

# What's New in Game Center

Session 611

Megan Gardner Software Engineer

# Game Center

Social gaming network

Leaderboards

Achievements

Challenges

Multiplayer

iOS, macOS, tvOS, and watchOS



# New in Game Center

New way of sending multiplayer invites

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Big news for the Game Center app

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New API: Persistent Game Sessions

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Apple Watch support

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New API: Persistent Game Sessions

Apple Watch support

# Messages-Based Multiplayer Invites

Play with anyone you can message



# Game Center Multiplayer

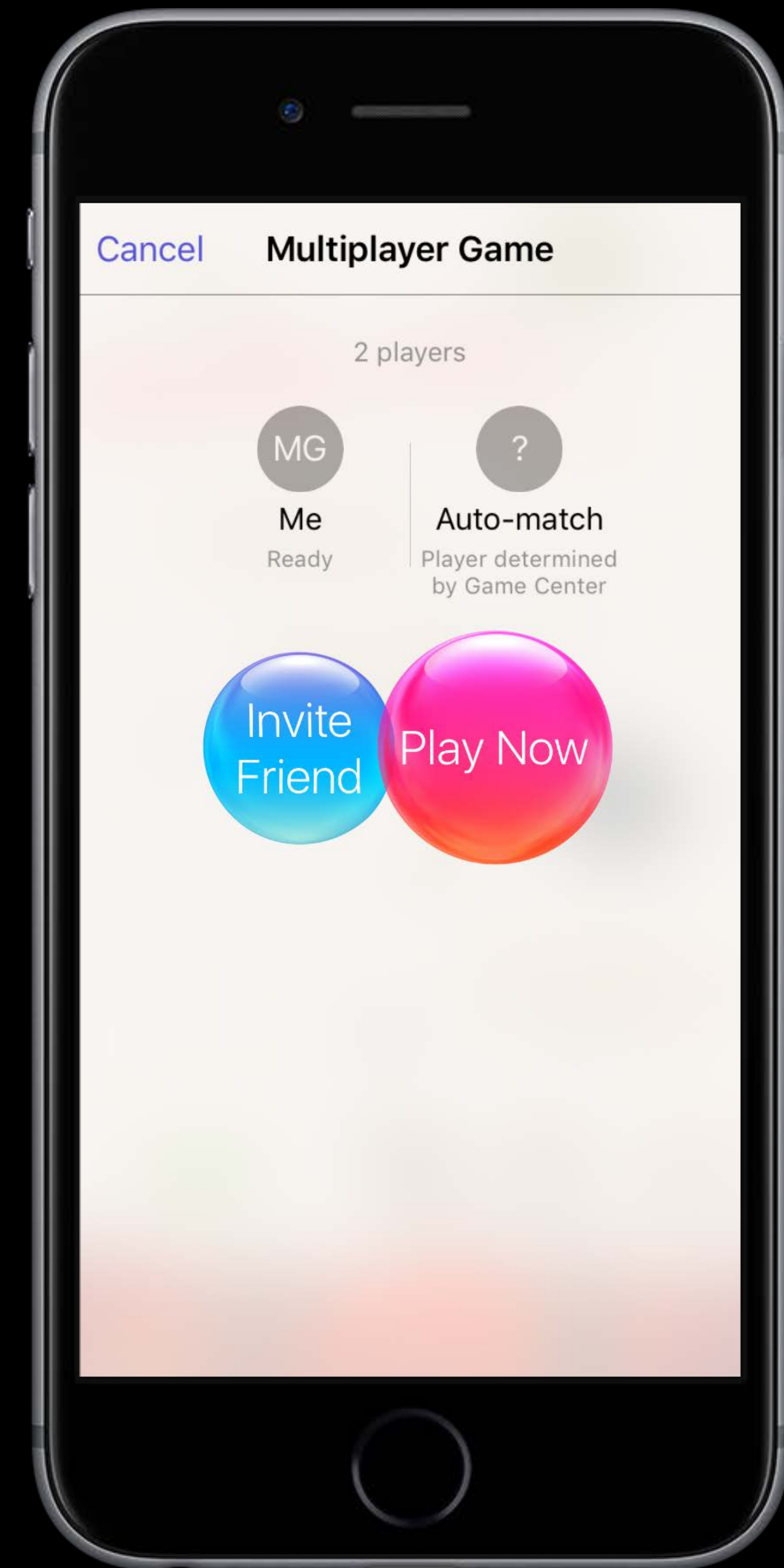
Current state

GKMatchmakerViewController

- Built-in UI
- Invite friends
- Play now (automatch)

