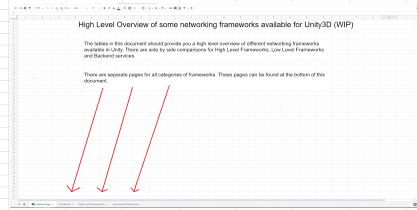# High Level Overview of some networking frameworks available for Unity3D (WIP)

The tables in this document should provide you a high level overview of different networking frameworks available in Unity. There are side by side comparisons for High Level Frameworks, Low Level Frameworks and Backend services.

There are separate pages for all categories of frameworks. These pages can be found at the bottom of this document.

Combined Comparison of both High and Low level frameworks

General

General	Mirror	Photon Unity Networking 2	Photon Bolt	Forge Networking Remastered	Dark Rift 2	MLAPI	SmartFoxServer 2X
Networking Model	Client/Server	Client/Client	Client/Server	Client/Server	Client/Server	Client/Server	Client / Authoritative Server
Unity Integration	Mirror components.	Initial setup wizard. PhotonView components	Bolt Wizard. Bolt components.	Forge Wizard. Forge components.	Message events, Plugins. Client and Server components	MLAPI components	DLL providing API
Highest possible authority	Dedicated server	Master client (1 player)	Dedicated server	Dedicated server	Dedicated server	Dedicated server	Dedicated server
Ease of client hacking	Minimal with dedicated server setup	Always possible for the Master Client unless Photon Server is used	Minimal with dedicated server setup	Minimal with dedicated server setup	Minimal with dedicated server setup	Minimal with dedicated server setup	Minimal, with custom server side validation of client requests
Host Migration	Not built-in. Requires self development	Built-in	Not built-in. Requires self development	Not built-in. Requires self development	Not built-in. Requires self development	Not built-in. Requires self development	Not applicable
Versioning (players of different versions separated)	Supported	Built-in	Supported	Supported	Supported	Supported	Supported
Network callbacks	Built-in	Built-in	Built-in	Built-in	Supported	Built-in	Built-in
Source Code	Open Source	Low level closed. High level open.	Closed Source (might be able to request under certain conditions)	Open Source	Available in paid version	Open Source	Closed Source
Built-in Physics Features/Support	?	?	?	?	?	?	Not supported
Cross-Platform	Desktop, Web, Mobile, Console	Desktop, Web, Mobile, Console	Desktop, Mobile, Console	Desktop, Web, Mobile, Console	Desktop, Mobile, Console, Web (custom listener required)	Desktop, Web, Mobile, Console	Desktop, Web, Mobile, Console
Web-based administration tool							Built-in
Integrated direct database connectivity							Built-in
Analytics for business statistics							Built-in

Hosting Features/Platform

Hosting Features/Platform	Mirror	Photon Unity Networking 2	Photon Bolt	Forge Networking Remastered	Dark Rift 2	MLAPI	SmartFoxServer 2X
Hosting	Dedicated Servers, Client hosted, Local LAN / Wifi	Photon Cloud or your own Photon Servers.	Dedicated Servers, Client hosted, P2P, Local LAN / Wifi	Dedicated Servers, Client hosted, P2P, Local LAN / Wifi	Dedicated Servers, Listen Server, Local LAN / Wifi	Dedicated Servers, Listen Server, Local LAN / Wifi	Dedicated server
Transport layer protocols	TCP, UDP, WebSockets, Steam, Custom	RUDP, TCP, WebSockets	UDP (?)	UDP/RUDP	Bi-channel UDP/TCP, Customizable (steam, custom, websockets)	TCP, UDP, WebSockets, Steam, Custom	TCP, UDP, WS, WSS, HTTP tunneling
Dedicated Game Servers	Built-in	Photon Servers for additional cost	Built-in	Built-in	Built-in	Built-in	Built-in
Listen Servers	Built-in	Built-in	Built-in	Built-in (self-hosted)	Built-in	Built-in	Built-in
Relay Servers	Requires 3rd party services	Built-in (with best region selection)	Built-in	Requires 3rd party services	Requires 3rd party services (steamworks)	Provided as a separate free service	Not applicable
Peer to Peer (P2P)	Not supported	Not supported	Built-in (?)	Steamworks P2P integration (?)	Not built-in. Requires self development	Built-in (Steam P2P)	Not supported
NAT punchthrough	Requires 3rd party services (steam api)	Not needed	Built-in	Built-in (self-hosted)	Requires 3rd party services (steam api)	Provided as a separate free service	Not applicable
LAN support	Built-in	Not supported	Built-in. Internet required for initial connection. Costs to circumvent.	Built-in	Built-in	Built-in	Built-in
Offline mode (single player)	Built-in	Built-in	Built-in	Built-in			Not applicable
Headless Server	Built-in	Photon Servers for additional cost	Built-in	Built-in	Built-in	Built-in	Built-in
Direct IP Connection	Built-in	Not supported	Built-in	Built-in	Built-in	Built-in	Built-in
Multicast (lan discovery)	Built-in	Not supported	Built-in	Built-in	Not built-in. Requires self development	Supported (depends on the used transport)	Not applicable
Server Plugins		Photon Servers for additional cost	Photon Servers for additional cost		Built-in		Extensions (custom server side game logic)

