

ET 框架学习笔记 - - 自己需要这样一个总结文档来帮助 总结与急速重构自己的游戏

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May 15, 2023

Contents

1 客户端场景组件：客户端大致的起始过程	1
1.1 Entry.cs: 指定的起始类，会触发三类回调，公用组件类的加载，和其它	1
1.2 EntryEvent1_InitShare: 第一类，公用组件类的加载，公用的几大组件	1
1.2.1 CurrentScenesComponent: 可以用来管理多个客户端场景，比如大世界会加载多块场景 (是说，大地图可以分 10 块 8 块小地图吗?)	1
1.2.2 CurrentScenesComponentSystem: CurrentScene() 方法，返回当前场景	2
1.2.3 ObjectWait: 也有生成系	2
1.2.4 PlayerComponent:	2
1.2.5 PlayerComponentSystem: 生成系，到处都要用它	2
1.3 AfterCreateCurrentScene_AddComponent:【UIComponent】【ResourcesLoaderComponent】	2
1.3.1 UIComponent: 管理 Scene 上的 UI	2
1.3.2 UIComponentSystem: 管理 Scene 上的 UI: 这个是组件生成管理系统，负责添加与删除。【UIEventComponent】是 UI 上的 UI 事件组件系统	3
1.3.3 ResourcesLoaderComponent: 相关的资源加载，这个文件里有生成系	3
1.4 EntryEvent2_InitServer: 前面 1 里，两端公用组件准备好了，现在就起始服务器？服务端的几大组件：	3
1.4.1 ActorMessageSenderComponent: 发送普通 actor 消息	4
1.4.2 ActorLocationSenderComponent: 发送 location actor 消息	4
1.4.3 LocationProxyComponent: 访问 location server 的组件	4
1.4.4 ActorMessageDispatcherComponent: Actor 消息分发组件	4
1.4.5 ServerSceneManagerComponent: 可以去对比，两端的管理者组件，有什么不同？	4
1.5 EntryEvent3_InitClient: 客户端	4
1.5.1 ResourcesComponent: 热更新资源包等的处理	5
1.5.2 GlobalComponent: 不知道是干什么的，Unity 里好像是 Root 根节点下的一个节点，组件？	5
1.6 前面三件 (【公用组件】，【服务器】，【客户端】的应用程序启动完成) 触发 UI 变更: 这个 UI 订阅说，一被通知，就创建注册登录界面	5
2 ClientComponent ClientScene 等客户端相关：有点儿理不清	5
2.1 ClientSceneManagerComponent: 是否，相当于，它是 SceneType 的管理者，就是先前各种服，注册登录服，网关服、匹配服等的管理者，大概主要还是地址传送	5

3 客户端场景与客户端场景加工厂	6
3.1 SceneChangeHelper: 场景切换协程	6
3.1.1 Unit: Unit 究竟是什么, 干什么的? 像是游戏的一个最小单位, 有位置与旋转参数	6
3.1.2 UnityEngine: 组件	7
3.1.3 UnityEngineSystem: 生成系. 感觉这个系统不太懂	7
3.1.4 UnitHelper: 帮助在不同使用情境下, 拿到 unit	7
3.2 SceneFactory: ClientScene: 添加三组件: 【CurrentScenesComponent】 【Player-Component】 【ObjectWait】。	7
3.2.1 UnitFactory: 为什么我抓出两个不一样的定义, 还没弄明白	8
4 标签系: 标签系统重构了, 现分为几个类型	8
4.1 ComponentOfAttribute : Attribute	8
4.2 ComponentView: MonoBehaviour	9
4.3 ComponentViewEditor: Editor	9
5 UI 上的事件驱动系统:	9
5.1 EventType	9
5.2 由 AppStartInitFinish 事件所触发的 CreateLoginUI	9
5.3 由 LoginFinish 事件所触发的 CreateLobbyUI	9
5.4 SceneChangeStart_AddComponent: 开始切换场景的时候, 就自动添加【OperaComponent】组件。现在对场景这块儿还不够熟悉	10
6 Helper 类的总结: 【但凡点击回调方法, 就变成 Helper 类!】为什么就变成了这么一个的帮助类呢?	10
6.1 LoginHelper.cs	10
6.2 EnterRoomHelper.cs	10
6.3 UIHelper.cs: 负责 UI 界面上的组件的, 添加与删除, 异步完成	11
6.4 SceneChangeHelper: 场景切换协程	12
7 UI 控件的生产事件机制流程: 以前的专用工厂再包装为 UI 上的事件机制	12
7.1 LoginHelper 发布 EventType.LoginFinish() 事件	12
7.2 LoginFinish_RemoveLoginUI: 一般对应两个事件, 旧视图的去除, 与新视图的添加	13
7.3 LoginFinish_CreateLobbyUI: 创建新视图	13
7.4 UIHelper: 帮助类, 来添加或是移除 UI 上的可装可拆的组件	13
7.5 UIComponentSystem: 管理 Scene 上的 UI: 这个是组件生成管理系统, 负责添加与删除。【UIEventComponent】是 UI 上的 UI 事件组件系统	13
7.6 UIEventComponentSystem: 管理所有 UI GameObject 以及 UI 事件: 应该主要是 UI 控件相关的事件。【自顶向下】的组件系统	13
7.7 AUIEvent: 跟下面的 UIEventComponent 关系是?	14
7.8 UIEventComponent: 管理所有 UI GameObject	14
7.9 UIEventComponentSystem: 生成系, 管理所有 UI GameObject 以及 UI 事件: 应该主要是 UI 控件相关的事件。【自顶向下】的组件系统	14
7.10 UILoginEvent: 一个实体类的例子, 具体的工厂生产逻辑	15
7.11 UILobbyEvent: 再加一个实体类的例子	15
7.12 TractorRoomEvent: 拖拉机房间, 【待修改完成】	16
8 Session 相关: 进行间通信	16
8.1 SessionComponent	16
8.2 SessionComponentDestroySystem: 【销毁系】: 只负责用户掉线, 或是下线后的自动移除会话框	16
8.3 OperaComponentSystem: 一个拿会话框必消息的使用场景	16

9 Player: 玩家相关, 添加的地方, 以及使用【这里还是有点儿糊涂】	17
9.1 Player: 玩家	17
9.2 PlayerComponent:	17
9.3 服务器端的 PlayerComponent	17
9.4 服务器端 PlayerComponentSystem	17
9.5 服务器端 SceneFactory-CreateServerScene 时【网关服】会添加【PlayerComponent】 玩家组件	18
9.6 SessionPlayerComponentSystem	18
9.7 SessionPlayerComponent: 会话框里, 会保留客户端玩家 playerId	18
10 Match: 匹配服, 没有独立出来的匹配服	19
10.1 服务器端 SceneFactory 的场景类型: SceneType-s	19
11 ResourcesComponent 资源包管理器相关: 有时候, 拖拉机游戏里会需要拿它来加载图片	19
11.1 ResourcesComponent: 同文件有其生成系	19
11.2 客户端 ConfigLoader 的 Invoke 标签下: 在根控件 Root 下添加资源管理器组件	20
12 整个框架: ET 7.2 + YooAssets + luban + FairGUI	20

