await GlobalTimer.Stop();
            await ActorMgr.RemoveAll();
        }
    }
}
```

- 客户端:

2 TcpServer

- 有些是系统里的类和方法: 比如下面的:

3 IHost.cs



```
Assembly Microsoft.Extensions.Hosting.Abstractions, Version=6.0.0.0, Culture=neutral, PublicKeyToken=adb9793829ddae60

using ...

namespace Microsoft.Extensions.Hosting
{
    public interface IHost : IDisposable
    {
        IServiceProvider Services { get; }

        Task StartAsync(CancellationToken cancellationToken = default);
        Task StopAsync(CancellationToken cancellationToken = default);
```

- 这里,WebApplication 的内部创建实现原理不是很懂

4 AppStartUp: 负责服务器的启动

```
internal class AppStartUp {

    static readonly Logger Log = LogManager.GetCurrentClassLogger();

    public static async Task Enter() {
        try {
            var flag = Start(); // <<<<<<<<<<<<<<<<<<<<
            if (!flag) return; // 启动服务器失败
            Log.Info($"launch embedded db...");
            ActorLimit.Init(ActorLimit.RuleType.None);
            GameDB.Init();
            GameDB.Open();
            Log.Info($"regist comps...");
            await CompRegister.Init();

            Log.Info($"load hotfix module");
            await HotfixMgr.LoadHotfixModule();

            Log.Info(" 进入游戏主循环...");
            Console.WriteLine("*** 进入游戏主循环 ***");

            Settings.LauchTime = DateTime.Now;
            Settings.AppRunning = true;
            TimeSpan delay = TimeSpan.FromSeconds(1);
            while (Settings.AppRunning) {
                await Task.Delay(delay);
            }
        }
        catch (Exception e) {
            Console.WriteLine($" 服务器执行异常, e:{e}");
            Log.Fatal(e);
        }
```

```
        Console.WriteLine($" 退出服务器开始");
        await HotfixMgr.Stop();
        Console.WriteLine($" 退出服务器成功");
    }

    private static bool Start() { // <<<<<<<<<<<<<<<<<<<<
        try {
            Settings.Load<AppSetting>("Configs/app_config.json", ServerType.Game); // 服务器的配置文件

            Console.WriteLine("init NLog config..."); // 配置日志系统:CPU/IO 密集型的服务器, 日志就显示狠复杂 [暂放一下]
            LayoutRenderer.Register<NLogConfigurationLayoutRender>("logConfiguration");
            LogManager.Configuration = new XmlLoggingConfiguration("Configs/app_log.config");
            LogManager.AutoShutdown = false;

            PolymorphicTypeMapper.Register(typeof(AppStartUp).Assembly); // app
            PolymorphicRegister.Load();
            PolymorphicResolver.Init();
            return true;
        }
        catch (Exception e) {
            Log.Error($" 启动服务器失败, 异常:{e}");
            return false;
        }
    }
}
```

5 服务器的配置文件 Configs/app_config.json

```
{
    "IsDebug": true,
    "ServerId": 1001, //[1000,9999]
    "ServerName": "geek_server",
    "LocalIp": "127.0.0.1",
    "TcpPort": 8899,
    "HttpCode": "inner_httpcode",
    "HttpPort": 20000,
    "GrpcPort": 30000,
    "LocalDBPrefix": "gamedb_",
    "LocalDBPath": "../../database/game/",
    "SDKType": 0,
    "DBModel": 0, //0:内嵌 1:mongodb
    "MongoUrl": "mongodb://127.0.0.1:27017/?authSource=admin",
    "MongoDBName": "geek_server"
}
```


```
{
  "IsDebug": true,
  "ServerId": 1001, //[1000,9999]
  "ServerName": "geek_server",
  "LocalIp": "127.0.0.1",
  "TcpPort": 8899,
  "HttpCode": "inner_httpcode",
  "HttpPort": 20000,
  "GrpcPort": 30000,
  "LocalDBPrefix": "gamedb_",
  "LocalDBPath": "../../database/game/",
  "SDKType": 0,
  "DBModel": 0, //0: 内嵌 1:mongodb
  "MongoUrl": "mongodb://127.0.0.1:27017/?authSource=admin",
  "MongoDBName": "geek_server"
}
```

6 TaskCompletionSource.cs