GKMatchmaker

- Programmatic API
- Create and process invites



# Messages-Based Invites

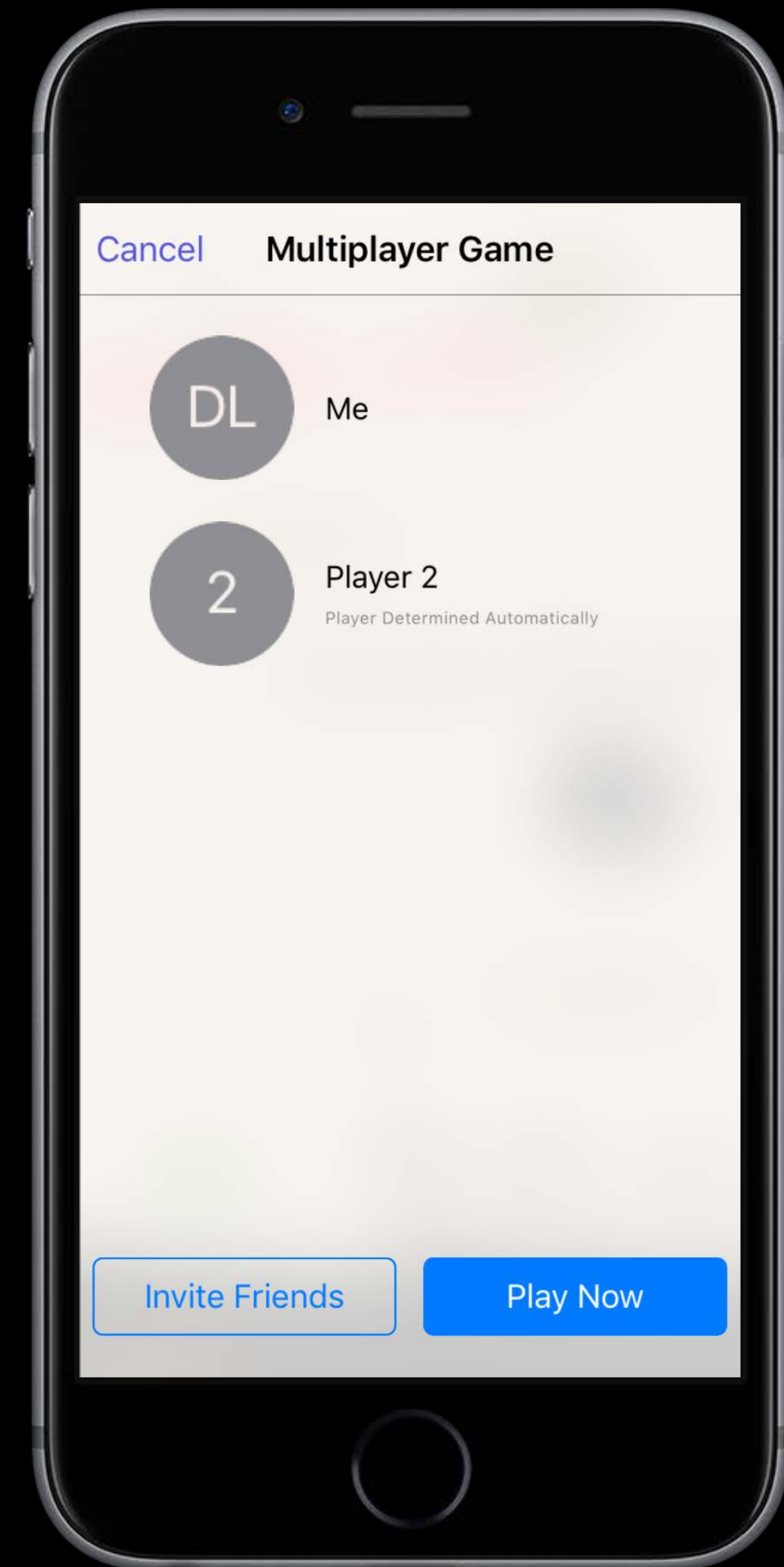
NEW

New integrated Messages View Controller

- Built into GKMatchmakerViewController
- No code changes required

Invite anybody

- Send invites via Messages and iCloud

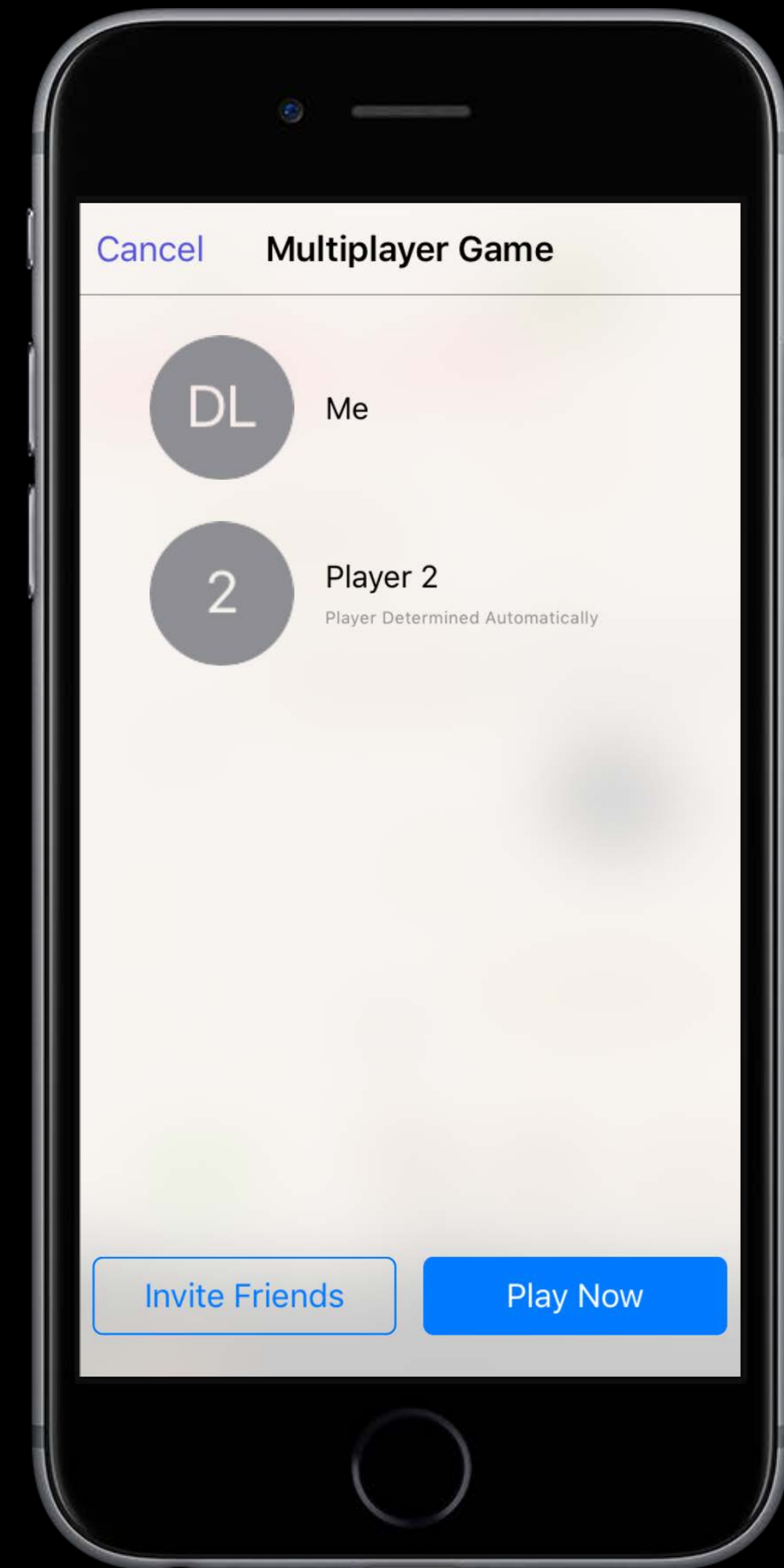


# Messages-Based Invites

Built-in UI

Generates Rich Link

Based on iCloud

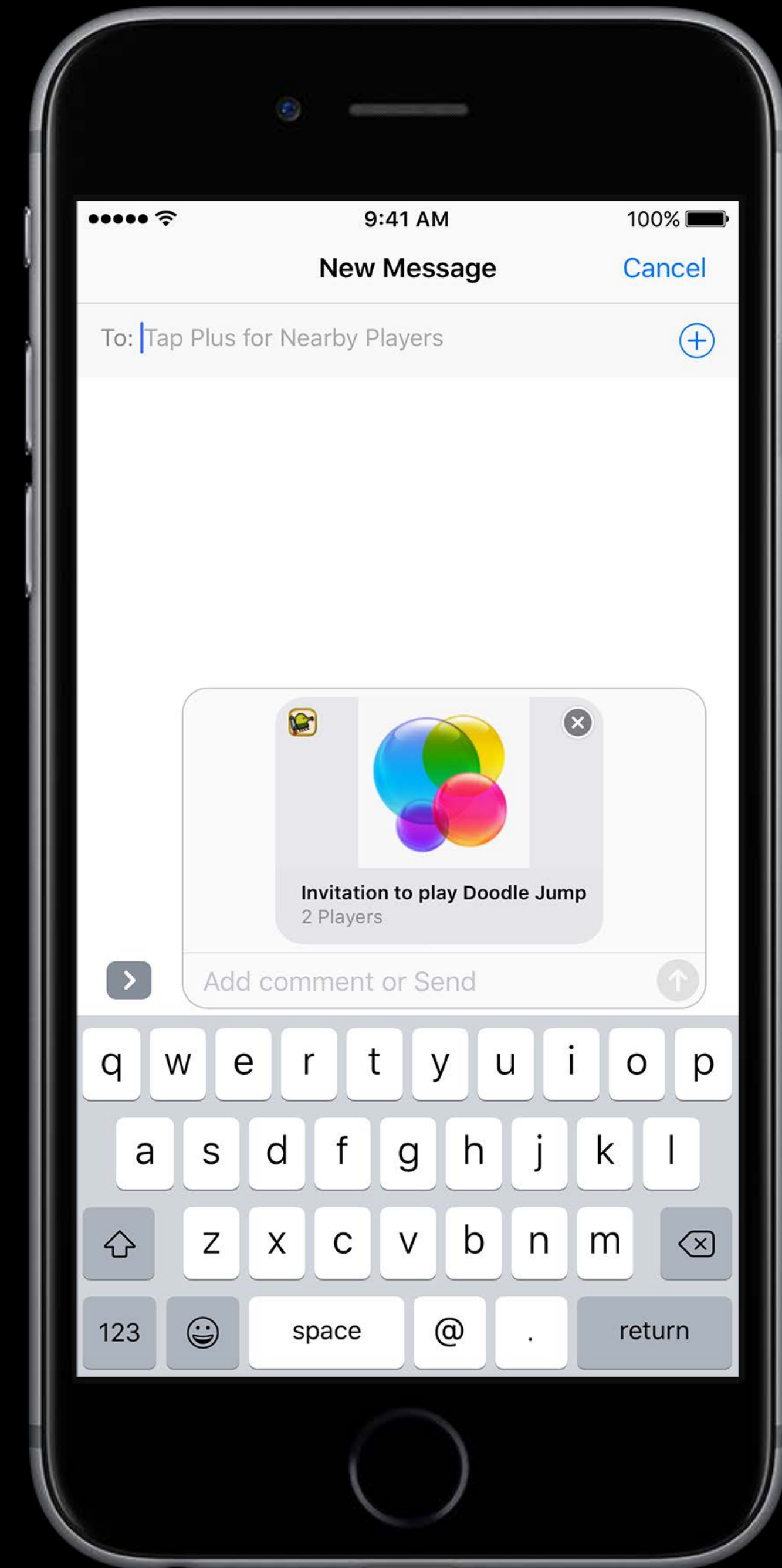