1 客户端场景组件: 客户端大致的起始过程

1.1 Entry.cs: 指定的起始类, 会触发三类回调, 公用组件类的加载, 和其它

```
public static class Entry {
    public static void Init() {
    }
    public static void Start() {
        StartAsync().Coroutine();
    }
    // 【各种应用程序, 第三方库等的初始化】
    private static async ETask StartAsync() {
        WinPeriod.Init();

        MongoHelper.Init();
        ProtobufHelper.Init();

        Game.AddSingleton<NetServices>();
        Game.AddSingleton<Root>();
        await Game.AddSingleton<ConfigComponent>().LoadAsync();

        // 不知道: 加这三个是在做什么? 它没有起有意义的名字, 但总之, 它是事件, 会触发相应的回调
        await EventSystem.Instance.PublishAsync(Root.Instance.Scene, new EventType.EntryEvent1());
        await EventSystem.Instance.PublishAsync(Root.Instance.Scene, new EventType.EntryEvent2());
        await EventSystem.Instance.PublishAsync(Root.Instance.Scene, new EventType.EntryEvent3());
    }
}
```

1.2 EntryEvent1_InitShare: 第一类,, 公用组件类的加载, 公用的几大组件

```
// 公用的相关组件的初始化:
[Event(SceneType.Process)]
public class EntryEvent1_InitShare: AEvent<EventType.EntryEvent1> {
    protected override async ETask Run(Scene scene, EventType.EntryEvent1 args) {
        Root.Instance.Scene.AddComponent<NetThreadComponent>();
        Root.Instance.Scene.AddComponent<OpcodeTypeComponent>();
        Root.Instance.Scene.AddComponent<MessageDispatcherComponent>();
        Root.Instance.Scene.AddComponent<NumericWatcherComponent>();
        Root.Instance.Scene.AddComponent<AIDispatcherComponent>();
        Root.Instance.Scene.AddComponent<ClientSceneManagerComponent>();
        await ETask.CompletedTask;
    }
}
```

1.2.1 CurrentScenesComponent: 可以用来管理多个客户端场景，比如大世界会加载多块场景（是说，大地图可以分 10 块 8 块小地图吗？）

// 可以用来管理多个客户端场景，比如大世界会加载多块场景（意思是说，大地图可以分 10 块 8 块小地图吗？）

```
[ComponentOf(typeof(Scene))]  
public class CurrentScenesComponent: Entity, IAwake {  
    public Scene Scene { get; set; }  
}
```

1.2.2 CurrentScenesComponentSystem: CurrentScene() 方法，返回当前场景

```
public static class CurrentScenesComponentSystem {  
    public static Scene CurrentScene(this Scene clientScene) {  
        return clientScene.GetComponent<CurrentScenesComponent>()?.Scene;  
    }  
}
```

1.2.3 ObjectWait: 也有生成系

```
[ComponentOf]  
public class ObjectWait: Entity, IAwake, IDestroy {  
    public Dictionary<Type, object> tcss = new Dictionary<Type, object>();  
}
```

1.2.4 PlayerComponent:

```
[ComponentOf(typeof(Scene))]  
public class PlayerComponent: Entity, IAwake {  
    public long MyId { get; set; }  
}
```

1.2.5 PlayerComponentSystem: 生成系，到处都要用它

```
[FriendOf(typeof(PlayerComponent))]  
public static class PlayerComponentSystem {  
    public static void Add(this PlayerComponent self, Player player) {  
        self.idPlayers.Add(player.Id, player);  
    }  
    public static Player Get(this PlayerComponent self, long id) {  
        self.idPlayers.TryGetValue(id, out Player gamer);  
        return gamer;  
    }  
    public static void Remove(this PlayerComponent self, long id) {  
        self.idPlayers.Remove(id);  
    }  
    public static Player[] GetAll(this PlayerComponent self) {  
        return self.idPlayers.Values.ToArray();  
    }  
}
```

1.3 AfterCreateCurrentScene_AddComponent:[UIComponent][ResourcesLoaderComponent]

```
[Event(SceneType.Current)]  
public class AfterCreateCurrentScene_AddComponent: AEvent<EventType.AfterCreateCurrentScene> {  
    protected override async ETask Run(Scene scene, EventType.AfterCreateCurrentScene args) {  
        scene.AddComponent<UIComponent>();  
        scene.AddComponent<ResourcesLoaderComponent>();  
        await ETask.CompletedTask;  
    }  
}
```

1.3.1 UIComponent: 管理 Scene 上的 UI

```
// 管理 Scene 上的 UI  
[ComponentOf(typeof(Scene))]  
public class UIComponent: Entity, IAwake {
```

```

    public Dictionary<string, UI> UIs = new Dictionary<string, UI>();
}

```

1.3.2 UIComponentSystem: 管理 Scene 上的 UI: 这个是组件生成管理系统，负责添加与删除。【UIEventComponent】是 UI 上的 UI 事件组件系统

// 管理 Scene 上的 UI: 这个是组件生成管理系统，负责添加与删除。【UIEventComponent】是 UI 上的 UI 事件组件系统

```

[FriendOf(typeof(UIComponent))]
public static class UIComponentSystem {
    public static async ETask<UI> Create(this UIComponent self, string uiType, UILayer uiLayer) {
        UI ui = await UIEventComponent.Instance.OnCreate(self, uiType, uiLayer);
        self.UIs.Add(uiType, ui);
        return ui;
    }
    public static void Remove(this UIComponent self, string uiType) {
        if (!self.UIs.TryGetValue(uiType, out UI ui)) {
            return;
        }
        UIEventComponent.Instance.OnRemove(self, uiType);

        self.UIs.Remove(uiType);
        ui.Dispose();
    }
    public static UI Get(this UIComponent self, string name) {
        UI ui = null;
        self.UIs.TryGetValue(name, out ui);
        return ui;
    }
}

```

1.3.3 ResourcesLoaderComponent: 相关的资源加载，这个文件里有生成系

```

[ComponentOf(typeof(Scene))]
public class ResourcesLoaderComponent: Entity, IAwake, IDestroy {
    public HashSet<string> LoadedResource = new HashSet<string>();
}

```

1.4 EntryEvent2_InitServer: 前面 1 里，两端公用组件准备好了，现在就起始服务器？服务端的几大组件：

```

[Event(SceneType.Process)]
public class EntryEvent2_InitServer: AEvent<ET.EventType.EntryEvent2> {
    protected override async ETask Run(Scene scene, ET.EventType.EntryEvent2 args) {
        // 发送普通 actor 消息
        Root.Instance.Scene.AddComponent<ActorMessageSenderComponent>();
        // 发送 location actor 消息
        Root.Instance.Scene.AddComponent<ActorLocationSenderComponent>();
        // 访问 location server 的组件
        Root.Instance.Scene.AddComponent<LocationProxyComponent>();
        Root.Instance.Scene.AddComponent<ActorMessageDispatcherComponent>();
        Root.Instance.Scene.AddComponent<ServerSceneManagerComponent>();
        Root.Instance.Scene.AddComponent<RobotCaseComponent>();
        Root.Instance.Scene.AddComponent<NavmeshComponent>();
        StartProcessConfig processConfig = StartProcessConfigCategory.Instance.Get(Options.Instance.Process);
        switch (Options.Instance.AppType) {
            case AppType.Server: {
                Root.Instance.Scene.AddComponent<NetInnerComponent, IPEndPoint>(processConfig.InnerIPPort);
                var processScenes = StartSceneConfigCategory.Instance.GetByProcess(Options.Instance.Process);
                foreach (StartSceneConfig startConfig in processScenes) {
                    await SceneFactory.CreateServerScene(ServerSceneManagerComponent.Instance, startConfig.Id, startConfig.InstanceName, startConfig.Type, startConfig);
                }
                break;
            }
            case AppType.Watcher: {
                StartMachineConfig startMachineConfig = WatcherHelper.GetThisMachineConfig();
                WatcherComponent watcherComponent = Root.Instance.Scene.AddComponent<WatcherComponent>();
                watcherComponent.Start(Options.Instance.CreateScenes);
                Root.Instance.Scene.AddComponent<NetInnerComponent, IPEndPoint>(NetworkHelper.ToIPEndPoint($"{startMachineConfig}"));
                break;
            }
        }
    }
}