Matchmaking

Matchmaking	Mirror	Photon Unity Networking 2	Photon Bolt	Forge Networking Remastered	Dark Rift 2	MLAPI	SmartFoxServer 2X
Matchmaking	Provided as a separate service	Built-in	Built-in	Not built-in. Requires self development or a 3rd party solution.	Provided as a separate service (requires Pro version)		Built-in
Room list	Provided as a separate service	Built-in	Built-in	Built-in	Not built-in. Requires self development		Built-in
Player Lobbies (ability to communicate)	Built-in	Not built-in. Requires self development (?)	Not built-in. Requires self development (?)	Built-in (is communication possible?)	Not built-in. Requires self development		Built-in
Room List Lobbies (rooms grouped by filters)	Provided as a separate service	Built-in	Built-in Filtering	Built-in	Provided as a separate service (requires Pro version)		Built-in
Custom Room options (player count, room visibility, other config)	Provided as a separate service	Built-in	Built-in	Built-in	Provided as a separate service (requires Pro version)		Built-in
Custom Matchmaking properties and filters	Provided as a separate service	Built-in	Built-in Filtering	Built-in	Provided as a separate service (requires Pro version)		Built-in
Slot Reservation (allows only certain players to join)	Provided as a separate service	Built-in	Built-in (accept and refuse certain connections)	Built-in (ability to ban is available)	Not built-in. Requires self development		Built-in
Invitations and challenges system							Built-in

In-Game

In-Game	Mirror	Photon Unity Networking 2	Photon Bolt	Forge Networking Remastered	Dark Rift 2	MLAPI	SmartFoxServer 2X
Synchronize variables	Syncvars, Command/RPCs, Events	Command/RPC, Events, OnSerializePhotonView	Bolt Wizard, Commands	Forge Wizard, RPCs	Messages/Events, IDarkRiftSerializable	NetworkedVar, Messaging System	Built-in
Animation synchronization	Built-in	Built-in	Built-in	Not built-in. Requires self development	Supported		Not built-in. Requires self development
Custom Networked Events	Built-in (Network Messages, SyncEvent)	Built-in	Built-in (global and targetted)	Built-in	Built-in	Built-in	Built-in
Commands & RPCs	Commands & RPCs	RPCs	Commands/Events	RPCs	MessageReceived/Send Message	ServerRPC and ClientRPC	Built-in
Message target selection (events, RPCs)	Built-in (fully custom)	Built-in (fully custom)	Built-in (fully custom)	Built-in (fully custom)	Built-in (fully custom)	Built-in (fully custom)	Built-in
Custom Properties (arbitrary values available to everyone)	Supported. SyncVars (lists, dicts, sets)	Built-in (RoomProperties)	Built-in (RoomProperties)	Supported	Supported	Supported	Built-in
Networked/Synchronized Timestamp	Built-in	Built-in	Not built-in(?)	Not built-in(?)	Supported	Built-in	Not built-in. Requires self development
Interest Groups/Visibility	Built-in	Built-in	Built-in	Built-in	Not built-in. Requires self development (in roadmap)	Built-in	Built-in
Custom Type Serialization (non RPC)	Built-in	Built-in	Built-in (Stream Bytes)	Built-in	Built-in	Built-in	Built-in
Networked Object Pooling	Supported	Built-in	Built-in (customizable)	Supported	Supported	Supported	Not applicable
Send Rate Customization	Built-in	Built-in	Built-in		Supported	Built-in	Supported
Synchronized map loading	Built-in	Built-in	Built-in	Built-in	Supported	Built-in	Not applicable
Entity Ownership/Control Transfer	Built-in	Built-in	Built-in	Built-in	Supported	Built-in	Supported
Additive Scene Loading	Built-in	Supported	Supported	Built-in	Supported		Not applicable
Physics Scenes	Built-in	Not built-in. Requires self development (?)	Not built-in. Requires self development (?)	Not built-in. Requires self development (?)	Supported		Not applicable
Ban Clients	Supported				Built-in (strike system)		Built-in
Spawn Management (Network Objects)	Built-in	Built-in	Built-in	Built-in	Not built-in. Requires self development	Built-in	Not applicable
RPC Return values					Not built-in. Requires self development	Built-in	Built-in
Dynamically create game Rooms							Built-in
Public and private chat messaging							Built-in
Administrator / Moderator messages							Built-in
Moderator support (kick / ban actions)							Built-in
Flooding filter with auto-kick / auto-ban functions							Built-in
Bad words filter with auto-kick / auto-ban functions							Built-in
Persistent banned users list							Built-in
Persistent Buddy List system							Built-in
Game spectators							Built-in
User profiles and permissions system							Built-in