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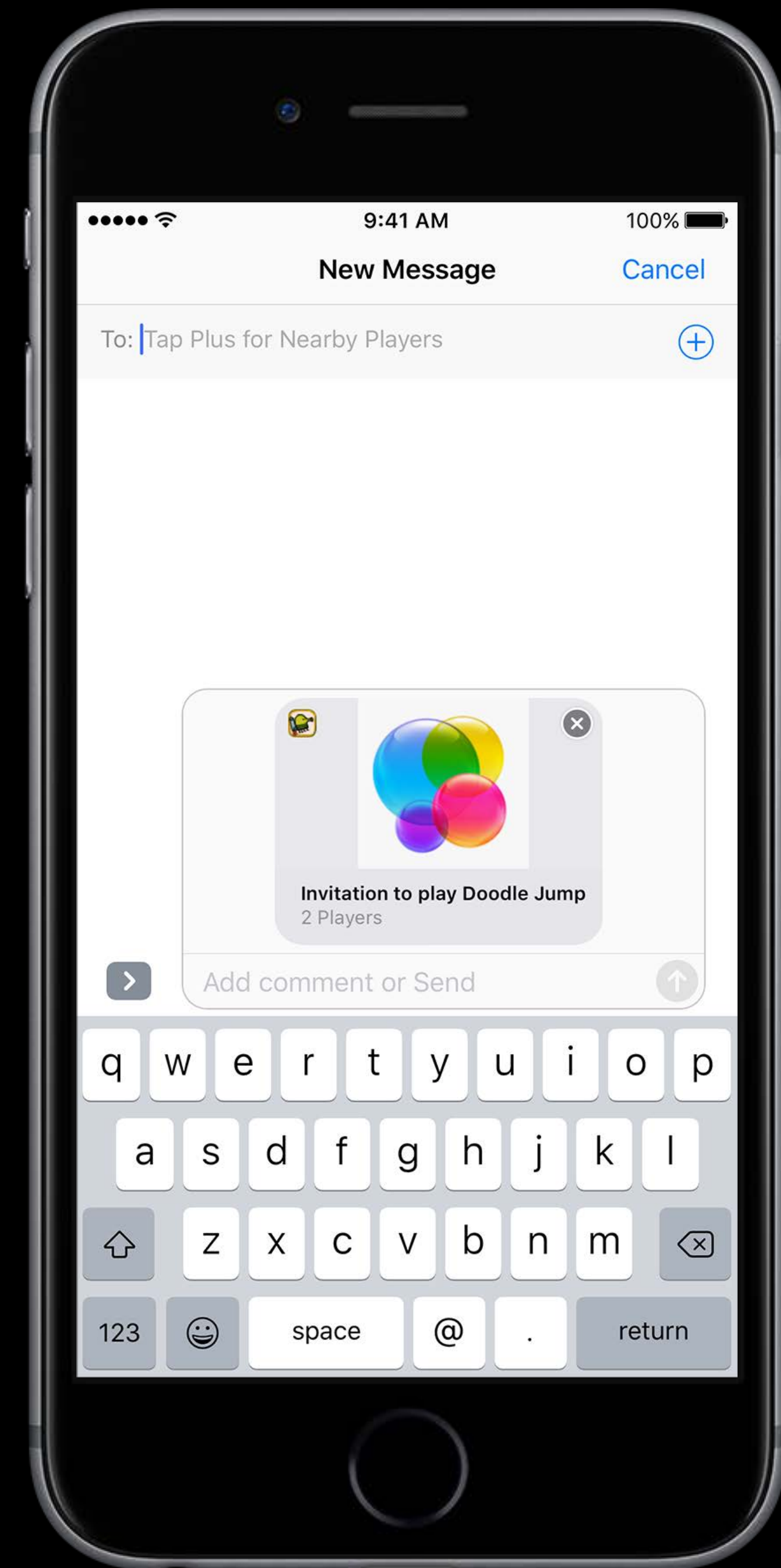


# Messages-Based Invites

## Built-in UI

Player selects invitees

- Contacts
- Game Center friends
- Nearby



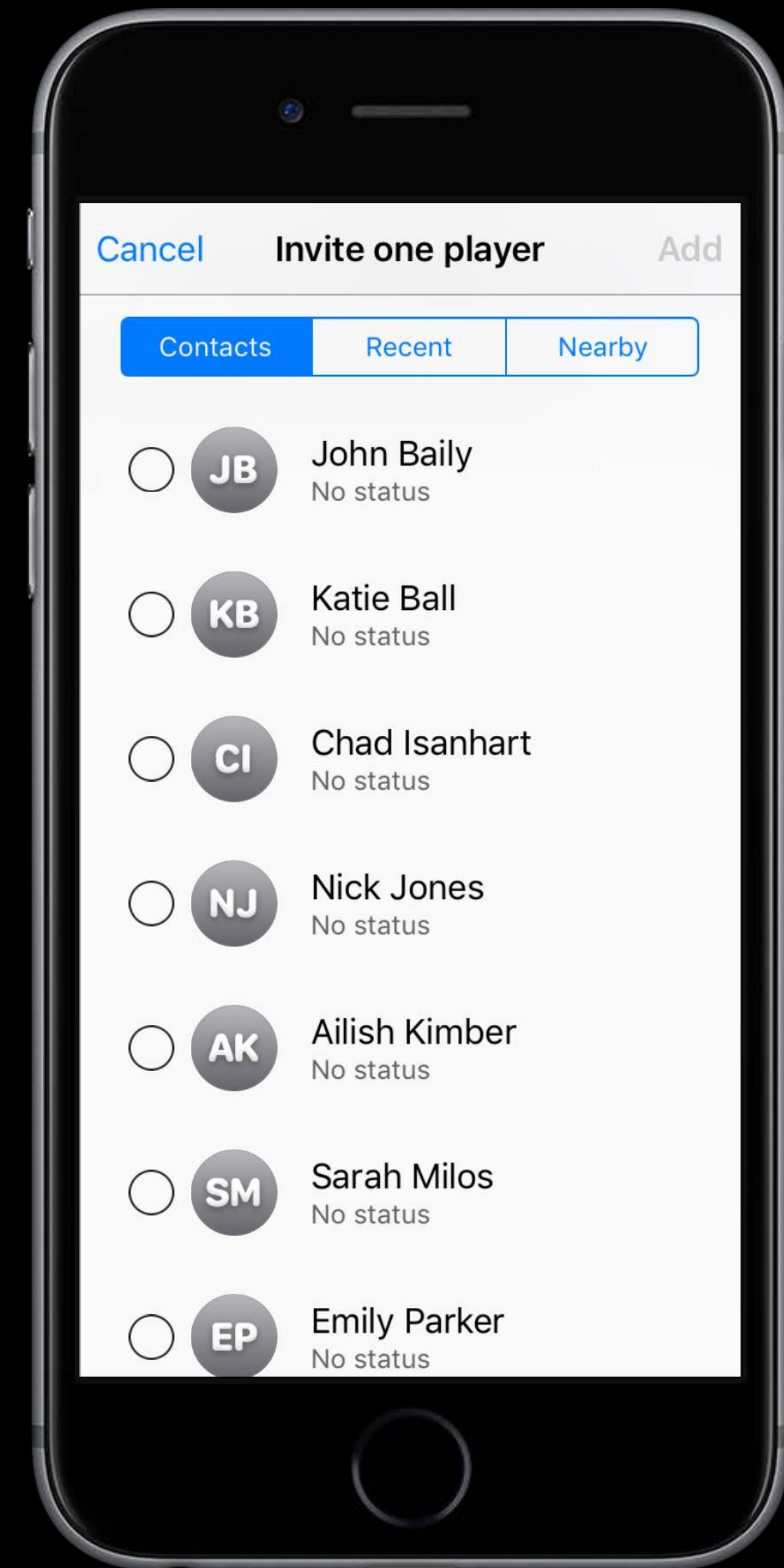


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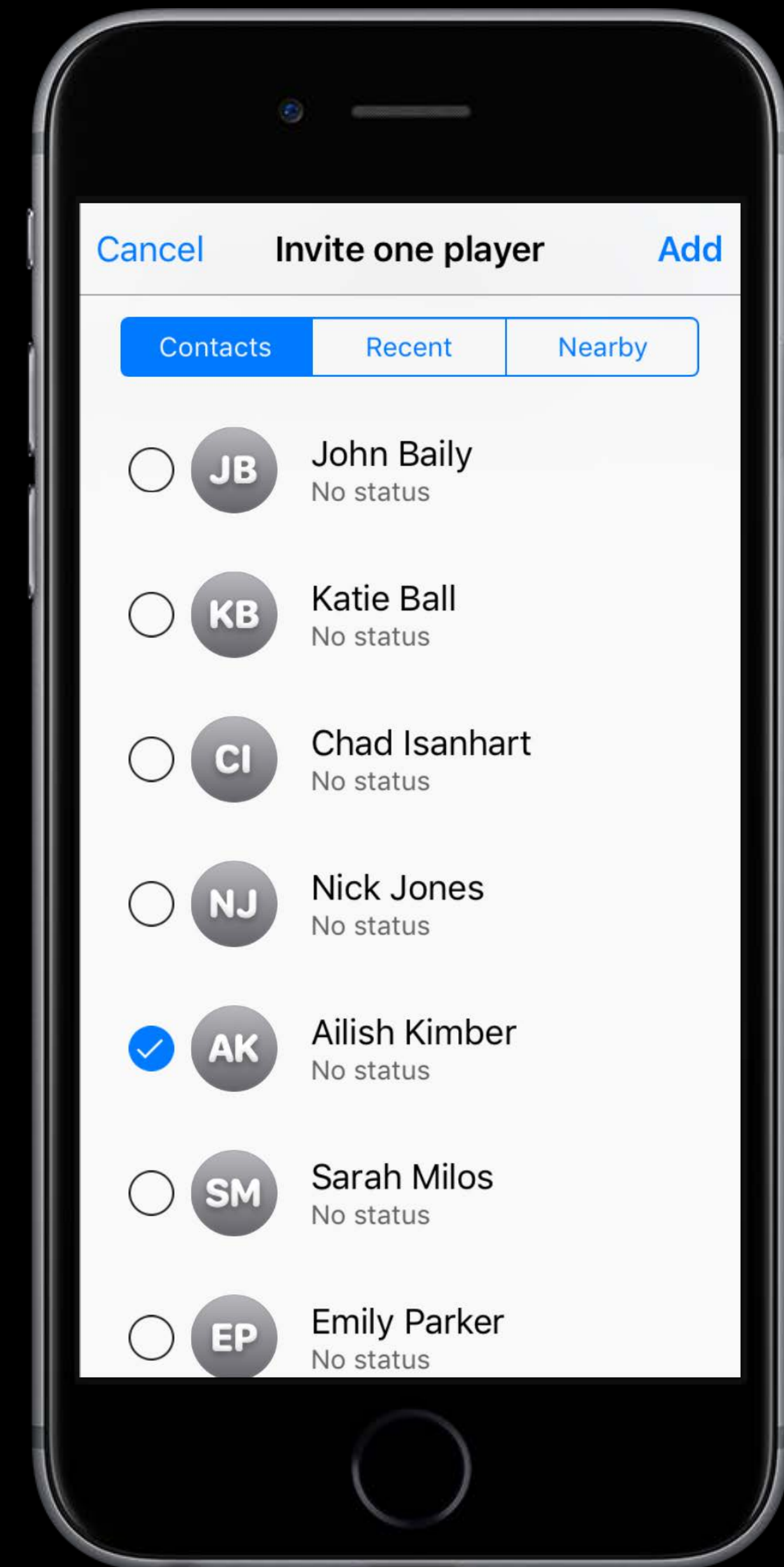


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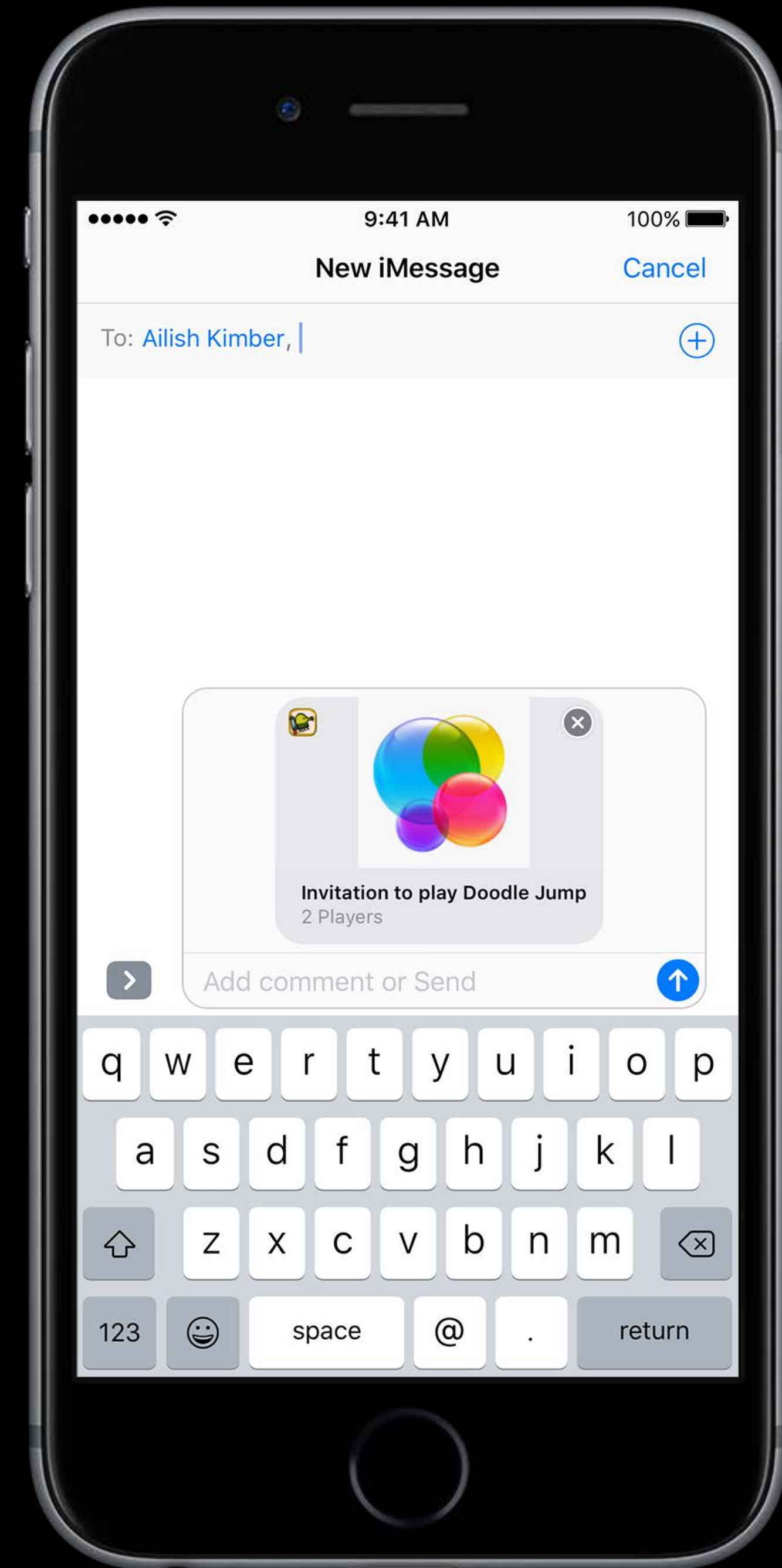