```

```

    }
    case AppType.GameTool:
        break;
    }
    if (Options.Instance.Console == 1) {
        Root.Instance.Scene.AddComponent<ConsoleComponent>();
    }
}
}
}

```

1.4.1 ActorMessageSenderComponent: 发送普通 actor 消息

```

[ComponentOf(typeof(Scene))]
public class ActorMessageSenderComponent: Entity, IAwake, IDestroy {
    public const long TIMEOUT_TIME = 40 * 1000;
    public static ActorMessageSenderComponent Instance { get; set; }
    public int RpcId;
    public readonly SortedDictionary<int, ActorMessageSender> requestCallback = new SortedDictionary<int, ActorMessageSender>();
    public long TimeoutCheckTimer;
    public List<int> TimeoutActorMessageSenders = new List<int>();
}

```

1.4.2 ActorLocationSenderComponent: 发送 location actor 消息

```

[ComponentOf(typeof(Scene))]
public class ActorLocationSenderComponent: Entity, IAwake, IDestroy {
    public const long TIMEOUT_TIME = 60 * 1000;
    public static ActorLocationSenderComponent Instance { get; set; }
    public long CheckTimer;
}

```

1.4.3 LocationProxyComponent: 访问 location server 的组件

```

[ComponentOf(typeof(Scene))]
public class LocationProxyComponent: Entity, IAwake, IDestroy {
    [StaticField]
    public static LocationProxyComponent Instance;
}

```

1.4.4 ActorMessageDispatcherComponent: Actor 消息分发组件

```

public class ActorMessageDispatcherInfo {
    public SceneType SceneType { get; }
    public IActorHandler IActorHandler { get; }
    public ActorMessageDispatcherInfo(SceneType sceneType, IActorHandler imActorHandler) {
        this.SceneType = sceneType;
        this.IActorHandler = imActorHandler;
    }
}
// Actor 消息分发组件
[ComponentOf(typeof(Scene))]
public class ActorMessageDispatcherComponent: Entity, IAwake, IDestroy, ILoad {
    [StaticField]
    public static ActorMessageDispatcherComponent Instance;
    public readonly Dictionary<Type, List<ActorMessageDispatcherInfo>> ActorMessageHandlers = new();
}

```

1.4.5 ServerSceneManagerComponent: 可以去对比，两端的管理者组件，有什么不同？

```

[ComponentOf(typeof(Scene))]
public class ServerSceneManagerComponent: Entity, IAwake, IDestroy {
    [StaticField]
    public static ServerSceneManagerComponent Instance;
}

```

1.5 EntryEvent3_InitClient: 客户端

```
[Event(SceneType.Process)]
public class EntryEvent3_InitClient: AEvent<ET.EventType.EntryEvent3> {
    protected override async ETTask Run(Scene scene, ET.EventType.EntryEvent3 args) {
        // 加载配置
        Root.Instance.Scene.AddComponent<ResourcesComponent>();

        Root.Instance.Scene.AddComponent<GlobalComponent>();
        await ResourcesComponent.Instance.LoadBundleAsync("unit.unity3d");

        Scene clientScene = await SceneFactory.CreateClientScene(1, "Game");
        await EventSystem.Instance.PublishAsync(clientScene, new EventType.AppStartInitFinish()); // 应用程序启动结束
    }
}
```

1.5.1 ResourcesComponent: 热更新资源包等的处理

```
[ComponentOf]
public class ResourcesComponent: Entity, IAwake, IDestroy {
    public static ResourcesComponent Instance { get; set; }
    public AssetBundleManifest AssetBundleManifestObject { get; set; }
    public Dictionary<int, string> IntToStringDict = new Dictionary<int, string>();
    public Dictionary<string, string> StringToABDict = new Dictionary<string, string>();
    public Dictionary<string, string> BundleNameToLowerDict = new Dictionary<string, string>() { { "StreamingAssets", "StreamingAssets" } };
    public readonly Dictionary<string, Dictionary<string, UnityEngine.Object>> resourceCache =
        new Dictionary<string, Dictionary<string, UnityEngine.Object>>();
    public readonly Dictionary<string, ABInfo> bundles = new Dictionary<string, ABInfo>();

    // 缓存包依赖, 不用每次计算
    public readonly Dictionary<string, string[]> DependenciesCache = new Dictionary<string, string[]>();
}
```

1.5.2 GlobalComponent: 不知道是干什么的, Unity 里好像是 Root 根节点下的一个节点, 组件?

```
[ComponentOf(typeof(Scene))]
public class GlobalComponent: Entity, IAwake {
    [StaticField]
    public static GlobalComponent Instance;
    public Transform Global;
    public Transform Unit { get; set; }
    public Transform UI;
}
```

1.6 前面三件 (【公用组件】, 【服务器】, 【客户端】的应用程序启动完成) 触发 UI 变更: 这个 UI 订阅说, 一被通知, 就创建注册登录界面

```
[Event(SceneType.Client)]
public class AppStartInitFinish_CreateLoginUI: AEvent<EventType.AppStartInitFinish> {
    protected override async ETTask Run(Scene scene, EventType.AppStartInitFinish args) {
        await UIHelper.Create(scene, UIType.UILogin, UILayer.Mid);
    }
}
```

- 感觉接下来就是相对熟悉的程序。再跟就去跟不熟悉的其它细节程序

2 ClientComponent ClientScene 等客户端相关: 有点儿理不清

2.1 ClientSceneManagerComponent: 是否, 相当于, 它是 SceneType 的管理者, 就是先前各种服, 注册登录服, 网关服、匹配服等的管理者, 大概主要还是地址传送

```
[ComponentOf(typeof(Scene))]
public class ClientSceneManagerComponent: Entity, IAwake, IDestroy {
```

```

[StaticField]
public static ClientSceneManagerComponent Instance;
}

```

3 客户端场景与客户端场景加工厂

3.1 SceneChangeHelper: 场景切换协程

```

public static class SceneChangeHelper {
    // 场景切换协程
    public static async ETTask SceneChangeTo(Scene clientScene, string sceneName, long sceneInstanceId) {
        clientScene.RemoveComponent<AIComponent>();

        CurrentScenesComponent currentScenesComponent = clientScene.GetComponent<CurrentScenesComponent>();
        currentScenesComponent.Scene?.Dispose(); // 删除之前的 CurrentScene, 创建新的
        Scene currentScene = SceneFactory.CreateCurrentScene(sceneInstanceId, clientScene.Zone, sceneName, currentScenesComponent);
        UnitComponent unitComponent = currentScene.AddComponent<UnitComponent>(); // <----- 添加组件

        // 可以订阅这个事件中创建 Loading 界面
        EventSystem.Instance.Publish(clientScene, new EventType.SceneChangeStart());
        // 等待 CreateMyUnit 的消息
        Wait_CreateMyUnit waitCreateMyUnit = await clientScene.GetComponent<ObjectWait>().Wait<Wait_CreateMyUnit>();
        M2C.CreateMyUnit m2CCreateMyUnit = waitCreateMyUnit.Message;
        Unit unit = UnitFactory.Create(currentScene, m2CCreateMyUnit.Unit);
        unitComponent.Add(unit);

        clientScene.RemoveComponent<AIComponent>();

        EventSystem.Instance.Publish(currentScene, new EventType.SceneChangeFinish());
        // 通知等待场景切换的协程
        clientScene.GetComponent<ObjectWait>().Notify(new Wait_SceneChangeFinish());
    }
}