Gameplay Specific	Mirror	Photon Unity Networking 2	Photon Bolt	Forge Networking Remastered	Dark Rift 2	MLAPI	SmartFoxServer 2X

Gameplay Specific	Mirror	Photon Unity Networking 2	Photon Bolt	Forge Networking Remastered	Dark Rift 2	MLAPI	SmartFoxServer 2X
Rewinding	Not built-in. Requires self development (?)	Not built-in. Requires self development (?)	Built-in hitbox rewinding	Built-in	Not built-in. Requires self development		Requires self development
Lag Compensation	Not built-in. Requires self development (?)	Not built-in. Requires self development (?)	Built-in		Not built-in. Requires self development	Built-in	Requires self development
Client side prediction	Not built-in. Requires self development (?)	Not built-in. Requires self development (?)	Built-in		Not built-in. Requires self development		Requires self development
Authoritative Movement	Supported	Supported	Built-in	Supported	Supported	Supported	Supported
Interpolation/Extrapolation	Built-in and customizable	Built-in and customizable	Built-in, not customizable (?)	Built-in and customizable	Supported	Supported	Requires self development
Reconnection system for unstable clients							Built-in
Dedicated MMO features							Built-in

High Level Frameworks

General	Mirror	Photon Unity Networking 2	Photon Bolt	Forge Networking Remastered	MLAPI	SmartFoxServer 2X
Networking Model	Client/Server	Client/Server	Client/Server	Client/Server	Client/Server	Client / Authoritative Server
Unity Integration	Mirror components.	Initial setup wizard. PhotonView components.	Bolt Wizard. Bolt components.	Forge Wizard. Forge components.	MLAPI components	DLL providing API
Highest possible authority	Dedicated server	Master client (1 player)	Dedicated server	Dedicated server	Dedicated server	Dedicated server
Ease of client hacking	Minimal with dedicated server setup	Always possible for the Master Client unless Photon Server is used	Minimal with dedicated server setup	Minimal with dedicated server setup	Minimal with dedicated server setup	Minimal, with custom server side validation of client requests
Host Migration	Not built-in. Requires self development	Built-in	Not built-in. Requires self development	Not built-in. Requires self development	Not built-in. Requires self development	Not applicable
Versioning (players of different versions separated)	Supported	Built-in	Supported	Supported	Supported	Supported
Network callbacks	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in
Source Code	Open Source	Low level closed. High level open.	Closed Source (might be able to request under certain conditions)	Open Source	Open Source	Closed Source
Built-in Physics Features/Support	?	?	?	?	?	Not supported
Cross-Platform	Desktop, Web, Mobile, Console	Desktop, Web, Mobile, Console	Desktop, Mobile, Console	Desktop, Web, Mobile, Console	Desktop, Web, Mobile, Console	Desktop, Web, Mobile, Console
Web-based administration tool						Built-in
Integrated direct database connectivity						Built-in
Analytics for business statistics						Built-in