# Messages-Based Invites

## Built-in UI

### Send Message

- Can add additional text
- Sends to all players
- Game Center accounts get a notification



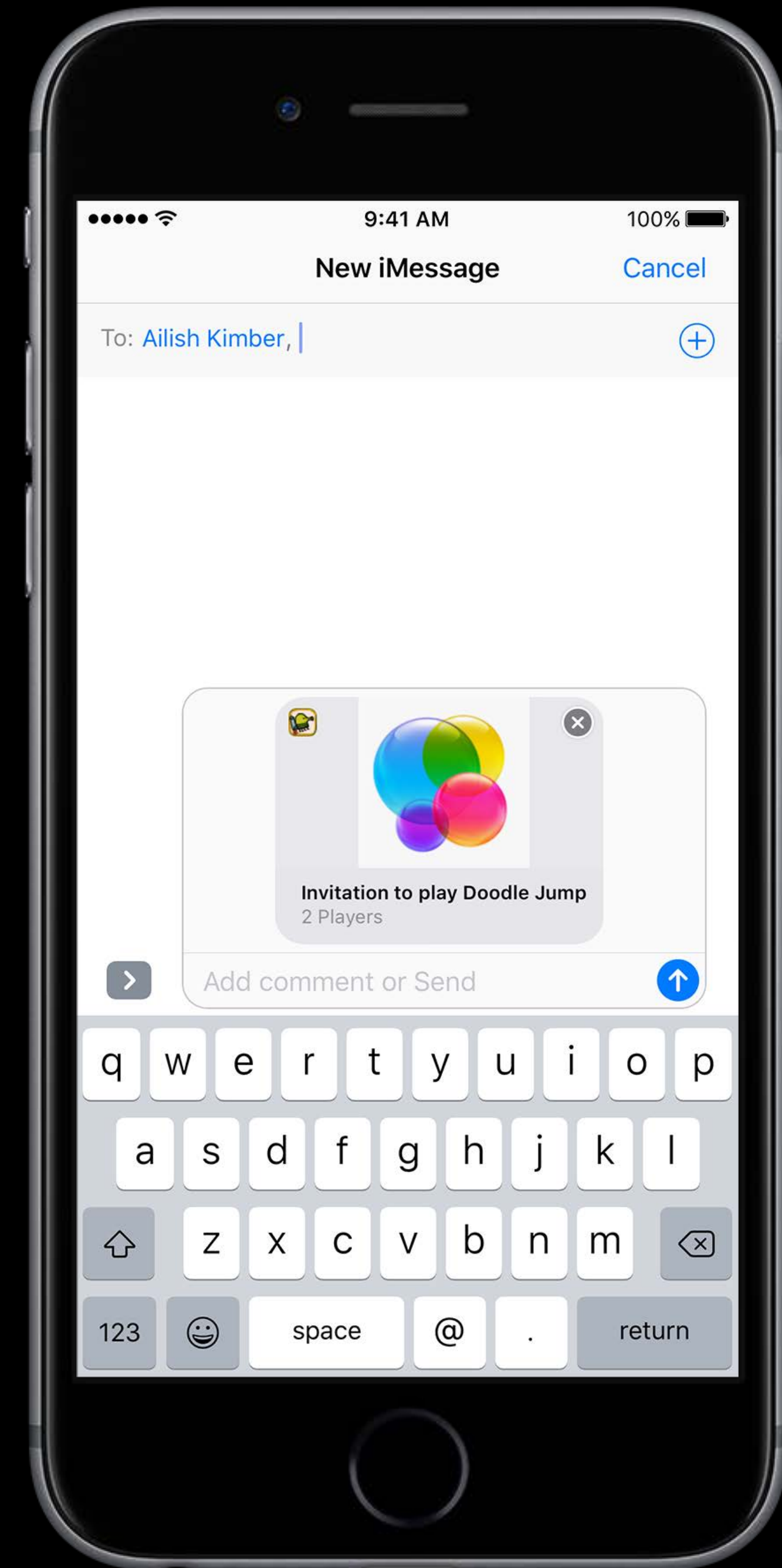


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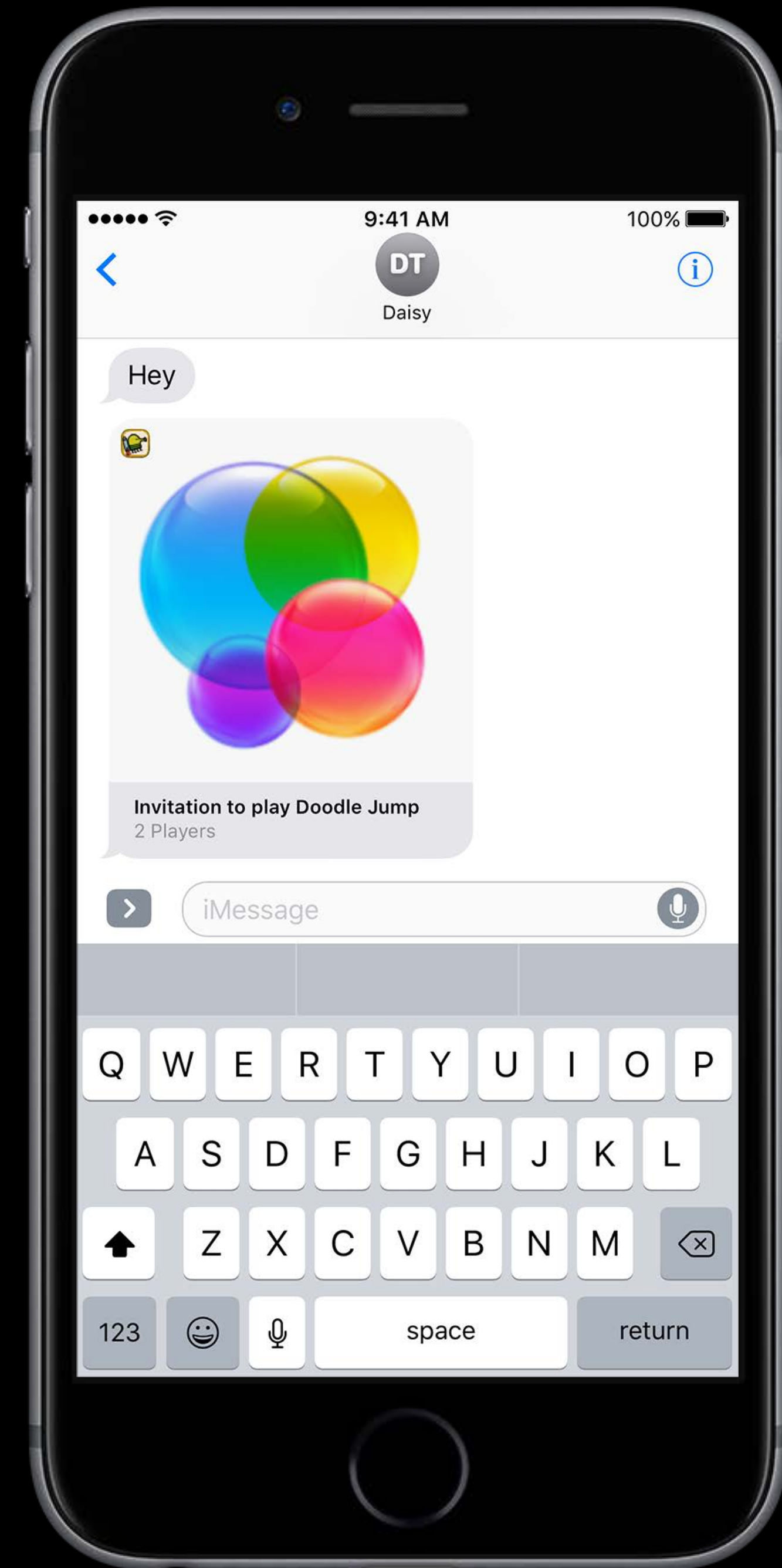


# Messages-Based Invites

## Built-in UI

Invitee accepts

- Taps the link to accept
- Takes into the game
  - Or App Store if game is not installed

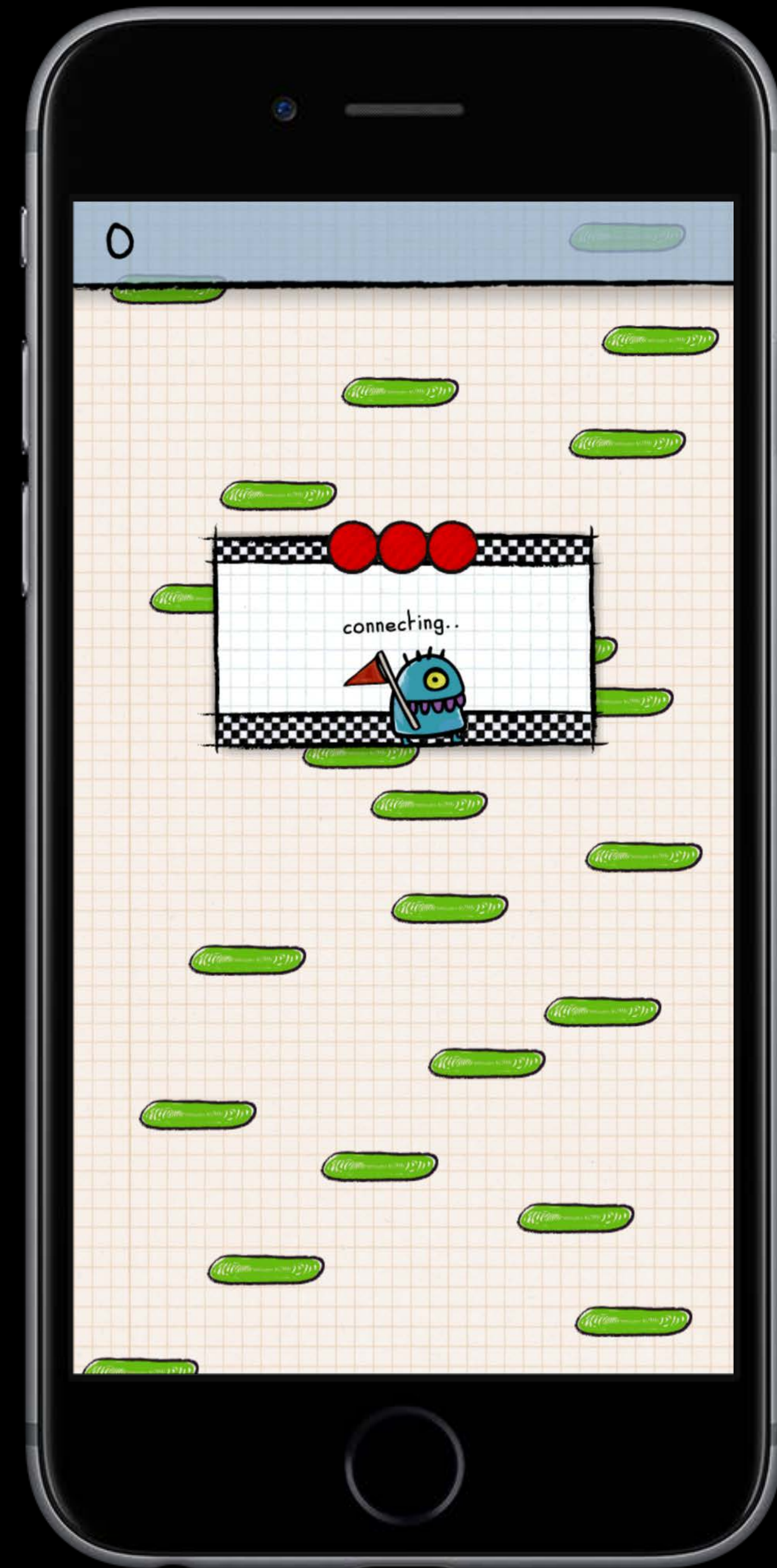


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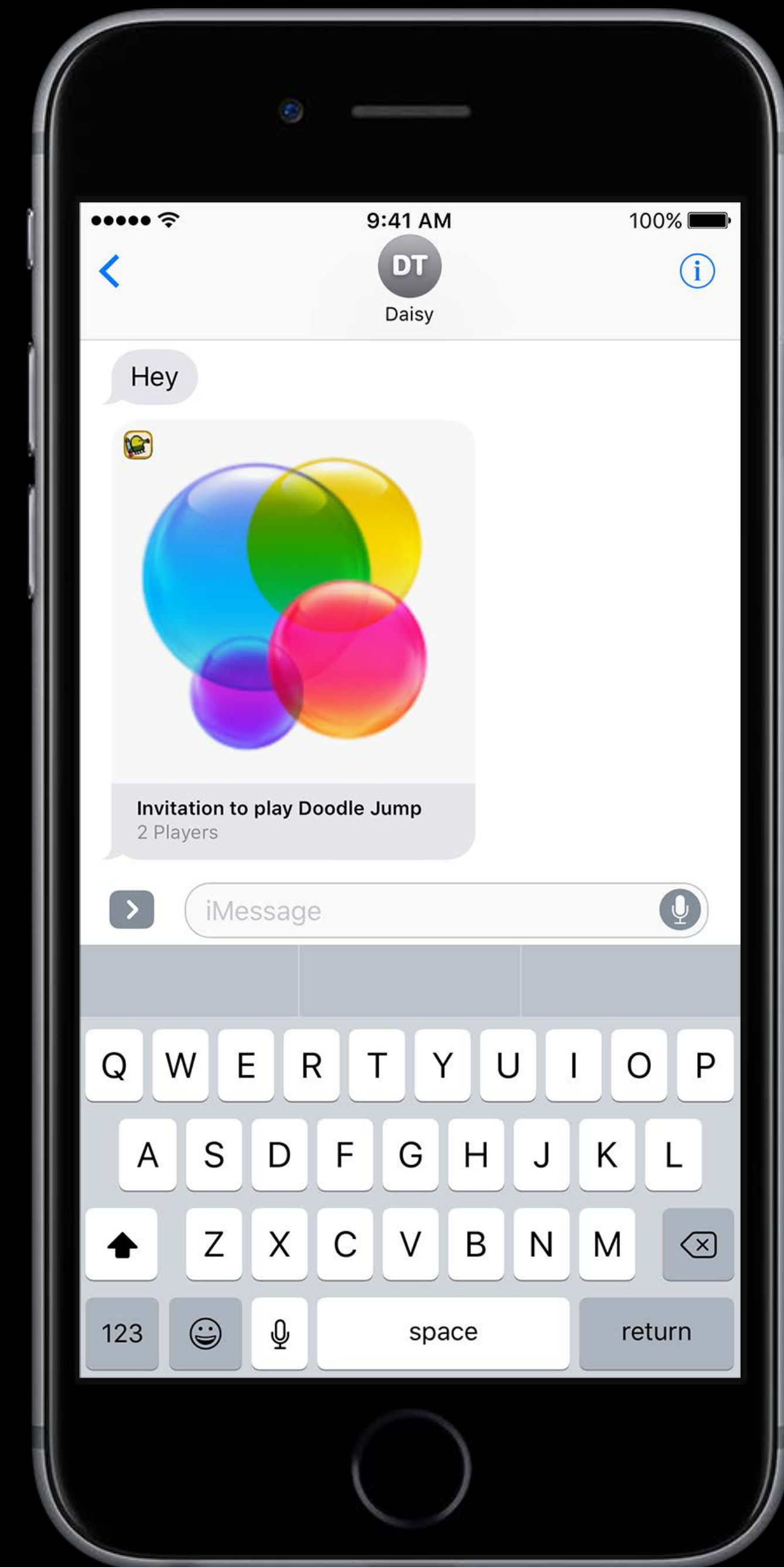
# Messages-Based Invites