```

3.1.1 Unit: Unit 究竟是什么，干什么的？像是游戏的一个最小单位，有位置与旋转参数

```

[ChildOf(typeof(UnitComponent))]
[DebuggerDisplay("ViewName,nq")]
public class Unit: Entity, IAwake<int> {
    public int ConfigId { get; set; } // 配置表 id
    [BsonIgnore]
    public UnitConfig Config => UnitConfigCategory.Instance.Get<this>.ConfigId;
    public UnitType Type => (UnitType)UnitConfigCategory.Instance.Get<this>.ConfigId.Type;
    [BsonElement]
    private float3 position; // 坐标
    [BsonIgnore]
    public float3 Position {
        get => this.position;
        set {
            float3 oldPos = this.position;
            this.position = value;
            EventSystem.Instance.Publish<this>.DomainScene(), new EventType.ChangePosition() { Unit = this, OldPos = oldPos }
        }
    }
    [BsonIgnore]
    public float3 Forward {
        get => math.mul<this>.Rotation, math.forward();
        set => this.Rotation = quaternion.LookRotation<value>, math.up();
    }
    [BsonElement]
    private quaternion rotation;
    [BsonIgnore]
    public quaternion Rotation {
        get => this.rotation;
        set {
            this.rotation = value;
            EventSystem.Instance.Publish<this>.DomainScene(), new EventType.ChangeRotation() { Unit = this };
        }
    }
    protected override string ViewName {
        get {

```



```

        return $"{this.GetType().Name} ({this.Id})";
    }
}
}

```

3.1.2 UnitComponent: 组件

```

[ComponentOf(typeof(Scene))]
public class UnitComponent: Entity, IAwake, IDestroy {
}

```

3.1.3 UnitComponentSystem: 生成系. 感觉这个系统不太懂

```

[ObjectSystem]
public class UnitComponentAwakeSystem : AwakeSystem<UnitComponent> {
    protected override void Awake(UnitComponent self) {
    }
}
[ObjectSystem]
public class UnitComponentDestroySystem : DestroySystem<UnitComponent> {
    protected override void Destroy(UnitComponent self) {
    }
}
public static class UnitComponentSystem {
    public static void Add(this UnitComponent self, Unit unit) {
    }
    public static Unit Get(this UnitComponent self, long id) {
        Unit unit = self.GetChild<Unit>(id);
        return unit;
    }
    public static void Remove(this UnitComponent self, long id) {
        Unit unit = self.GetChild<Unit>(id);
        unit?.Dispose();
    }
}
}

```

3.1.4 UnitHelper: 帮助在不同使用情境下，拿到 unit

```

public static class UnitHelper {
    public static Unit GetMyUnitFromClientScene(Scene clientScene) {
        PlayerComponent playerComponent = clientScene.GetComponent<PlayerComponent>();
        Scene currentScene = clientScene.GetComponent<CurrentScenesComponent>().Scene;
        return currentScene.GetComponent<UnitComponent>().Get(playerComponent.MyId);
    }
    public static Unit GetMyUnitFromCurrentScene(Scene currentScene) {
        PlayerComponent playerComponent = currentScene.Parent.GetComponent<Scene>().GetComponent<PlayerComponent>();
        return currentScene.GetComponent<UnitComponent>().Get(playerComponent.MyId);
    }
}
}

```

3.2 SceneFactory: ClientScene: 添加三组件：【CurrentScenesComponent】【PlayerComponent】【ObjectWait】。

- SceneChangeHelper 类会调用工厂加工。

```

public static class SceneFactory {
    public static async ETask<Scene> CreateClientScene(int zone, string name) {
        await ETask.CompletedTask;

        Scene clientScene = EntitySceneFactory.CreateScene(zone, SceneType.Client, name, ClientSceneManagerComponent);
        clientScene.AddComponent<CurrentScenesComponent>();// 它添加了这些组件，也看下
        clientScene.AddComponent<ObjectWait>();
        clientScene.AddComponent<PlayerComponent>();

        EventSystem.Instance.Publish(clientScene, new EventType.AfterCreateClientScene()); // 好奇葩的事件，去看下
        return clientScene;
    }
    public static Scene CreateCurrentScene(long id, int zone, string name, CurrentScenesComponent currentScenesComponent) {
        Scene currentScene = EntitySceneFactory.CreateScene(id, IdGenerater.Instance.GenerateInstanceId(), zone, SceneType.Current, currentScenesComponent);
    }
}

```

```

        currentScenesComponent.Scene = currentScene;

        EventSystem.Instance.Publish(currentScene, new EventType.AfterCreateCurrentScene());
        return currentScene;
    }
}

```

3.2.1 UnitFactory: 为什么我抓出两个不一样的定义，还没弄明白

```

public static class UnitFactory {
    public static Unit Create(Scene scene, long id, UnitType unitType) {
        UnitComponent unitComponent = scene.GetComponent<UnitComponent>();
        switch (unitType) {
            case UnitType.Player: {
                Unit unit = unitComponent.AddChildWithId<Unit, int>(id, 1001);
                unit.AddComponent<MoveComponent>();
                unit.Position = new float3(-10, 0, -10);

                NumericComponent numericComponent = unit.AddComponent<NumericComponent>();
                numericComponent.Set(NumericType.Speed, 6f); // 速度是 6 米每秒
                numericComponent.Set(NumericType.AOI, 15000); // 视野 15 米

                unitComponent.Add(unit);
                // 加入 aoi
                unit.AddComponent<AOIEntity, int, float3>(9 * 1000, unit.Position);
                return unit;
            }
            default:
                throw new Exception($"not such unit type: {unitType}");
        }
    }
}

public static class UnitFactory {
    public static Unit Create(Scene currentScene, UnitInfo unitInfo) {
        UnitComponent unitComponent = currentScene.GetComponent<UnitComponent>();
        Unit unit = unitComponent.AddChildWithId<Unit, int>(unitInfo.UnitId, unitInfo.ConfigId);
        unitComponent.Add(unit);

        unit.Position = unitInfo.Position;
        unit.Forward = unitInfo.Forward;

        NumericComponent numericComponent = unit.AddComponent<NumericComponent>();
        foreach (var kv in unitInfo.KV) {
            numericComponent.Set(kv.Key, kv.Value);
        }

        unit.AddComponent<MoveComponent>();
        if (unitInfo.MoveInfo != null) {
            if (unitInfo.MoveInfo.Points.Count > 0) {
                unitInfo.MoveInfo.Points[0] = unit.Position;
                unit.MoveToAsync(unitInfo.MoveInfo.Points).Coroutine();
            }
        }
        unit.AddComponent<ObjectWait>();
        unit.AddComponent<XunLuoPathComponent>();

        EventSystem.Instance.Publish(unit.DomainScene(), new EventType.AfterUnitCreate() {Unit = unit});
        return unit;
    }
}