Hosting Features/Platform	Mirror	Photon Unity Networking 2	Photon Bolt	Forge Networking Remastered	MLAPI	SmartFoxServer 2X
Hosting	Dedicated Servers, Client hosted, Local LAN / Wifi	Photon Cloud or your own Photon Servers.	Dedicated Servers, Client hosted, P2P, Local LAN / Wifi	Dedicated Servers, Client hosted, P2P, Local LAN / Wifi	Dedicated Servers, Listen Server, Local LAN / Wifi	Dedicated server
Transport layer protocols	TCP, UDP, WebSockets, Steam, Custom	RUDP, TCP, WebSockets	UDP (?)	UDP/RUDP	TCP, UDP, WebSockets, Steam, Custom	TCP, UDP, WS, WSS, HTTP tunneling
Dedicated Game Servers	Built-in	Photon Servers for additional cost	Built-in	Built-in	Built-in	Built-in
Listen Servers	Built-in	Built-in	Built-in	Built-in (self-hosted)	Built-in	Built-in
Relay Servers	Requires 3rd party services	Built-in (with best region selection)	Built-in	Requires 3rd party services	Provided as a separate free service	Not applicable
Peer to Peer (P2P)	Not supported	Not supported	Built-in (?)	Steamworks P2P integration (?)	Built-in (Steam P2P)	Not supported
NAT punchthrough	Requires 3rd party services (steam api)	Not needed	Built-in	Built-in (self-hosted)	Provided as a separate free service	Not applicable
LAN support	Built-in	Not supported	Built-in. Internet required for initial connection. Costs to circumvent.	Built-in	Built-in	Not applicable
Offline mode (single player)	Built-in	Built-in	Built-in	Built-in		Not applicable
Headless Server	Built-in	Photon Servers for additional cost	Built-in	Built-in	Built-in	Built-in
Direct IP Connection	Built-in	Not supported	Built-in	Built-in	Built-in	Built-in
Multicast (lan discovery)	Built-in	Not supported	Built-in	Built-in	Supported (depends on the used transport)	Not applicable
Server Plugins		Photon Servers for additional cost	Photon Servers for additional cost			Extensions (custom server side game logic)

Matchmaking	Mirror	Photon Unity Networking 2	Photon Bolt	Forge Networking Remastered	MLAPI	SmartFoxServer 2X
Matchmaking	Provided as a separate service	Built-in	Built-in	Not built-in. Requires self development or a 3rd party solution.		Built-in
Room list	Provided as a separate service	Built-in	Built-in	Built-in		Built-in
Player Lobbies (ability to communicate)	Built-in	Not built-in. Requires self development (?)	Not built-in. Requires self development (?)	Built-in (is communication possible?)		Built-in
Room List Lobbies (rooms grouped by filters)	Provided as a separate service	Built-in	Built-in Filtering	Built-in		Built-in
Custom Room options (player count, room visibility, other config)	Provided as a separate service	Built-in	Built-in	Built-in		Built-in
Custom Matchmaking properties and filters	Provided as a separate service	Built-in	Built-in Filtering	Built-in		Built-in
Slot Reservation (allows only certain players to join)	Provided as a separate service	Built-in	Built-in (accept and refuse certain connections)	Built-in (ability to ban is available)		Built-in
Invitations and challenges system						

In-Game	Mirror	Photon Unity Networking 2	Photon Bolt	Forge Networking Remastered	MLAPI	SmartFoxServer 2X
Synchronize variables	Syncvars, Command/RPCs, Events	Command/RPC, Events, OnSerializePhotonView	Bolt Wizard, Commands	Forge Wizard, RPCs	NetworkedVar, Messaging System	Built-in
Animation synchronization	Built-in	Built-in	Built-in	Not built-in. Requires self development	Built-in	Not built-in. Requires self development
Custom Networked Events	Built-in (Network Messages, SyncEvent)	Built-in	Built-in (global and targetted)	Built-in	Built-in	Built-in
Commands & RPCs	Commands & RPCs	RPCs	Commands/Events	RPCs	ServerRPC and ClientRPC	Built-in
Message target selection (events, RPCs)	Built-in (fully custom)	Built-in (fully custom)	Built-in (fully custom)	Built-in (fully custom)	Built-in (fully custom)	Built-in
Custom Properties (arbitrary values available to everyone)	Supported. SyncVars (lists, dicts, sets)	Built-in (RoomProperties)	Built-in (RoomProperties)	Supported	Supported	Built-in
Networked/Synchronized Timestamp	Built-in	Built-in	Not built-in(?)	Not built-in(?)	Built-in	Not built-in. Requires self development
Interest Groups/Visibility	Built-in	Built-in	Built-in	Built-in	Built-in	Built-in
Custom Type Serialization (non RPC)	Built-in	Built-in	Built-in (Stream Bytes)	Built-in	Built-in	Built-in
Networked Object Pooling	Supported	Built-in	Built-in (customizable)	Supported	Built-in	Not applicable
Send Rate Customization	Built-in	Built-in	Built-in		Built-in	Supported
Synchronized map loading	Built-in	Built-in	Built-in	Built-in	Built-in	Not applicable
Entity Ownership/Control Transfer	Built-in	Built-in	Built-in	Built-in	Built-in	Supported
Additive Scene Loading	Built-in	Supported	Supported	Built-in		Not applicable
Physics Scenes	Built-in	Not built-in. Requires self development (?)	Not built-in. Requires self development (?)	Not built-in. Requires self development (?)		Not applicable
Ban Clients	Supported				Built-in	Built-in
Spawn Management (Network Objects)	Built-in	Built-in	Built-in	Built-in	Built-in	Not applicable
RPC Return values					Built-in	Built-in
Dynamically create game Rooms						Built-in
Public and private chat messaging						Built-in
Administrator / Moderator messages						Built-in
Moderator support (kick / ban actions)						Built-in
Flooding filter with auto-kick / auto-ban functions						Built-in
Bad words filter with auto-kick / auto-ban functions						Built-in
Persistent banned users list						Built-in
Persistent Buddy List system						Built-in
Game spectators						Built-in
User profiles and permissions system						Built-in