Rich link image

Shown with invite

Filename: GKMessageInvite.png

Height and Width: 150px - 960px



# Game Center Friends

Friends list frozen

- No longer a prerequisite for multiplayer
- Friends visible in Recent Players tab

GKFriendRequestComposeViewController deprecated

- Allowed apps to present UI to send friend requests
- Rarely seen

Game Center App

# Game Center App

Manage account

Manage friends

Browse games list

Browse leaderboards

View achievements

View challenges

View turns





# Game Center App

Manage account

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# Game Center App

Manage account

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Browse games list

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# Game Center in iOS

Manage account	Settings
Manage friends	Settings
Browse games	App Store
View leaderboards	GKGameCenterViewController
View achievements	GKGameCenterViewController
Send and view challenges	GKGameCenterViewController
View and take turns	GKTurnBasedMatchmakerViewController

# Game Sessions

A brand new way to multiplayer

# Game Center Multiplayer

## Real-time

- Connects 2-4 players
- Requires all players to keep running app
- Peer-to-peer connections for duration of match

## Turn-based

- Connects 2-16 players
- Formal passing of turns among players
- Games stored by Game Center until aged out

# Game Sessions

iCloud-based multiplayer

Generalized interface for saving and sharing game data

Easily sharable instances

Flexible game structure

Real time session streams

Play with anyone

# Game Sessions

Data and Player



# Game Sessions

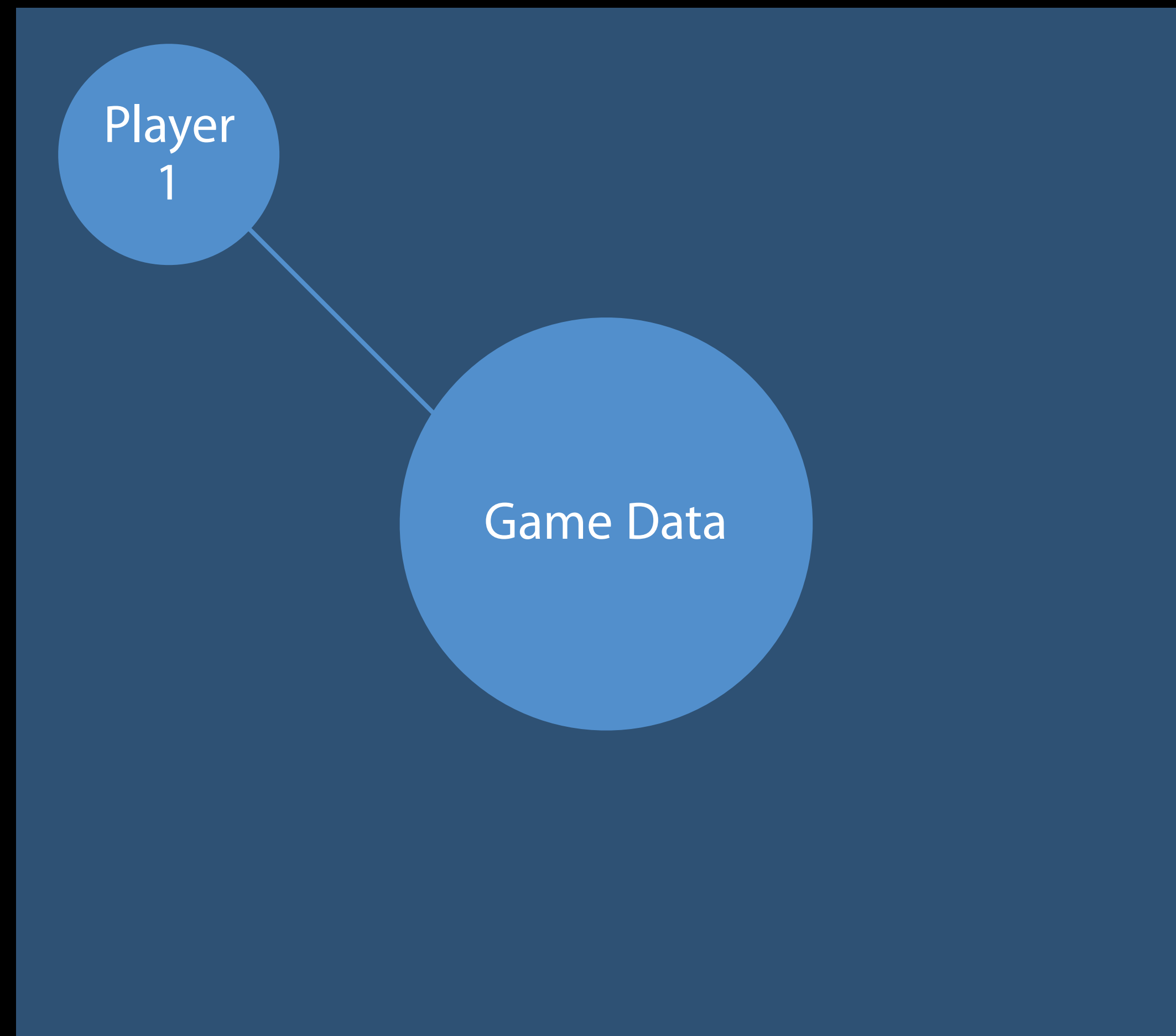
Data and Player





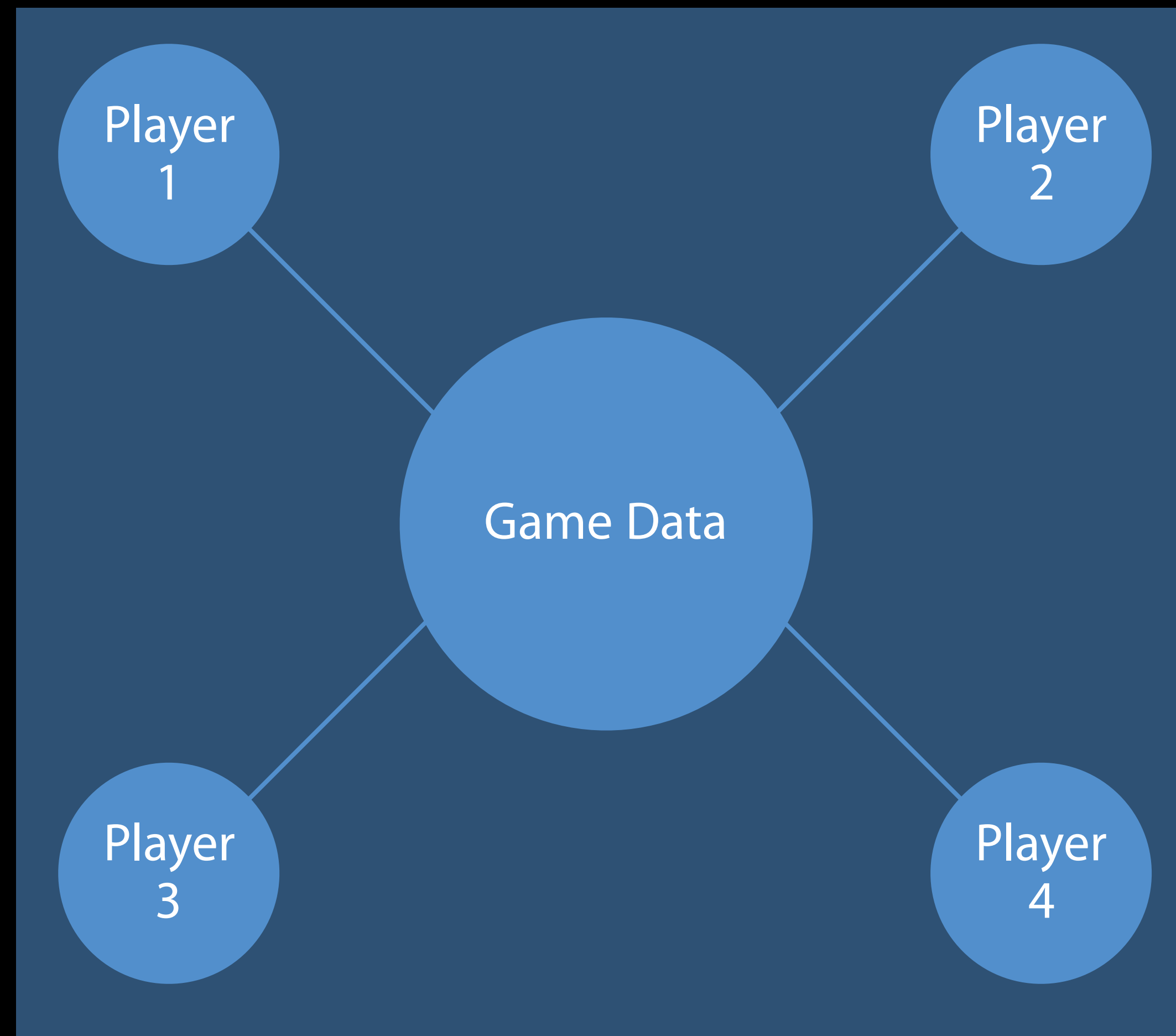