```

4 标签系: 标签系统重构了，现分为几个类型

4.1 ComponentOfAttribute : Attribute

```

// 组件类父级实体类型约束
// 父级实体类型唯一的 标记指定父级实体类型 【ComponentOf(typeof(parentType)】
// 不唯一则标记 【ComponentOf】
[AttributeUsage(AttributeTargets.Class)]
public class ComponentOfAttribute : Attribute {
    public Type Type;
}

```

```

    public ComponentOfAttribute(Type type = null) {
        this.Type = type;
    }
}

```

4.2 ComponentView: MonoBehaviour

```

public class ComponentView: MonoBehaviour {
    public Entity Component {
        get;
        set;
    }
}

```

4.3 ComponentViewEditor: Editor

```

[CustomEditor(typeof (ComponentView))]
public class ComponentViewEditor: Editor {
    public override void OnInspectorGUI() {
        ComponentView componentView = (ComponentView) target;
        Entity component = componentView.Component;
        ComponentViewHelper.Draw(component);
    }
}

```

5 UI 上的事件驱动系统:

5.1 EventType

```

namespace EventType {
    public struct SceneChangeStart {
    }
    public struct SceneChangeFinish {
    }

    public struct AfterCreateClientScene {
    }
    public struct AfterCreateCurrentScene {
    }

    public struct AppStartInitFinish {
    }
    public struct LoginFinish {
    }
    // public struct EnterMapFinish {
    public struct EnterRoomFinish {
    }
    public struct AfterUnitCreate {
        public Unit Unit;
    }
}

```

5.2 由 AppStartInitFinish 事件所触发的 CreateLoginUI

```

[Event(SceneType.Client)] // ET 事件系统的工具，标签系
public class AppStartInitFinish_CreateLoginUI: AEvent<EventType.AppStartInitFinish> {

```

5.3 由 LoginFinish 事件所触发的 CreateLobbyUI

```

[Event(SceneType.Client)]
public class LoginFinish_CreateLobbyUI: AEvent<EventType.LoginFinish> {
    protected override async ETask Run(Scene scene, EventType.LoginFinish args) {
        await UIHelper.Create(scene, UIType.UILobby, UILayer.Mid);
    }
}

```

- 这些是原示范框架都已经完成了的，我只需要添加剩余的逻辑。

5.4 SceneChangeStart_AddComponent: 开始切换场景的时候, 就自动添加【OperaComponent】组件。现在对场景这块儿还不够熟悉

```
// 这个比较喜欢: 场景切换, 切换开始, 可以做什么? 切换结束, 可以做什么? 全成事件触发机制。任何时候, 活宝妹就是一定要嫁给亲爱的表哥
[Event(SceneType.Client)]
public class SceneChangeStart_AddComponent: AEvent<EventType.SceneChangeStart> {
    protected override async ETask Run(Scene scene, EventType.SceneChangeStart args) {
        Scene currentScene = scene.CurrentScene();
        // 加载场景资源
        await ResourcesComponent.Instance.LoadBundleAsync($"{currentScene.Name}.unity3d");
        // 切换到 map 场景
        await SceneManager.LoadSceneAsync(currentScene.Name);

        currentScene.AddComponent<OperaComponent>();
    }
}
```

- 场景加载结束的时候, 好像相对做的事情不多。

6 Helper 类的总结: 【但凡点击回调方法, 就变成 Helper 类!】为什么就变成了这么一个个的帮助类呢?

6.1 LoginHelper.cs

```
public static class LoginHelper {
    public static async ETask Login(Scene clientScene, string account, string password) {
        try {
            // 创建一个 ETModel 层的 Session
            clientScene.RemoveComponent<RouterAddressComponent>();
            // 获取路由跟 realmDispatcher 地址
            RouterAddressComponent routerAddressComponent = clientScene.GetComponent<RouterAddressComponent>();
            if (routerAddressComponent == null) {
                routerAddressComponent = clientScene.AddComponent<RouterAddressComponent, string, int>(ConstValue.RouterHttpHost, ConstValue.RouterHttpPort);
                await routerAddressComponent.Init();
            }
            clientScene.AddComponent<NetClientComponent, AddressFamily>(routerAddressComponent.RouterManagerIPAddress, AddressFamily.IPv4);
            IPEndPoint realmAddress = routerAddressComponent.GetRealmAddress(account);

            R2C_Login r2CLogin;
            using (Session session = await RouterHelper.CreateRouterSession(clientScene, realmAddress)) {
                r2CLogin = (R2C_Login) await session.Call(new C2R_Login() { Account = account, Password = password });
            }
            // 创建一个 gate Session, 并且保存到 SessionComponent 中: 与网关服的会话框。主要负责用户下线后会话框的自动移除销毁
            Session gateSession = await RouterHelper.CreateRouterSession(clientScene, NetworkHelper.ToIPEndPoint(r2CLogin.Address));
            clientScene.AddComponent<SessionComponent>().Session = gateSession;

            G2C_LoginGate g2CLoginGate = (G2C_LoginGate)await gateSession.Call(
                new C2G_LoginGate() { Key = r2CLogin.Key, GateId = r2CLogin.GateId });
            Log.Debug(" 登陆 gate 成功!");
            await EventSystem.Instance.PublishAsync(clientScene, new EventType.LoginFinish());
        }
        catch (Exception e) {
            Log.Error(e);
        }
    }
}
```

6.2 EnterRoomHelper.cs

- 这里需要注意的是: 原项目里面还是保留了 C2G_EnterMap 消息的。分两块查看一下:
 - 可以先去查一下, 斗地主里是如何【开始匹配】的
 - ET 7 框架里, 服务器是如何处理消息的, 变成了不同的 场景类型: SceneType, 由不同场景, 也就是不同的专职服务器来处理各种逻辑功能块的消息

* 仍然是 **标签系的消息处理器**：因为先前的不同服变成了现在的不同场景，分场景（先前的不同服）来定义消息处理器，以处理当前场景（特定功能逻辑服）下的消息，如匹配服的消息。

- 如果每个按钮的回调：都单独一个类，不成了海量回调类了？

- 老版本：斗地主里，进入地图的参考【ET】里，就要去找，如何处理这些组件的？

```
// public static class EnterMapHelper {
public static class EnterRoomHelper {

// 进拖拉机房：异步过程，需要与房间服交互的。【房间服】：
// 【C2G_EnterRoom】：消息也改下
public static async ETask EnterRoomAsync(Scene clientScene) {
    try {
        G2C_EnterMap g2CEnterMap = await clientScene.GetComponent<SessionComponent>().Session.Call(new C2G_EnterMap()) as G
        clientScene.GetComponent<PlayerComponent>().MyId = g2CEnterMap.MyId;

        // 等待场景切换完成
        await clientScene.GetComponent<ObjectWait>().Wait<Wait_SceneChangeFinish>();

        // EventSystem.Instance.Publish(clientScene, new EventType.EnterMapFinish());
        EventSystem.Instance.Publish(clientScene, new EventType.EnterRoomFinish()); // 这个，再去找下，谁在订阅这个事件，如何带

        // // 老版本：斗地主里，进入地图的参考【ET7】里，就要去找，如何处理这些组件的？
        // Game.Scene.AddComponent<OperaComponent>();
        // Game.Scene.GetComponent<UIComponent>().Remove(UIType.UILobby);
    }
    catch (Exception e) {
        Log.Error(e);
    }
}
}
```