Gameplay Specific	Mirror	Photon Unity Networking 2	Photon Bolt	Forge Networking Remastered	MLAPI	SmartFoxServer 2X

Gameplay Specific	Mirror	Photon Unity Networking 2	Photon Bolt	Forge Networking Remastered	MLAPI	SmartFoxServer 2X	
Rewinding	Not built-in. Requires self development (?)	Not built-in. Requires self development (?)	Built-in hitbox rewinding	Built-in		Requires self development	
Lag Compensation	Not built-in. Requires self development (?)	Not built-in. Requires self development (?)	Built-in		Built-in	Requires self development	
Client side prediction	Not built-in. Requires self development (?)	Not built-in. Requires self development (?)	Built-in			Requires self development	
Authoritative Movement	Supported	Supported	Built-in	Supported	Supported	Supported	
Interpolation/Extrapolation	Built-in and customizable	Built-in and customizable	Built-in, not customizable (?)	Built-in and customizable	Supported	Requires self development	
Reconnection system for unstable clients						Built-in	
Dedicated MMO features						Built-in	

Low Level Frameworks

General	Dark Rift 2	LiteNetLib				
Networking Model	Client/Server					
Unity Integration	Message events, Plugins. Client and Server components					
Highest possible authority	Dedicated server					
Ease of client hacking	Minimal with dedicated server setup					
Host Migration	Not built-in. Requires self development					
Versioning (players of different versions separated)	Supported					
Network callbacks	Supported					
Source Code	Available in paid version					
Built-in Physics Features/Support	?					
Cross-Platform	Desktop, Mobile, Console, Web (custom listener required)					

Hosting Features/Platform	Dark Rift 2					
Hosting	Dedicated Servers, Listen Server, Local LAN / Wifi					
Transport layer protocols	Bi-channel UDP/TCP, Customizable (steam, custom, websockets)					
Dedicated Game Servers	Built-in					
Listen Servers	Built-in					
Relay Servers	Requires 3rd party services (steamworks)					
Peer to Peer (P2P)	Not built-in. Requires self development					
NAT punchthrough	Requires 3rd party services (steam api)					
LAN support	Built-in					
Offline mode (single player)						
Headless Server	Built-in					
Direct IP Connection	Built-in					
Multicast (lan discovery)	Not built-in. Requires self development					
Server Plugins	Built-in					

Matchmaking	Dark Rift 2					
Matchmaking	Provided as a separate service (requires Pro version)					
Room list	Not built-in. Requires self development					
Player Lobbies (ability to communicate)	Not built-in. Requires self development					
Room List Lobbies (rooms grouped by filters)	Provided as a separate service (requires Pro version)					
Custom Room options (player count, room visibility, other config)	Provided as a separate service (requires Pro version)					
Custom Matchmaking properties and filters	Provided as a separate service (requires Pro version)					
Slot Reservation (allows only certain players to join)	Not built-in. Requires self development					

In-Game	Dark Rift 2					
Synchronize variables	Messages/Events, IDarkRiftSerializable					
Animation synchronization	Supported					
Custom Networked Events	Built-in					
Commands & RPCs	MessageReceived/Send Message					
Message target selection (events, RPCs)	Built-in (fully custom)					
Custom Properties (arbitrary values available to everyone)	Supported					
Networked/Synchronized Timestamp	Supported					
Interest Groups/Visibility	Not built-in. Requires self development (in roadmap)					
Custom Type Serialization (non RPC)	Built-in					
Networked Object Pooling	Supported					
Send Rate Customization	Supported					
Synchronized map loading	Supported					
Entity Ownership/Control Transfer	Supported					
Additive Scene Loading	Supported					
Physics Scenes	Supported					
Ban Clients	Built-in (strike system)					
Spawn Management (Network Objects)	Not built-in. Requires self development					
RPC Return values	Not built-in. Requires self development					

Gameplay Specific	Dark Rift 2					
Rewinding	Not built-in. Requires self development					
Lag Compensation	Not built-in. Requires self development					
Client side prediction	Not built-in. Requires self development					
Authoritative Movement	Supported					
Interpolation/Extrapolation	Supported					