# Game Sessions

## Data and Player



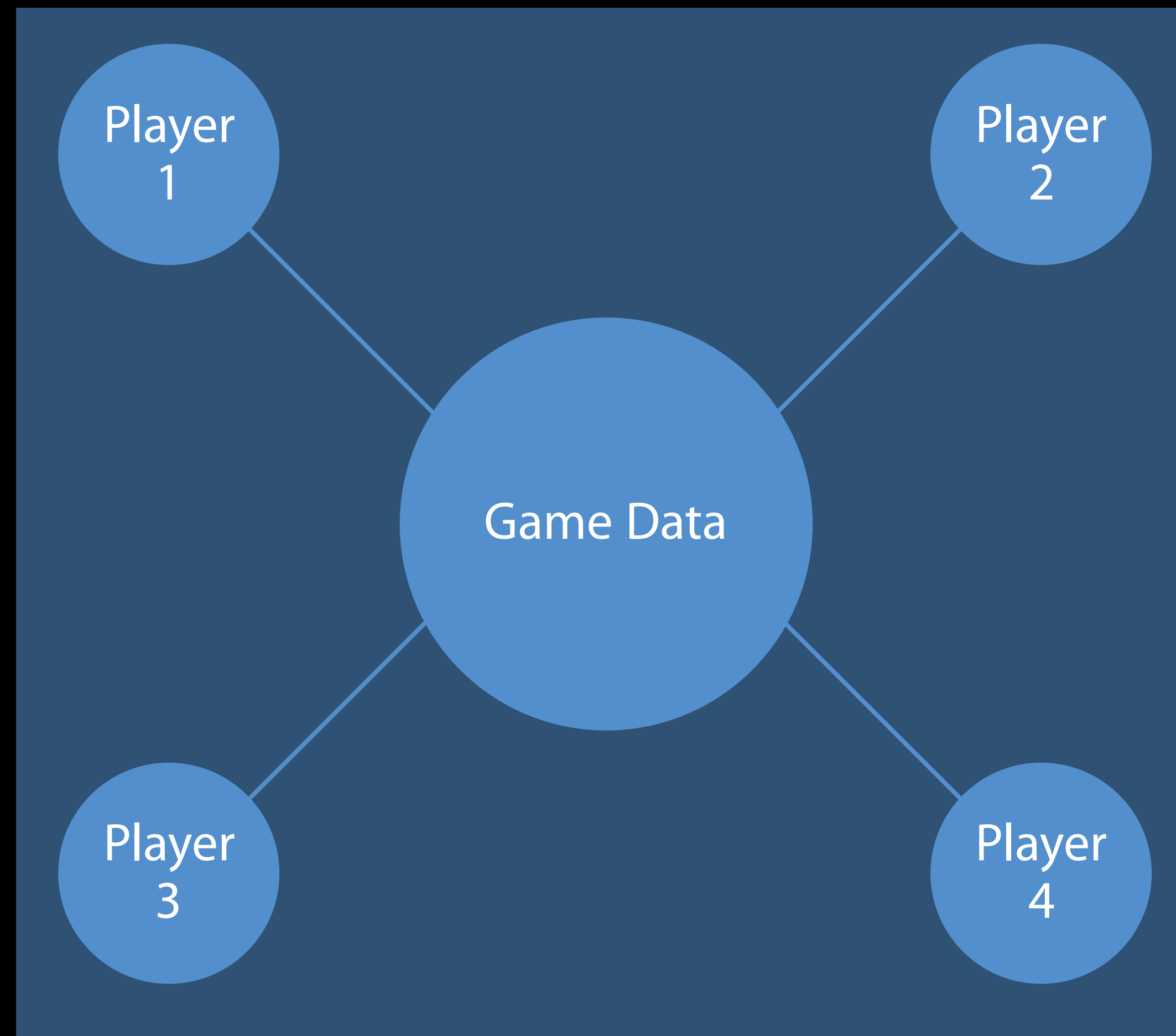
# Game Sessions

Multiple players



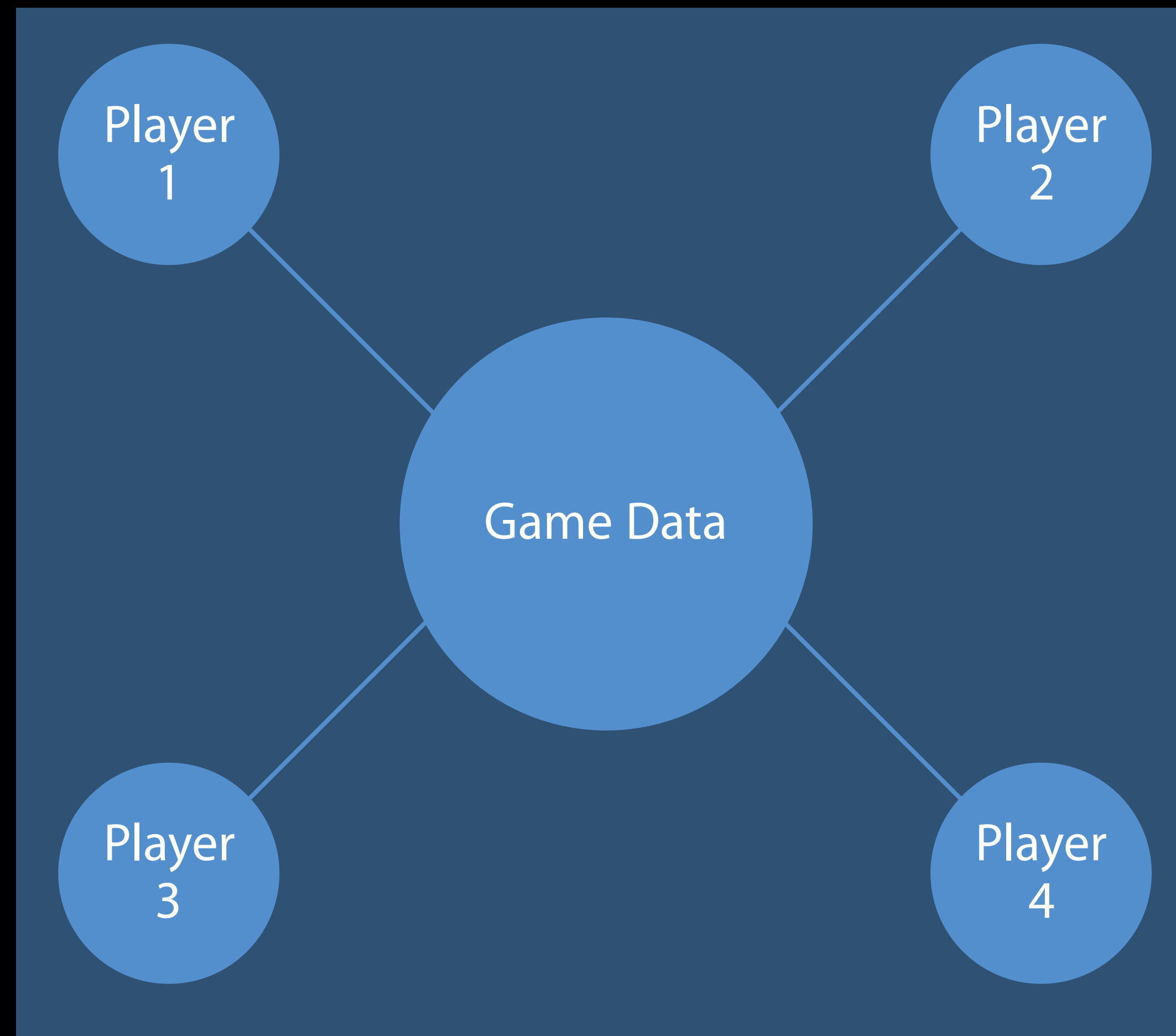
# Game Sessions

Message passing



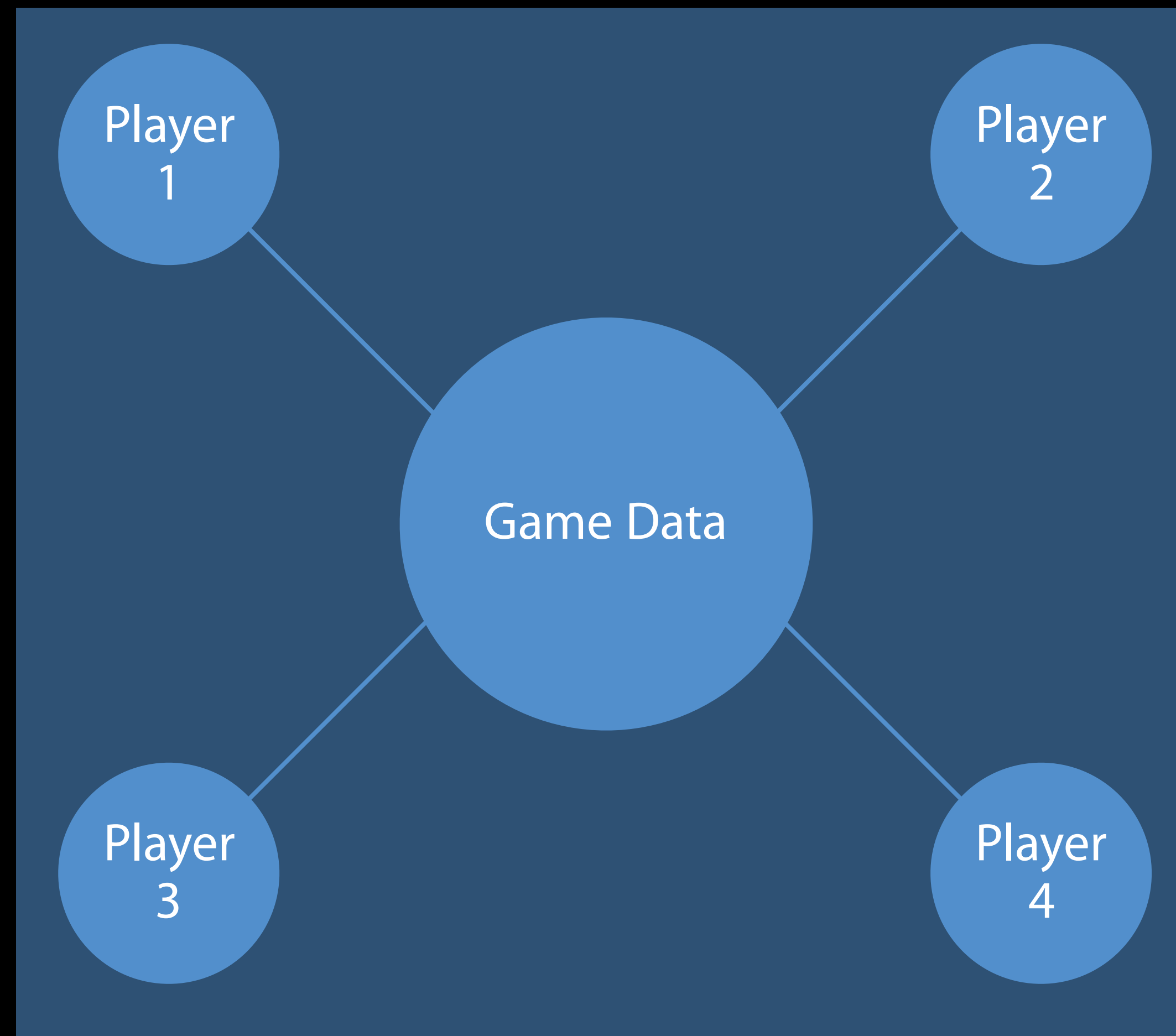
# Game Sessions

Message passing



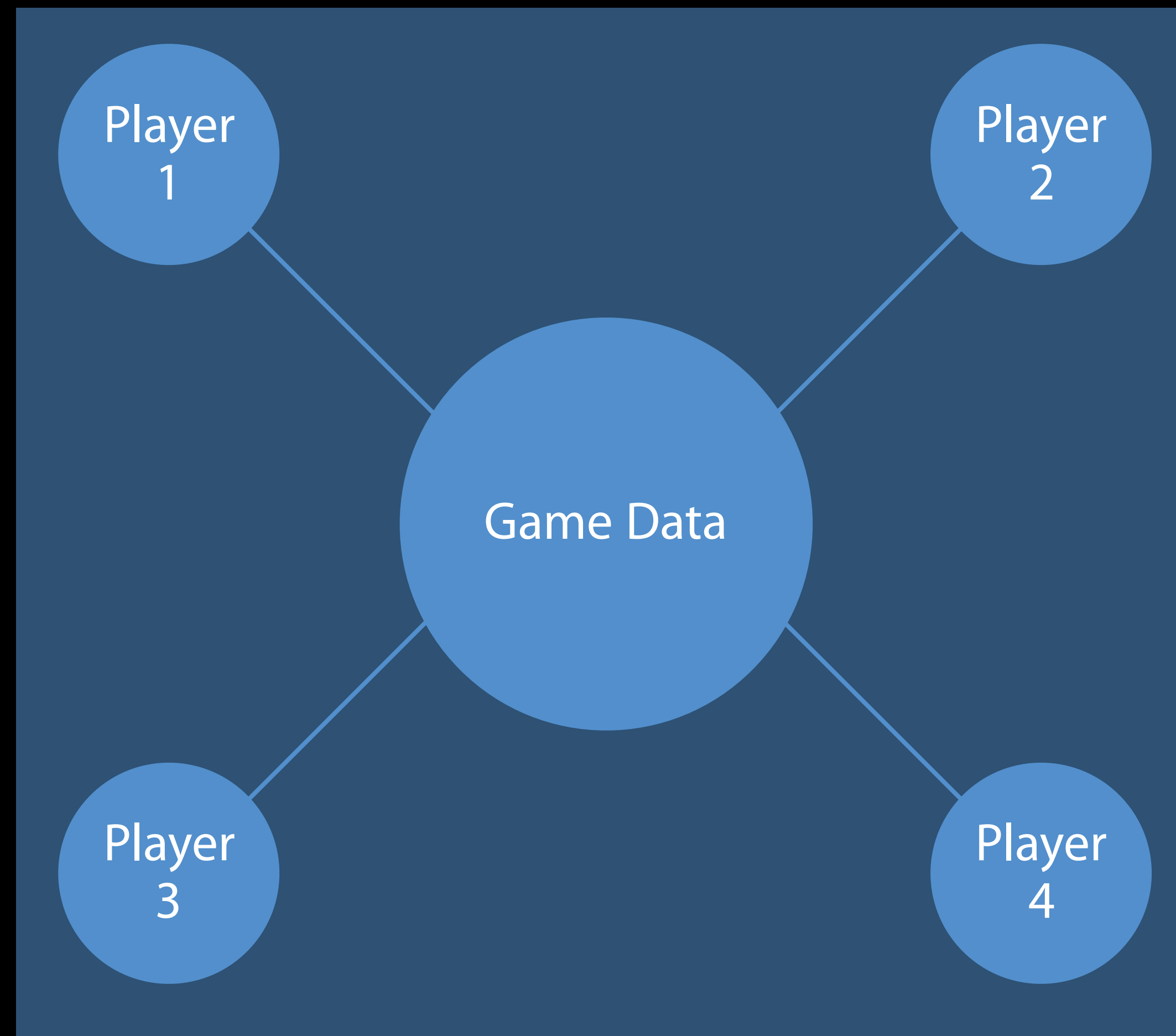
# Game Sessions

Message passing



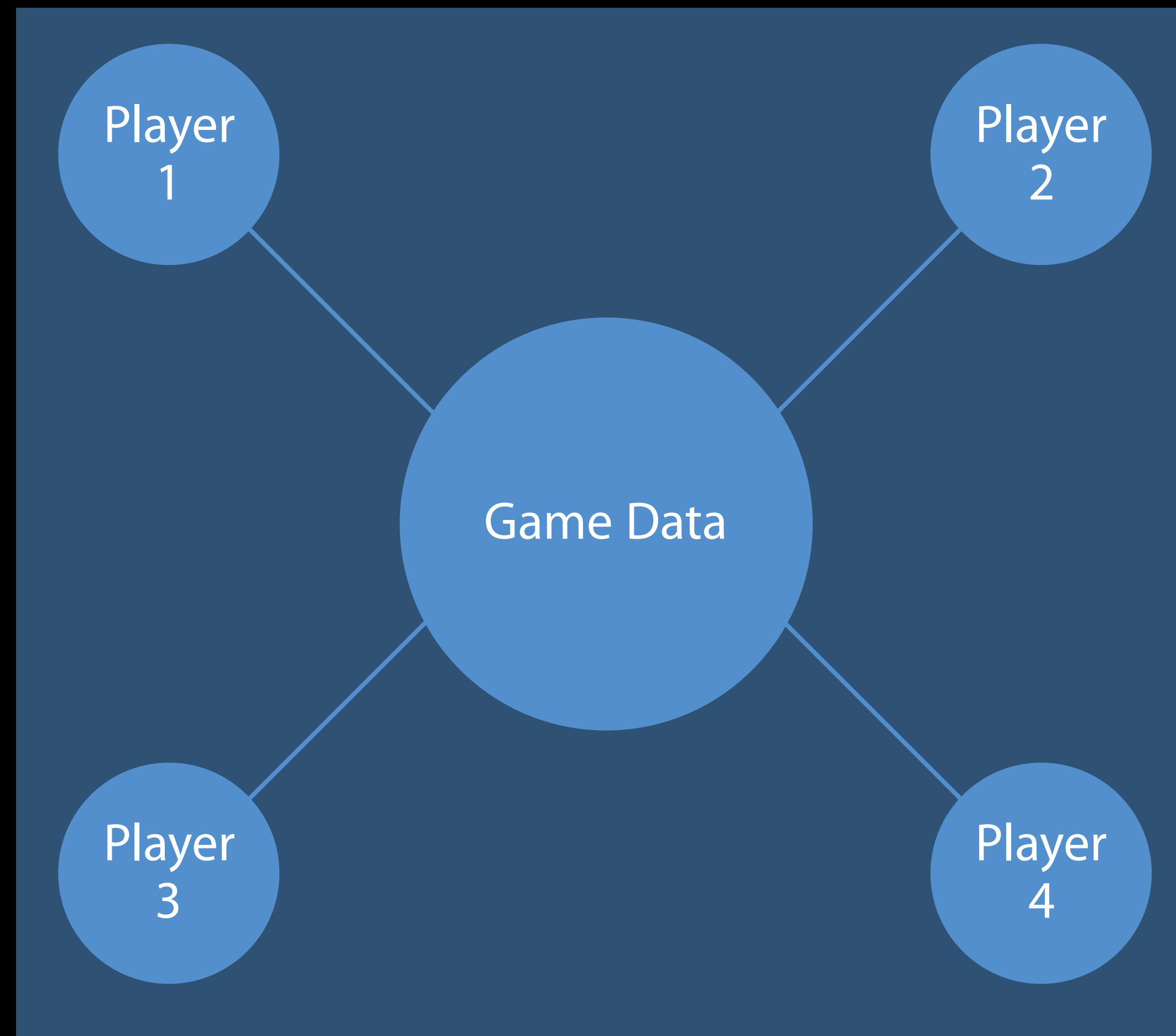
# Game Sessions

Message passing



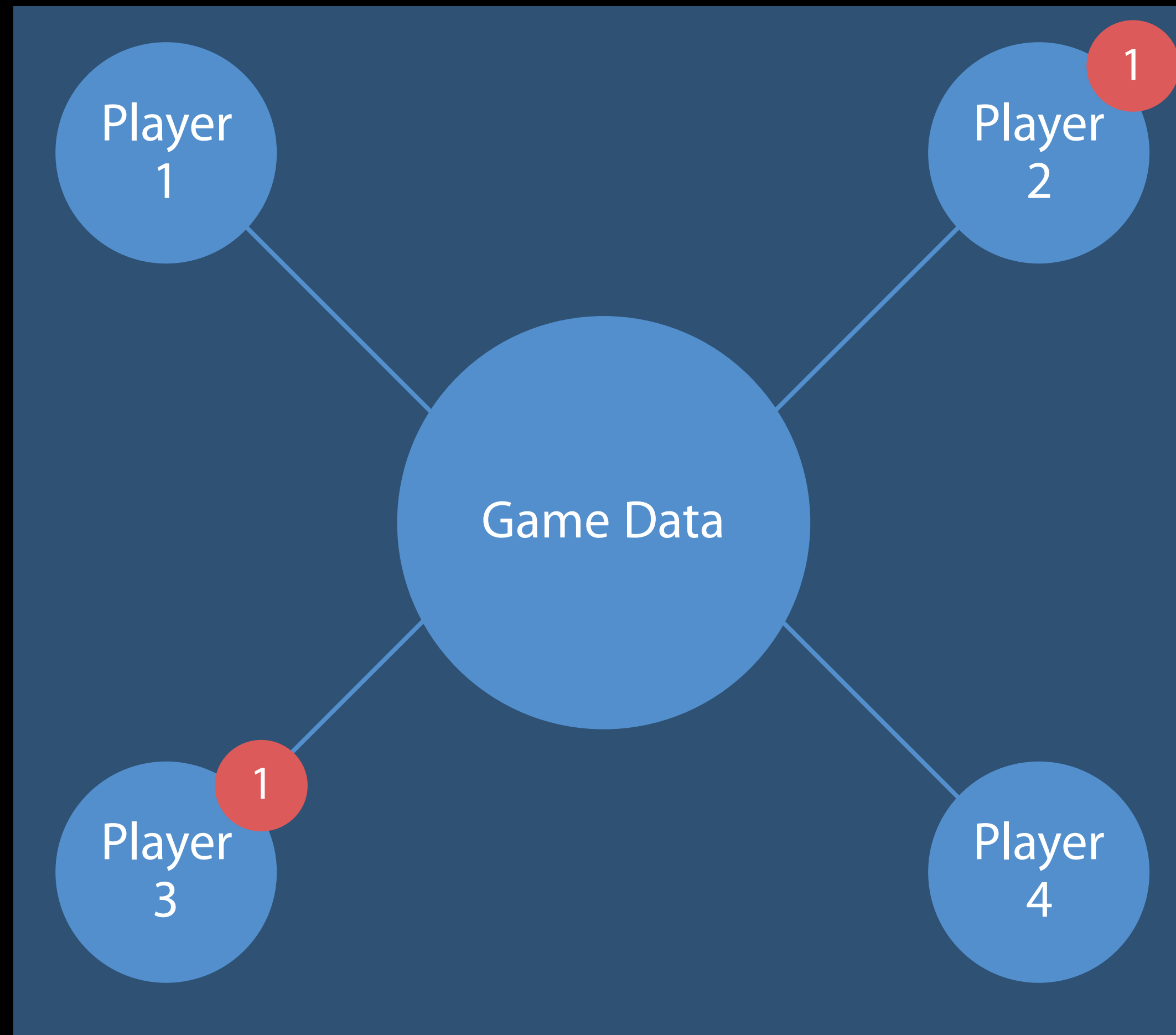
# Game Sessions

## Badging



# Game Sessions

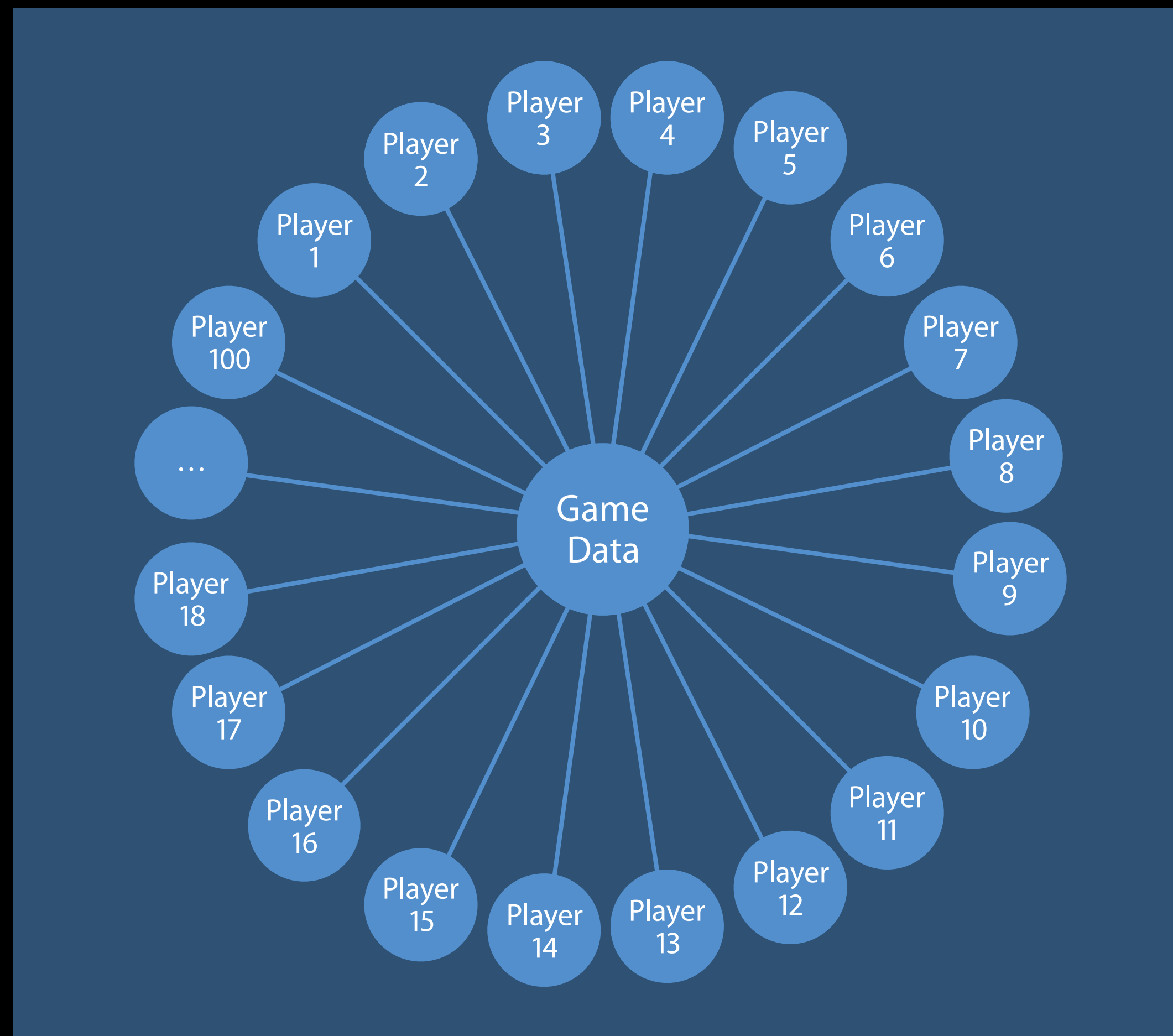
## Badging





# Game Sessions

Many players



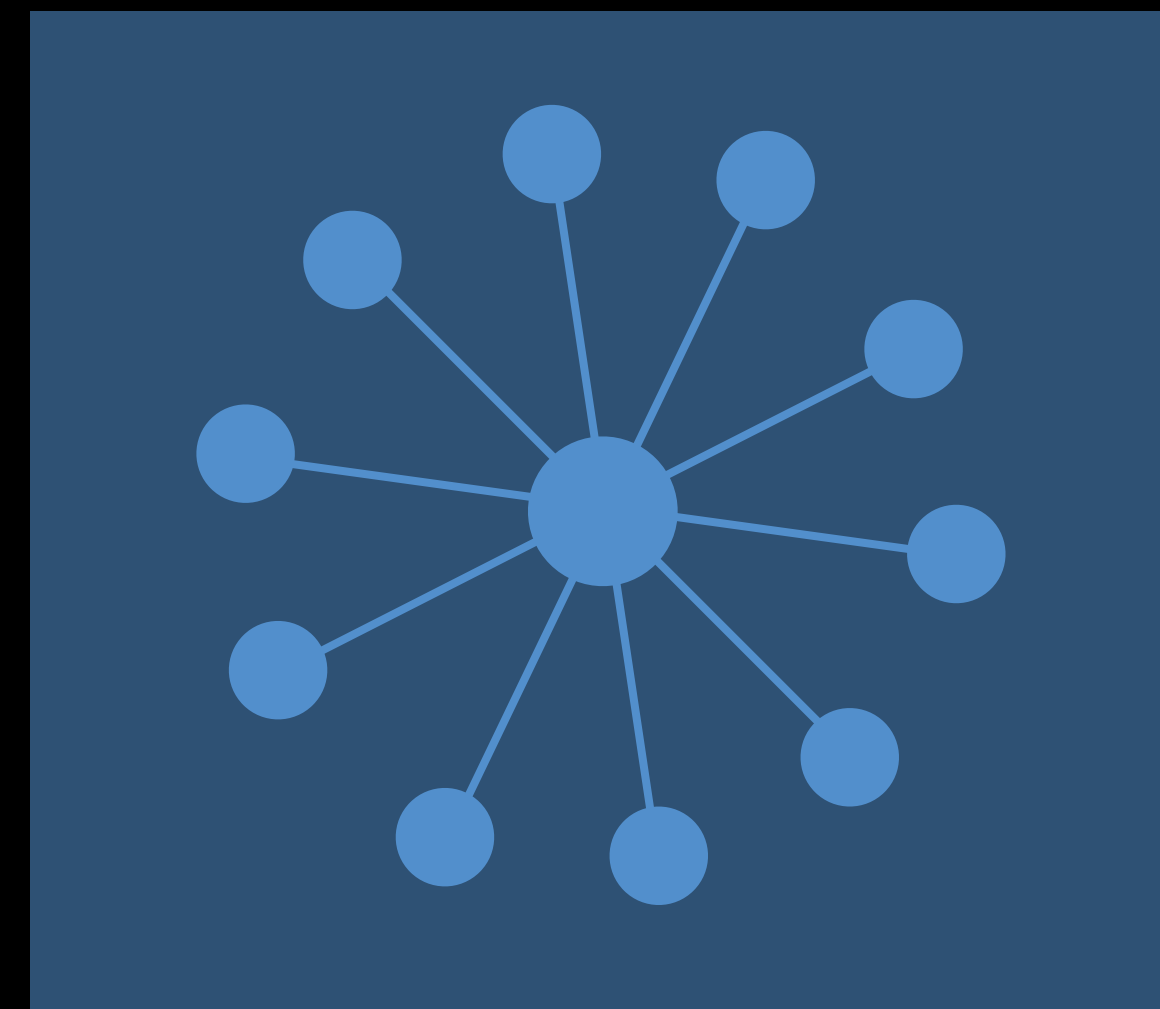
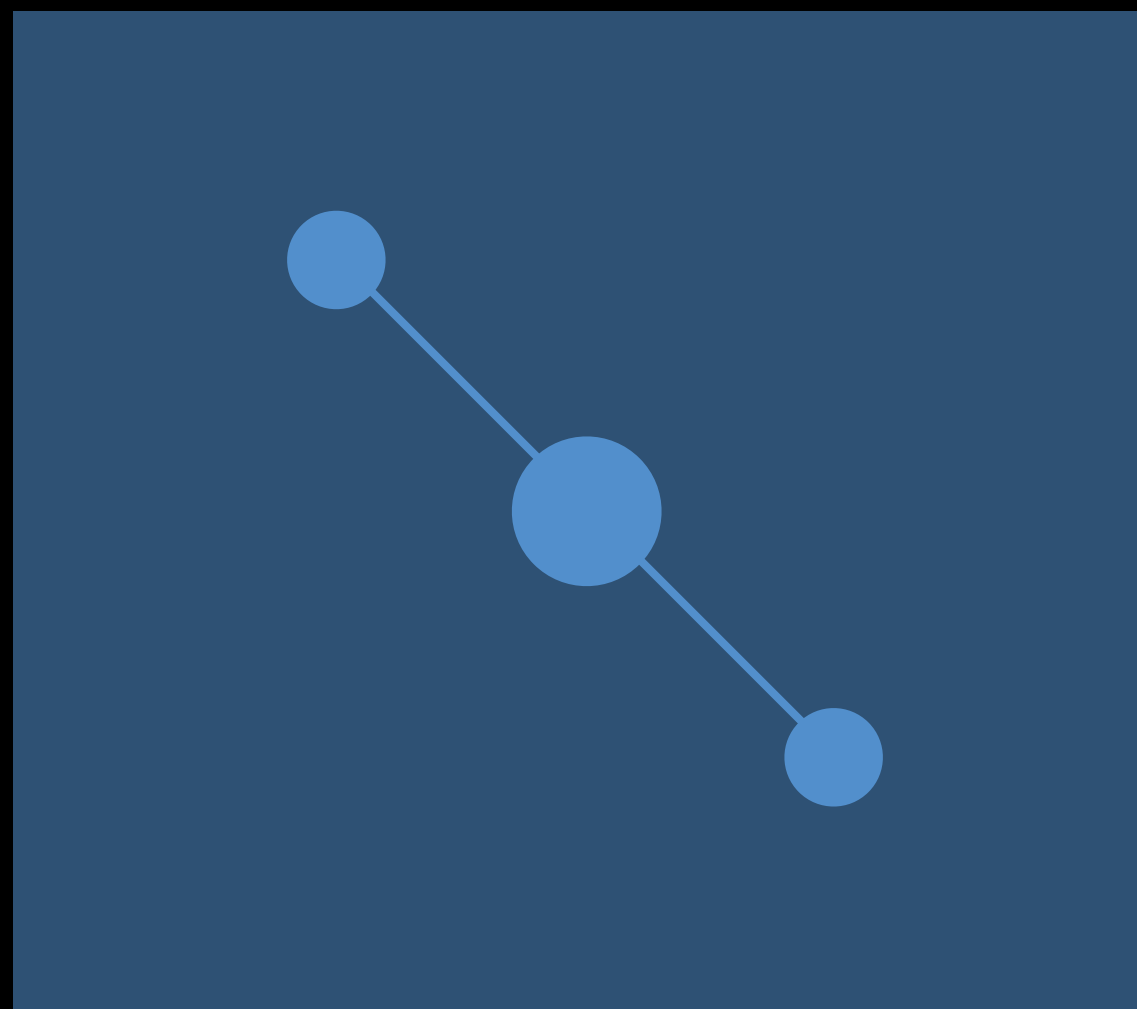
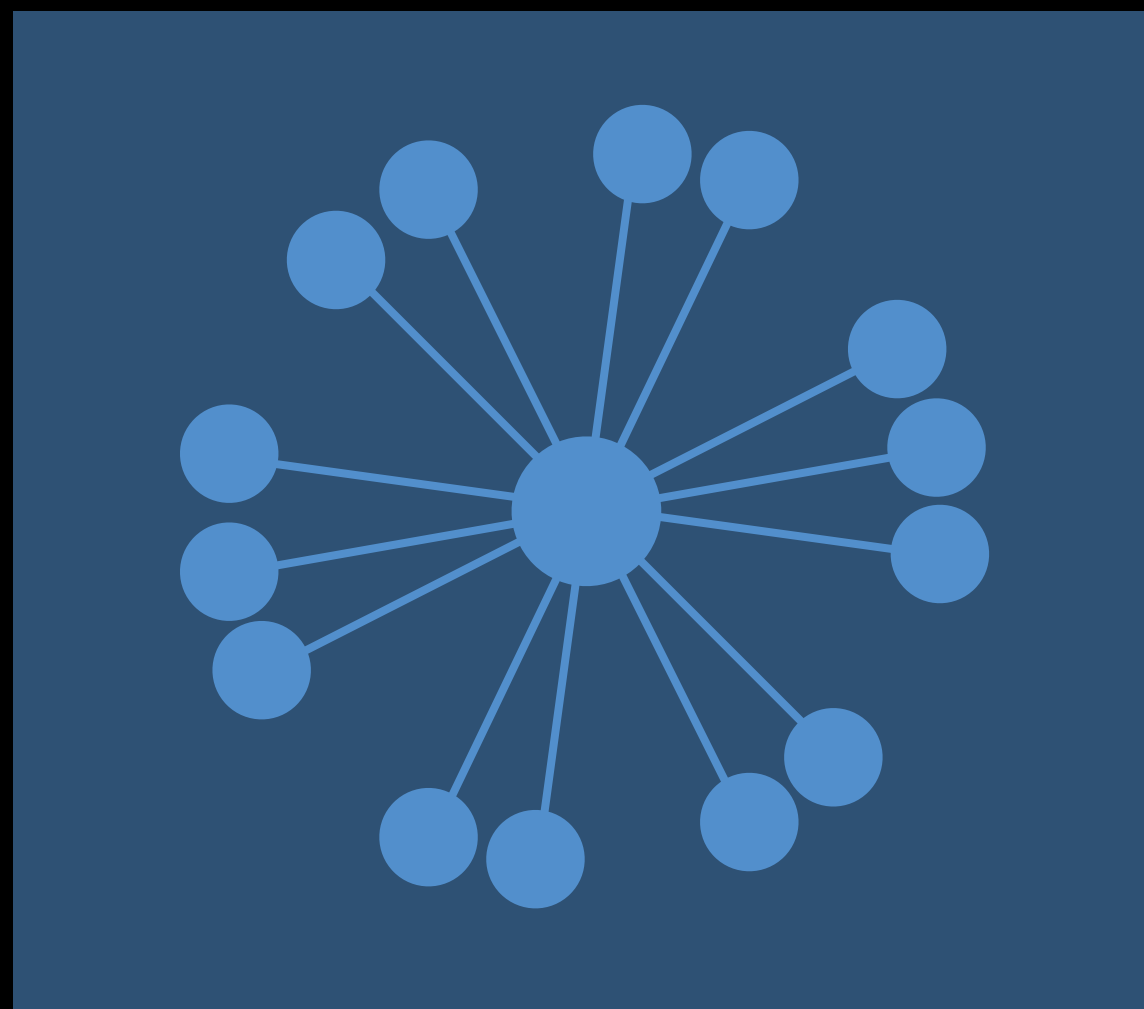
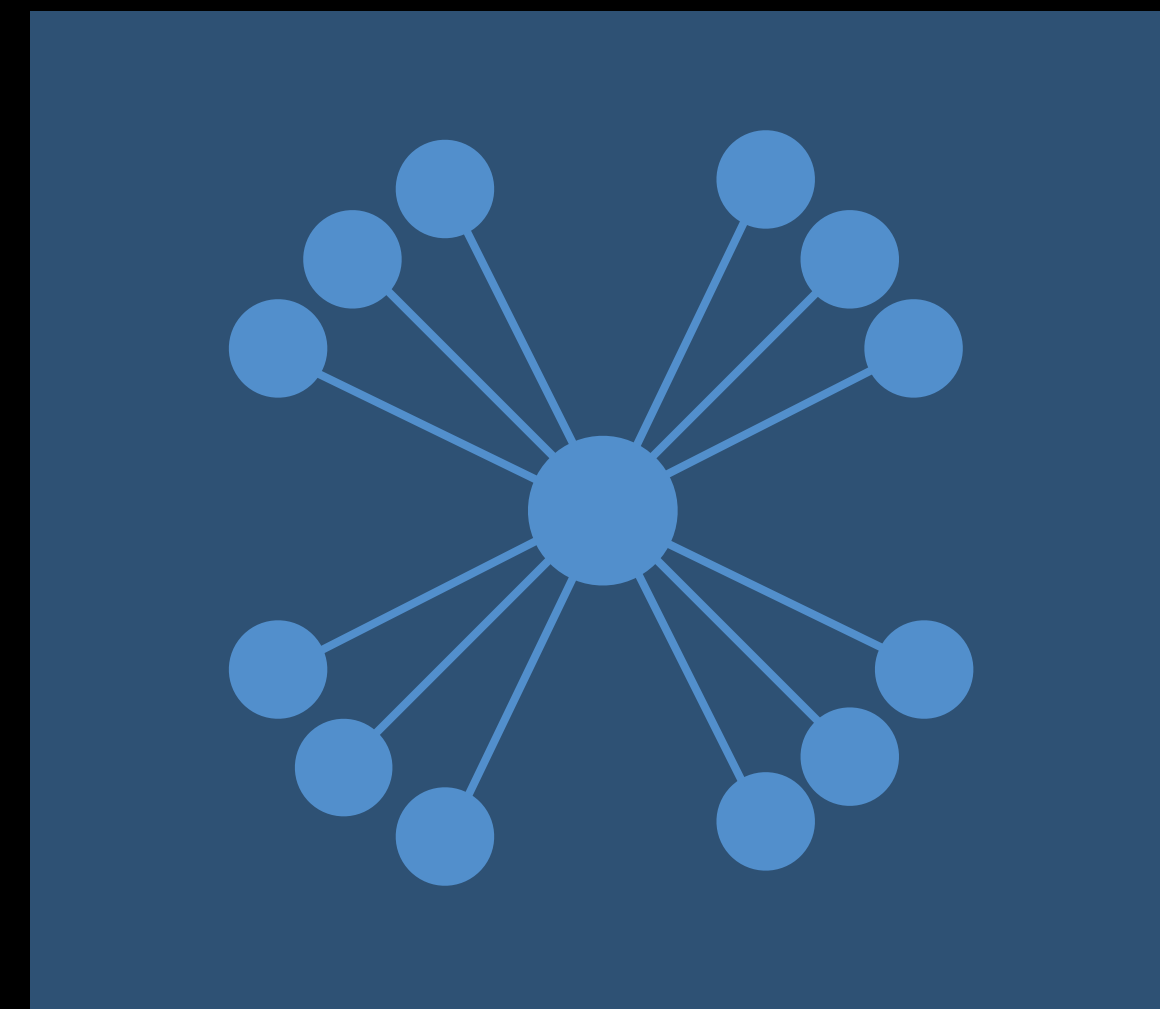
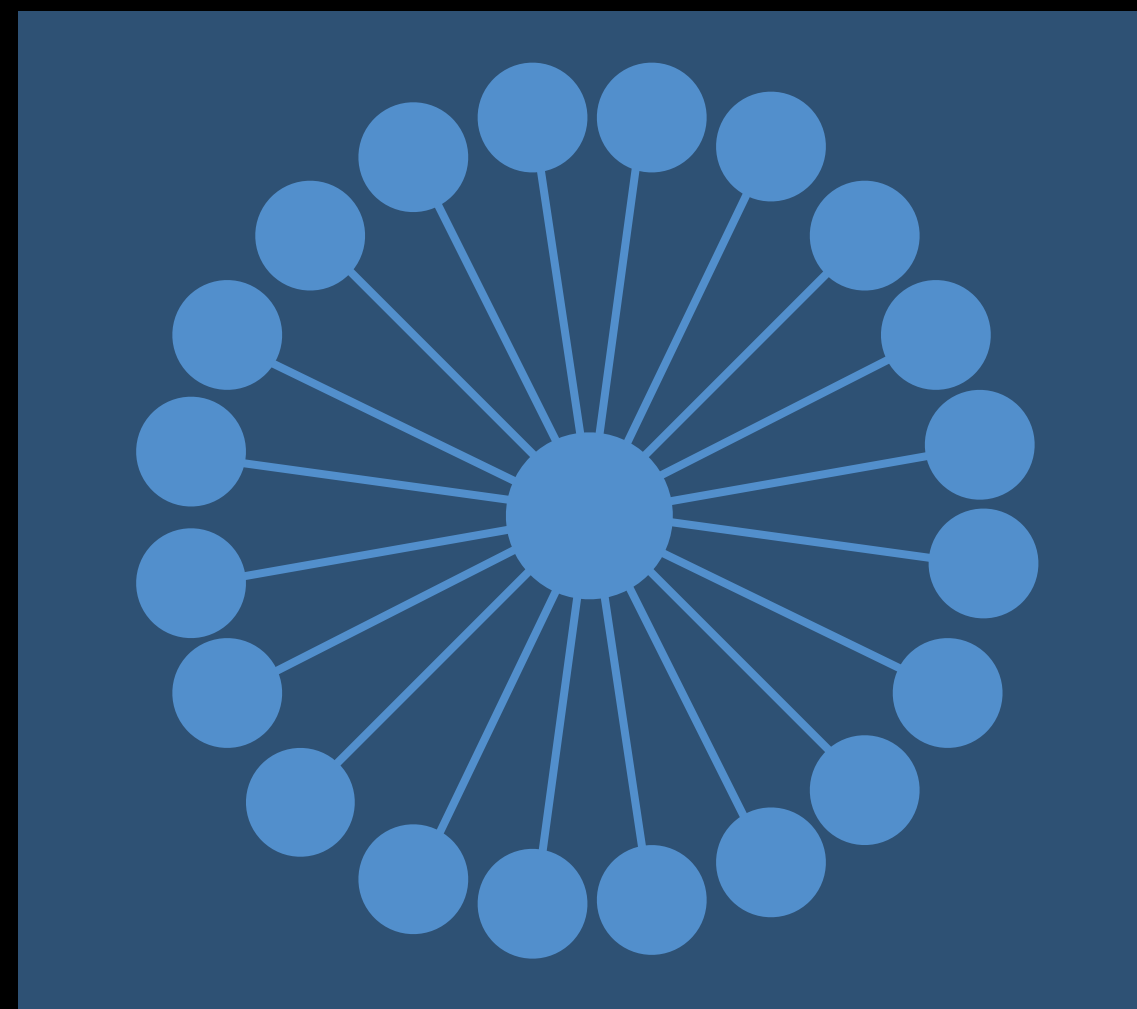
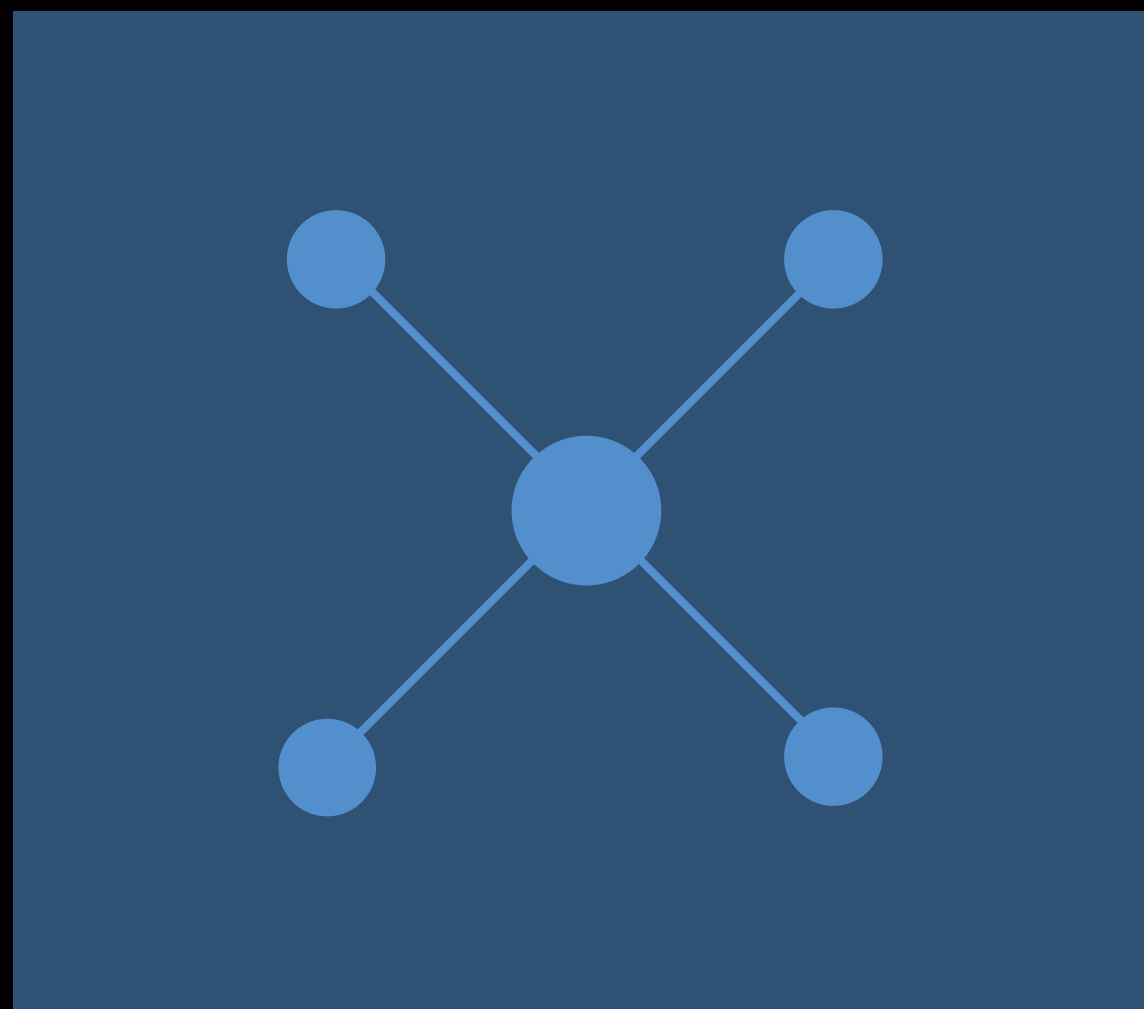
# Game Sessions