• 一个服务器端的消息处理器供自己参考：【分场景的消息处理器，仍使用标签系】

```
[MessageHandler(SceneType.Client)]
public class M2C_CreateMyUnitHandler : AMHandler<M2C_CreateMyUnit> {
    protected override async ETask Run(Session session, M2C_CreateMyUnit message) {
        // 通知场景切换协程继续往下走
        session.DomainScene().GetComponent<ObjectWait>().Notify(new Wait_CreateMyUnit() {Message = message});
        await ETask.CompletedTask;
    }
}
```

• 再来一个场景切换开始事件的：【任何时候，活宝妹就是一定要嫁给亲爱的表哥!!!】

```
// 这个比较喜欢：场景切换，先前不同功能定义的服，切换开始，可以做什么？切换结束，可以做什么？全成事件触发机制。
[Event(SceneType.Client)]
public class SceneChangeStart_AddComponent : AEvent<EventType.SceneChangeStart> {

    protected override async ETask Run(Scene scene, EventType.SceneChangeStart args) {
        Scene currentScene = scene.CurrentScene();

        // 加载场景资源
        await ResourcesComponent.Instance.LoadBundleAsync($"{currentScene.Name}.unity3d");
        // 切换到 map 场景
        await SceneManager.LoadSceneAsync(currentScene.Name);

        currentScene.AddComponent<OperaComponent>();
    }
}
```

6.3 UIHelper.cs: 负责 UI 界面上的组件的，添加与删除，异步完成

```
public static class UIHelper {
    public static async ETask<UI> Create(Scene scene, string uiType, UILayer uiLayer) {
        return await scene.GetComponent<UIComponent>().Create(uiType, uiLayer);
    }
    public static async ETask Remove(Scene scene, string uiType) {
        scene.GetComponent<UIComponent>().Remove(uiType);
        await ETask.CompletedTask;
    }
}
```

6.4 SceneChangeHelper: 场景切换协程

```
public static class SceneChangeHelper {
    // 场景切换协程
    public static async ETTask SceneChangeTo(Scene clientScene, string sceneName, long sceneInstanceId) {
        clientScene.RemoveComponent<AIComponent>();

        CurrentScenesComponent currentScenesComponent = clientScene.GetComponent<CurrentScenesComponent>();
        currentScenesComponent.Scene?.Dispose(); // 删除之前的 CurrentScene, 创建新的
        Scene currentScene = SceneFactory.CreateCurrentScene(sceneInstanceId, clientScene.Zone, sceneName, currentScenesComponent);
        UnitComponent unitComponent = currentScene.AddComponent<UnitComponent>();

        // 可以订阅这个事件中创建 Loading 界面
        EventSystem.Instance.Publish(clientScene, new EventType.SceneChangeStart());
        // 等待 CreateMyUnit 的消息
        Wait_CreateMyUnit waitCreateMyUnit = await clientScene.GetComponent<ObjectWait>().Wait<Wait_CreateMyUnit>();
        M2C_CreateMyUnit m2CCreateMyUnit = waitCreateMyUnit.Message;
        Unit unit = UnitFactory.Create(currentScene, m2CCreateMyUnit.Unit);
        unitComponent.Add(unit);

        clientScene.RemoveComponent<AIComponent>();

        EventSystem.Instance.Publish(currentScene, new EventType.SceneChangeFinish());
        // 通知等待场景切换的协程
        clientScene.GetComponent<ObjectWait>().Notify(new Wait_SceneChangeFinish());
    }
}
```

7 UI 控件的生产事件机制流程：以前的专用工厂再包装为 UI 上的事件机制

- 一般是由某个事件的发布，因为订阅（使用订阅标签系），所以会被触发创建视图

7.1 LoginHelper 发布 EventType.LoginFinish() 事件

```
public static class LoginHelper {
    public static async ETTask Login(Scene clientScene, string account, string password) {
        try {
            // 创建一个 ETModel 层的 Session
            clientScene.RemoveComponent<RouterAddressComponent>();
            // 获取路由跟 realmDispatcher 地址
            RouterAddressComponent routerAddressComponent = clientScene.GetComponent<RouterAddressComponent>();
            if (routerAddressComponent == null) {
                routerAddressComponent = clientScene.AddComponent<RouterAddressComponent, string, int>(ConstValue.RouterHttpHost);
                await routerAddressComponent.Init();
                clientScene.AddComponent<NetClientComponent, AddressFamily>(routerAddressComponent.RouterManagerIPAddress.AddressFamily);
            }
            IPEndPoint realmAddress = routerAddressComponent.GetRealmAddress(account);

            R2C_Login r2CLogin;
            using (Session session = await RouterHelper.CreateRouterSession(clientScene, realmAddress)) {
                r2CLogin = (R2C_Login) await session.Call(new C2R_Login() { Account = account, Password = password });
            }
            // 创建一个 gate Session, 并且保存到 SessionComponent 中: 与网关服的会话框。主要负责用户下线后会话框的自动移除销毁
            Session gateSession = await RouterHelper.CreateRouterSession(clientScene, NetworkHelper.ToIPEndPoint(r2CLogin.Address));
            clientScene.AddComponent<SessionComponent>().Session = gateSession;

            G2C_LoginGate g2CLoginGate = (G2C_LoginGate)await gateSession.Call(
                new C2G_LoginGate() { Key = r2CLogin.Key, GateId = r2CLogin.GateId });
            Log.Debug(" 登陆 gate 成功!");
            await EventSystem.Instance.PublishAsync(clientScene, new EventType.LoginFinish()); // <----- 事件的发布
        }
        catch (Exception e) {
            Log.Error(e);
        }
    }
}
```

7.2 LoginFinish_RemoveLoginUI: 一般对应两个事件，旧视图的去除，与新视图的添加

```
[Event(SceneType.Client)]
public class LoginFinish_RemoveLoginUI: AEvent<EventType.LoginFinish> {
    protected override async ETask Run(Scene scene, EventType.LoginFinish args) {
        await UIHelper.Remove(scene, UIType.UILogin);
    }
}
```

7.3 LoginFinish_CreateLobbyUI: 创建新视图

```
[Event(SceneType.Client)]
public class LoginFinish_CreateLobbyUI : AEvent<EventType.LoginFinish> {

    protected override async ETask Run(Scene scene, EventType.LoginFinish args) {
        await UIHelper.Create(scene, UIType.UILobby, UILayer.Mid);
    }
}
```

7.4 UIHelper: 帮助类，来添加或是移除 UI 上的可装可折的组件

[illegible]

7.5 UIComponentSystem: 管理 Scene 上的 UI: 这个是组件生成管理系统, 负责添加与删除。【UIEventComponent】是 UI 上的 UI 事件组件系统

```
// 管理 Scene 上的 UI: 这个定组件生成管理系统, 负责添加与删除。【UIEventComponent】是 UI 上的 UI 事件组件系统
[FriendOf(typeof(UIComponent))]
public static class UIComponentSystem {
    public static async ETask<UI> Create(this UIComponent self, string uiType, UILayer uiLayer) {
        UI ui = await UIEventComponent.Instance.OnCreate(self, uiType, uiLayer); // <!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!>
        self.UIs.Add(uiType, ui);
        return ui;
    }
    public static void Remove(this UIComponent self, string uiType) {
        if (!self.UIs.TryGetValue(uiType, out UI ui)) {
            return;
        }
        UIEventComponent.Instance.OnRemove(self, uiType);

        self.UIs.Remove(uiType);
        ui.Dispose();
    }
    public static UI Get(this UIComponent self, string name) {
        UI ui = null;
        self.UIs.TryGetValue(name, out ui);
        return ui;
    }
}
```