```
namespace System.Threading.Tasks
{
    public class TaskCompletionSource<TResult>
    {
        public TaskCompletionSource();
        public TaskCompletionSource(object state);
        public TaskCompletionSource(TaskCreationOptions creationOptions);
        public TaskCompletionSource(object state, TaskCreationOptions creationOptions);

        public Task<TResult> Task { get; }

        public void SetCanceled();
        public void SetException(IEnumerable<Exception> exceptions);
        public void SetException(Exception exception);
        public void SetResult(TResult result);
        public bool TrySetCanceled();
        public bool TrySetCanceled(CancellationToken cancellationToken);
        public bool TrySetException(IEnumerable<Exception> exceptions);
        public bool TrySetException(Exception exception);
        public bool TrySetResult(TResult result);
    }
}
```

7 GameClient.cs

- async Task<ClientNetChannel> Connect(string host, int port)：与远程服务器连接的部分

```
public int Port { private set; get; }
public string Host { private set; get; }
public const int ConnectEvt = 101; // 连接事件
public const int DisconnectEvt = 102; // 连接断开

public async Task<ClientNetChannel> Connect(string host, int port) {
    Host = host;
    Port = port;
    try {
        var connection = await ClientFactory.ConnectAsync(new IPEndPoint(IPAddress.Parse(Host), Port)); // 异步连接
        UnityEngine.Debug.Log($"Connected to {connection.LocalEndPoint}");
        Channel = new ClientNetChannel(connection, new ClientLengthPrefixedProtocol());
        OnConnected(NetCode.Success);
        return Channel;
    }
    catch (Exception e) {
        UnityEngine.Debug.LogError(e.ToString());
        OnConnected(NetCode.Failed);
        throw;
    }
}
```

- ClientFactory.cs 再往底层一点儿的细节

```
public static class ClientFactory {

    public static async ValueTask<ConnectionContext> ConnectAsync(EndPoint endpoint) {
        var conn = new SocketConnection(endpoint).StartAsync(); // <<<<<<<<<<
        return await conn.ConfigureAwait(false);
    }
}
```

- SocketConnection.cs：ConnectionContext

```
public async ValueTask<ConnectionContext> StartAsync() {
    await _socket.ConnectAsync(_endPoint).ConfigureAwait(false); // <<<<<<<<<<
    var pair = DuplexPipe.CreateConnectionPair(PipeOptions.Default, PipeOptions.Default);
    LocalEndPoint = _socket.LocalEndPoint;
    RemoteEndPoint = _socket.RemoteEndPoint;
    Transport = pair.Transport;
    _application = pair.Application;
    _ = ExecuteAsync(); // <<<<<<<<<<
```

```
    return this;
}
private async Task ExecuteAsync() {
    Exception sendError = null;
    try {
        // Spawn send and receive logic
        var receiveTask = DoReceive();
        var sendTask = DoSend();
        // If the sending task completes then close the receive
        // We don't need to do this in the other direction because the kestrel
        // will trigger the output closing once the input is complete.
        if (await Task.WhenAny(receiveTask, sendTask).ConfigureAwait(false) == sendTask) { // 这里什么情况下等，读得稀里糊涂
            // Tell the reader it's being aborted
            _socket.Dispose();
        }
        // Now wait for both to complete
        await receiveTask;
        sendError = await sendTask;
        // Dispose the socket(should noop if already called)
        _socket.Dispose();
    }
    catch (Exception ex) {
        Console.WriteLine($"Unexpected exception in {nameof(SocketConnection)}.{nameof(StartAsync)}: " + ex);
    }
    finally {
        // Complete the output after disposing the socket
        _application.Input.Complete(sendError);
    }
}
```

-