7.6 UIComponentSystem: 管理所有 UI GameObject 以及 UI 事件: 应该主要是 UI 控件相关的事件。【自顶向下】的组件系统

```
// 管理所有 UI GameObject 以及 UI 事件：应该主要是 UI 控件相关的事件。【自顶向下】的组件系统
[FriendOf(typeof(UIEventComponent))]  
public static class UIEventComponentSystem {  
    [ObjectSystem]  
    public class UIEventComponentAwakeSystem : AwakeSystem<UIEventComponent> {
```



```

public class UIEventComponentAwakeSystem : AwakeSystem<UIEventComponent> {
    protected override void Awake(UIEventComponent self) {
        UIEventComponent.Instance = self;
        GameObject uiRoot = GameObject.Find("/Global/UI"); // Unity 视图面板上的全局父控件
        ReferenceCollector referenceCollector = uiRoot.GetComponent<ReferenceCollector>();
        // 面板上的：四大层级
        self.UILayers.Add((int)UILayer.Hidden, referenceCollector.Get<GameObject>(UILayer.Hidden.ToString()).transform);
        self.UILayers.Add((int)UILayer.Low, referenceCollector.Get<GameObject>(UILayer.Low.ToString()).transform);
        self.UILayers.Add((int)UILayer.Mid, referenceCollector.Get<GameObject>(UILayer.Mid.ToString()).transform);
        self.UILayers.Add((int)UILayer.High, referenceCollector.Get<GameObject>(UILayer.High.ToString()).transform);
        var uiEvents = EventSystem.Instance.GetTypes(typeof(UIEventAttribute));
        foreach (Type type in uiEvents) {
            object[] attrs = type.GetCustomAttributes(typeof(UIEventAttribute), false);
            if (attrs.Length == 0) {
                continue;
            }
            UIEventAttribute uiEventAttribute = attrs[0] as UIEventAttribute;
            // 字典管理：它的字典，负责为每种类型，创建一个工厂实例，来生产其所负责的 UI 组件面板等。字典管理，工厂是可以随需要。
            AUIEvent aUIEvent = Activator.CreateInstance(type) as AUIEvent;
            self.UIEvents.Add(uiEventAttribute.UIType, aUIEvent);
        }
    }
}

public static async ETask<UI> OnCreate(this UIEventComponent self, UIComponent uiComponent, string uiType, UILayer uiLayer) {
    try {
        UI ui = await self.UIEvents[uiType].OnCreate(uiComponent, uiLayer); // 调用：工厂的生产方法
        return ui;
    }
    catch (Exception e) {
        throw new Exception($"on create ui error: {uiType}", e);
    }
}

public static Transform GetLayer(this UIEventComponent self, int layer) {
    return self.UILayers[layer];
}

public static void OnRemove(this UIEventComponent self, UIComponent uiComponent, string uiType) {
    try {
        self.UIEvents[uiType].OnRemove(uiComponent);
    }
    catch (Exception e) {
        throw new Exception($"on remove ui error: {uiType}", e);
    }
}
}

```

7.10 UILoginEvent: 一个实体类的例子，具体的工厂生产逻辑

```

[UIEvent(UIType.UILogin)]
public class UILoginEvent: AUIEvent {
    public override async ETask<UI> OnCreate(UIComponent uiComponent, UILayer uiLayer) {
        await uiComponent.DomainScene().GetComponent<ResourcesLoaderComponent>().LoadAsync(UIType.UILogin.StringToAB());
        GameObject bundleGameObject = (GameObject) ResourcesComponent.Instance.GetAsset(UIType.UILogin.StringToAB(), UIType.UILogin);
        GameObject gameObject = UnityEngine.Object.Instantiate(bundleGameObject, UIEventComponent.Instance.GetLayer((int)UILayer.High));
        UI ui = uiComponent.AddChild<UI, string, GameObject>(UIType.UILogin, gameObject);
        ui.AddComponent<UILoginComponent>();
        return ui;
    }

    public override void OnRemove(UIComponent uiComponent) {
        ResourcesComponent.Instance.UnloadBundle(UIType.UILogin.StringToAB());
    }
}

```

7.11 UILobbyEvent: 再加一个实体类的例子

```

// UI 系统的事件机制：接收到 LoginFinish 之后触发的大厅创建
[UIEvent(UIType.UILobby)]
public class UILobbyEvent: AUIEvent {
    public override async ETask<UI> OnCreate(UIComponent uiComponent, UILayer uiLayer) {
        await ETask.CompletedTask;
        await uiComponent.DomainScene().GetComponent<ResourcesLoaderComponent>().LoadAsync(UIType.UILobby.StringToAB());
        GameObject bundleGameObject = (GameObject) ResourcesComponent.Instance.GetAsset(UIType.UILobby.StringToAB(), UIType.UILobby);
        GameObject gameObject = UnityEngine.Object.Instantiate(bundleGameObject, UIEventComponent.Instance.GetLayer((int)UILayer.High));
    }
}

```

```

        UI ui = uiComponent.AddChild<UI, string, GameObject>(UIType.UILobby, gameObject);
        ui.AddComponent<UILobbyComponent>();
        return ui;
    }
    public override void OnRemove(UIComponent uiComponent) {
        ResourcesComponent.Instance.UnloadBundle(UIType.UILobby.StringToAB());
    }
}

```

7.12 TractorRoomEvent: 拖拉机房间，【待修改完成】

// UI 系统的事件机制：定义，如何创建拖拉机游戏房间 **【TODO:】** UNITY 里是需要制作相应预设的
[UIEvent(UIType.TractorRoom)]

```

public class TractorRoomEvent: AUIEvent {
    public override async ETask<UI> OnCreate(UIComponent uiComponent, UILayer uiLayer) {
        await ETask.CompletedTask;
        await uiComponent.DomainScene().GetComponent<ResourcesLoaderComponent>().LoadAsync(UIType.TractorRoom.StringToAB());
        GameObject bundleGameObject = (GameObject) ResourcesComponent.Instance.GetAsset(UIType.TractorRoom.StringToAB(), UI
        GameObject gameObject = UnityEngine.Object.Instantiate(bundleGameObject, UIEventComponent.Instance.GetLayer((int)ui
        UI ui = uiComponent.AddChild<UI, string, GameObject>(UIType.TractorRoom, gameObject);
        // 【拖拉机游戏房间】：它可能由好几个不同的组件组成，这里要添加的不止一个
        ui.AddComponent<TractorRoomComponent>(); // <=====
        ui.AddComponent<GamerComponent>(); // 这里的难点：成为这个控件带个 UI 小面板，要怎么添加呢？
        return ui;
    }
    public override void OnRemove(UIComponent uiComponent) {
        ResourcesComponent.Instance.UnloadBundle(UIType.TractorRoom.StringToAB());
    }
}

```

- 【任何时候，活宝妹就是一定要嫁给亲爱的表哥!!! 爱表哥，爱生活!!!】

8 Session 相关：进行间通信

8.1 SessionComponent

```

[ComponentOf(typeof(Scene))]
public class SessionComponent: Entity, IAwake, IDestroy {
    public Session Session { get; set; }
}

```

8.2 SessionComponentDestroySystem: 【销毁系】：只负责用户掉线，或是下线后的自动移除会话框

```

// 【销毁系】：只负责用户掉线，或是下线后的自动移除会话框
public class SessionComponentDestroySystem: DestroySystem<SessionComponent> {
    protected override void Destroy(SessionComponent self) {
        self.Session?.Dispose();
    }
}

```

8.3 OperaComponentSystem: 一个拿会话框必消息的使用场景

```

[FriendOf(typeof(OperaComponent))]
public static class OperaComponentSystem { // 生命周期感知，生成系统
    [ObjectSystem]
    public class OperaComponentAwakeSystem : AwakeSystem<OperaComponent> {
        protected override void Awake(OperaComponent self) {
            self.mapMask = LayerMask.GetMask("Map");
        }
    }
    [ObjectSystem]
    public class OperaComponentUpdateSystem : UpdateSystem<OperaComponent> {
        protected override void Update(OperaComponent self) {
            if (Input.GetMouseButtonDown(1)) {
                Ray ray = Camera.main.ScreenPointToRay(Input.mousePosition);
            }
        }
    }
}

```


9.5 服务器端 SceneFactory-CreateServerScene 时【网关服】会添加【PlayerComponent】玩家组件

[illegible]

9.6 SessionPlayerComponentSystem

```
public static class SessionPlayerComponentSystem {
    public class SessionPlayerComponentDestroySystem: DestroySystem<SessionPlayerComponent> {
        protected override void Destroy(SessionPlayerComponent self) {
            // 发送断线消息
            ActorLocationSenderComponent.Instance?.Send(self.PlayerId, new G2M_SessionDisconnect());
            self.DomainScene().GetComponent<PlayerComponent>()?.Remove(self.PlayerId);
        }
    }

    public static Player GetMyPlayer(this SessionPlayerComponent self) {
        return self.DomainScene().GetComponent<PlayerComponent>().Get(self.PlayerId);
    }
}
```

9.7 SessionPlayerComponent: 会话框里，会保留客户端玩家 playerId

```
[ComponentOf(typeof(Session))]
public class SessionPlayerComponent : Entity, IAwake, IDestroy {
    public long PlayerId { get; set; }
}
```

10 Match: 匹配服，没有独立出来的匹配服

10.1 服务器端 SceneFactory 的场景类型：SceneType-s

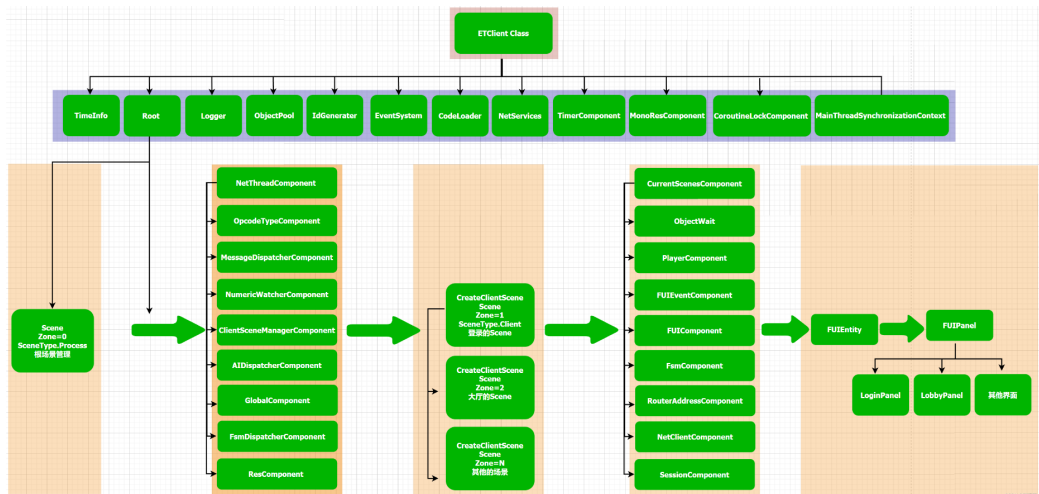
- **【匹配服】**：可以添加一个。但参考项目里也没有独立出来。所以要想一下，有哪些组件是这个匹配服所需要的？太少就不用独立了

```
public static class SceneFactory {
    public static async ETask<Scene> CreateServerScene(Entity parent, long id, long instanceId, int zone, string name) {
        await ETask.CompletedTask;
        Scene scene = EntitySceneFactory.CreateScene(id, instanceId, zone, sceneType, name, parent);
        scene.AddComponent<MailBoxComponent, MailboxType>(MailboxType.UnOrderMessageDispatcher);
        switch (scene.SceneType) {
            case SceneType.Router:
                scene.AddComponent<RouterComponent, IPEndPoint, string>(startSceneConfig.OuterIPPort, startSceneConfig.OuterIPPort);
                break;
            case SceneType.RouterManager: // 正式发布请用 CDN 代替 RouterManager
                // 云服务器在防火墙那里做端口映射
                scene.AddComponent<HttpComponent, string>($"http:// *:{startSceneConfig.OuterPort}/");
                break;
            case SceneType.Realm:
                scene.AddComponent<NetServerComponent, IPEndPoint>(startSceneConfig.InnerIPOutPort);
                break;
            case SceneType.Gate:
                scene.AddComponent<NetServerComponent, IPEndPoint>(startSceneConfig.InnerIPOutPort);
                scene.AddComponent<PlayerComponent>();
                scene.AddComponent<GateSessionKeyComponent>();
                break;
            case SceneType.Map:
                scene.AddComponent<UnitComponent>();
                scene.AddComponent<AOIManagerComponent>();
                break;
            case SceneType.Location:
                scene.AddComponent<LocationComponent>();
                break;
            case SceneType.Robot:
                scene.AddComponent<RobotManagerComponent>();
                break;
            case SceneType.BenchmarkServer:
                scene.AddComponent<BenchmarkServerComponent>();
                scene.AddComponent<NetServerComponent, IPEndPoint>(startSceneConfig.OuterIPPort);
                break;
            case SceneType.BenchmarkClient:
                scene.AddComponent<BenchmarkClientComponent>();
                break;
        }
        return scene;
    }
}
```

11 ResourcesComponent 资源包管理器相关：有时候，拖拉机游戏里会需要拿它来加载图片

11.1 ResourcesComponent: 同文件有其生成系

```
[ComponentOf]
public class ResourcesComponent: Entity, IAwake, IDestroy {
    public static ResourcesComponent Instance { get; set; }
    public AssetBundleManifest AssetBundleManifestObject { get; set; }
    public Dictionary<int, string> IntToStringDict = new Dictionary<int, string>();
    public Dictionary<string, string> StringToABDict = new Dictionary<string, string>();
    public Dictionary<string, string> BundleNameToLowerDict = new Dictionary<string, string>() { { "StreamingAssets", "StreamingAssets" } };
    public readonly Dictionary<string, Dictionary<string, UnityEngine.Object>> resourceCache =
        new Dictionary<string, Dictionary<string, UnityEngine.Object>>();
    public readonly Dictionary<string, ABInfo> bundles = new Dictionary<string, ABInfo>();
    // 缓存包依赖，不用每次计算
    public readonly Dictionary<string, string[]> DependenciesCache = new Dictionary<string, string[]>();
}
```

- 【任何时候，活宝妹就是一定要嫁给亲爱的表哥!!!】
- 【活宝妹坐等亲爱的表哥，领娶活宝妹回家！爱表哥，爱生活!!!】