Many players



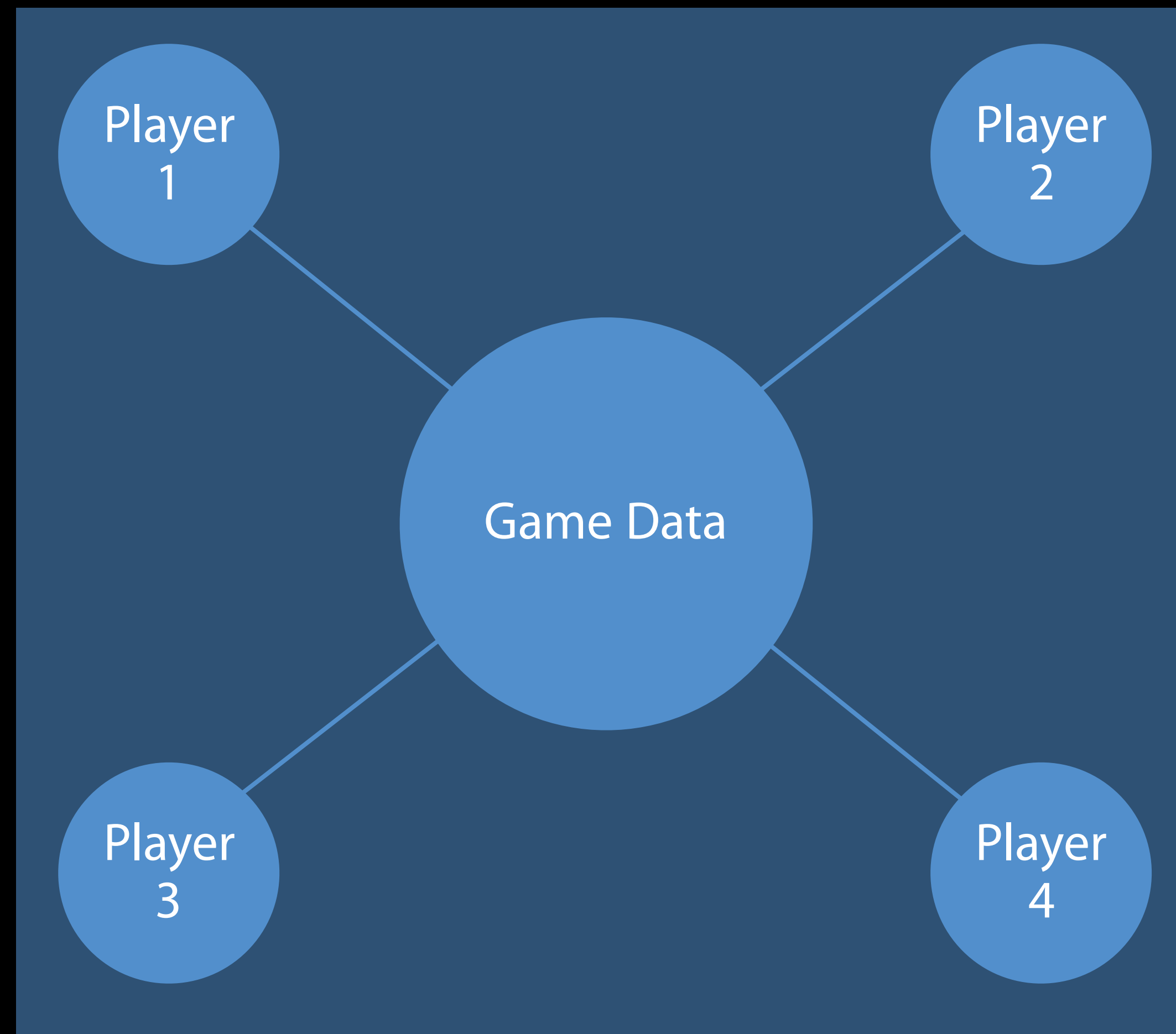
# Game Sessions

Many sessions



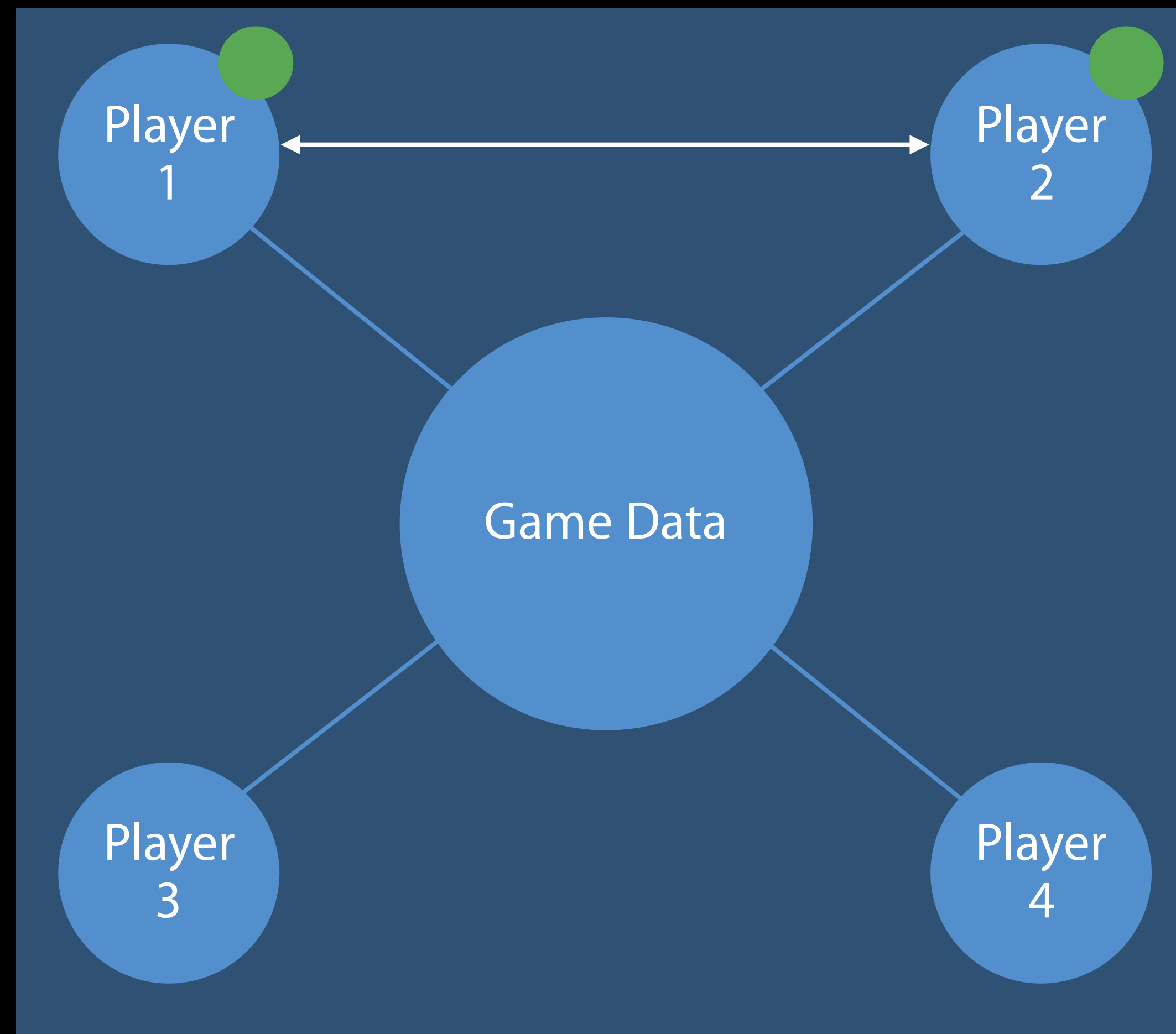
# Game Sessions

Real-time streams



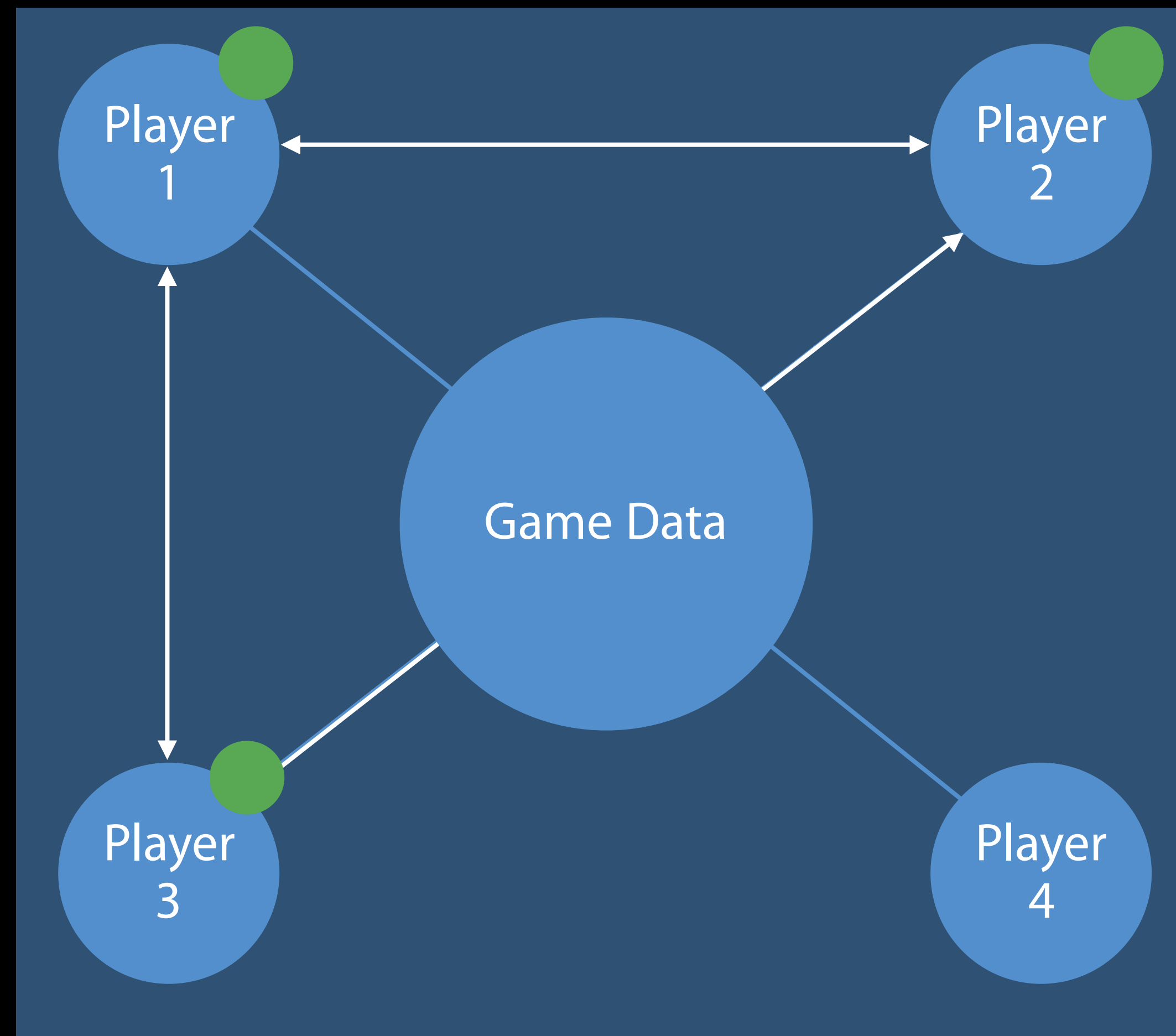
# Game Sessions

Real-time streams



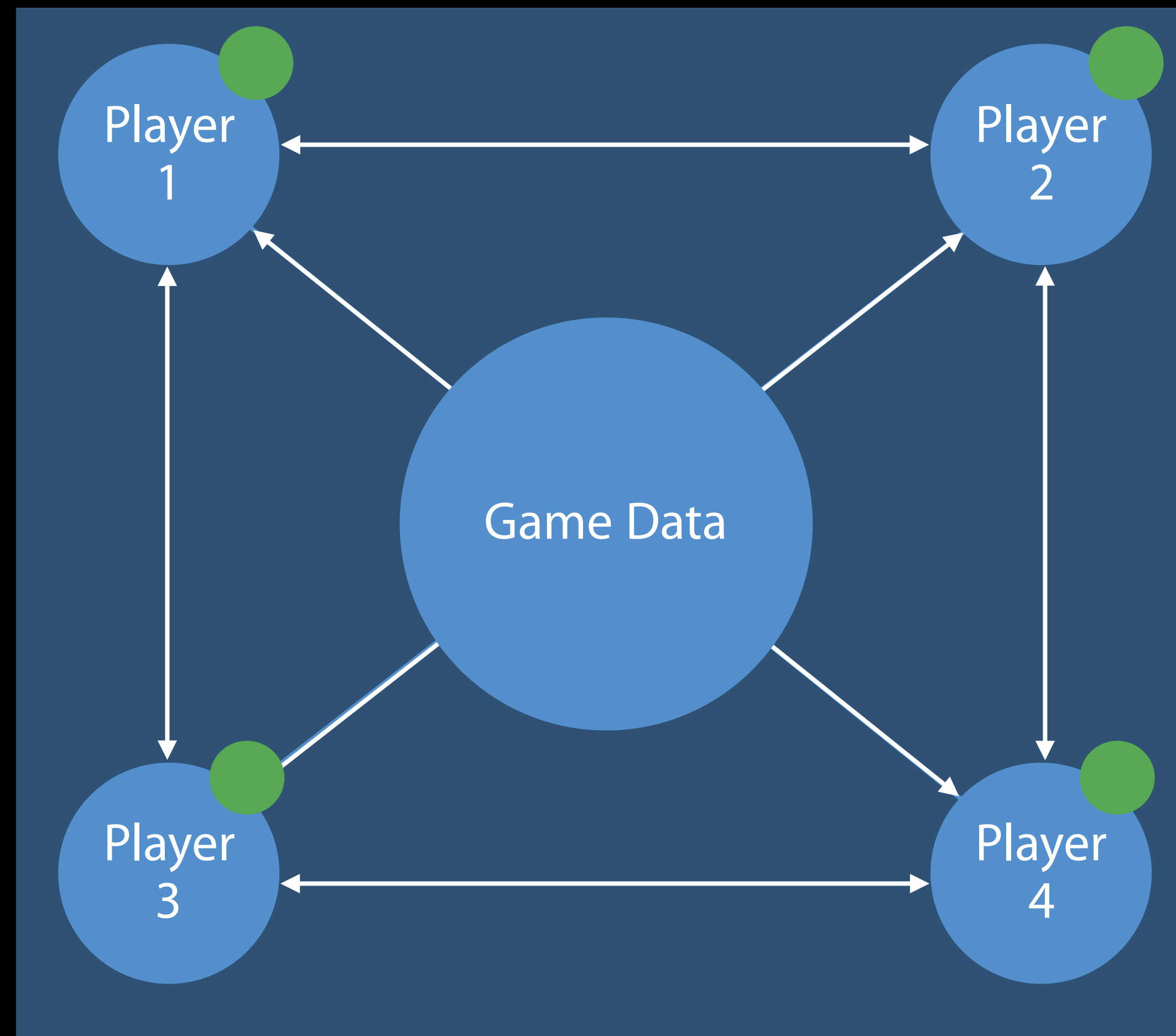
# Game Sessions

Real-time streams



# Game Sessions

Real-time streams



# Classes

## GKGameSession

- Interact with session data

## GKCloudPlayer

- Player in a GKGameSession

## GKEventListener

- Notify when events happen on a session

## GKGameSessionError

- Errors we can get from sessions



GKGameSession

# GKGameSession

## API overview

Create a session, delete a session, get session list

Load game data, store game data, resolve conflicts

Share session, add players, remove players, get player list

Send notification messages, set and clear badges

Join real-time stream, leave stream

Send and receive data within stream

# GKGameSession

## Details

### Game data

- Store up to 512KB game data
- Stored in users iCloud
- Follows Cloud Kit conventions

### Messages and Badges

- Game Center Notifications
- Badging controlled by developer

### Real-time streams

- Leverages Apple infrastructure

# Creating a Session

## What you'll need

### Title

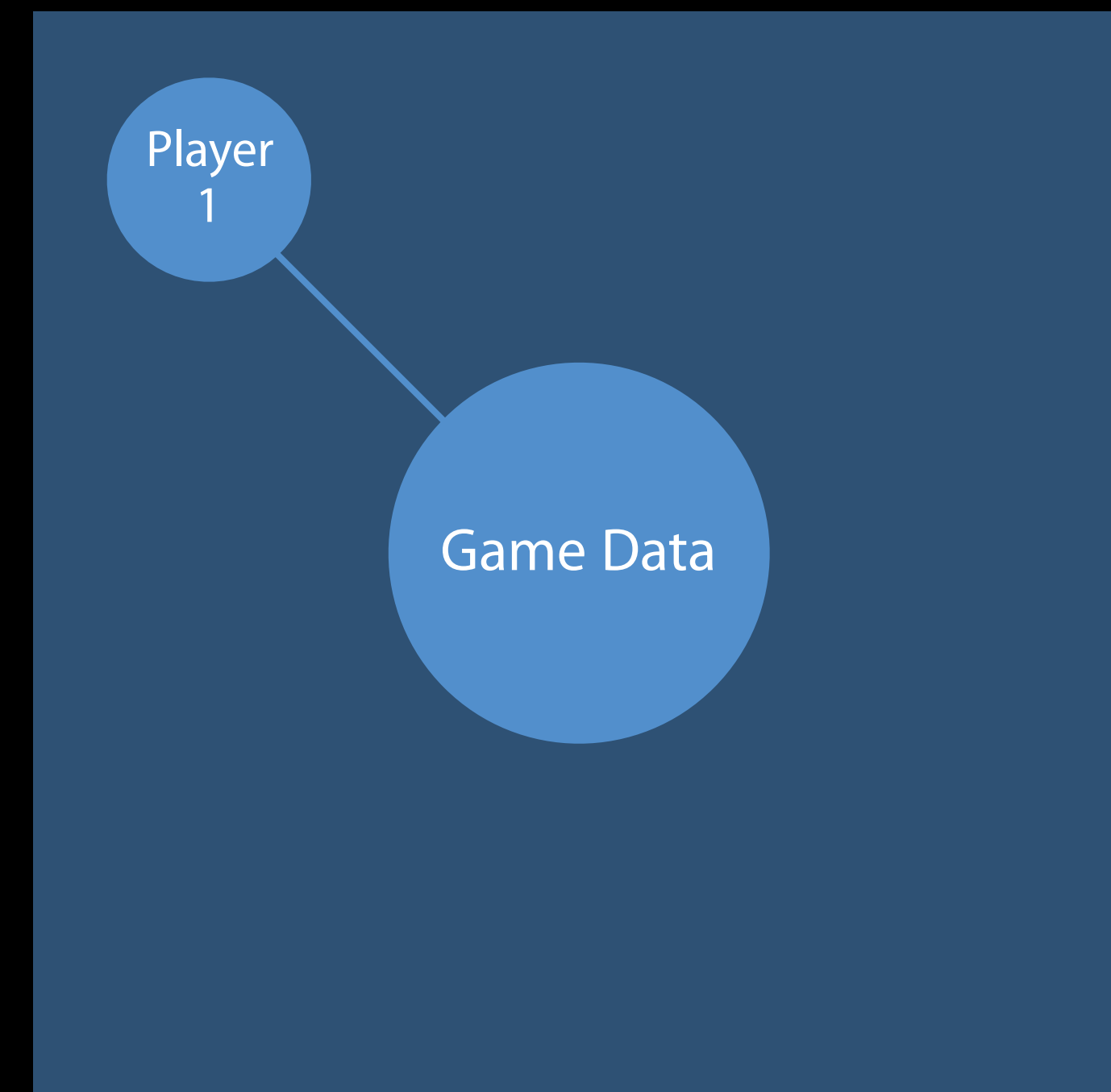
- Name for the session

### Container ID

- Allows sharing session among multiple games

### Max streaming players

- Up to 16



```
+ (void)createSessionInContainer:(NSString *)containerName withTitle:(NSString *)title
maxConnectedPlayers:(NSInteger)maxPlayers completionHandler:(void (^)(GKGameSession *session,
NSError *error))completionHandler;
```

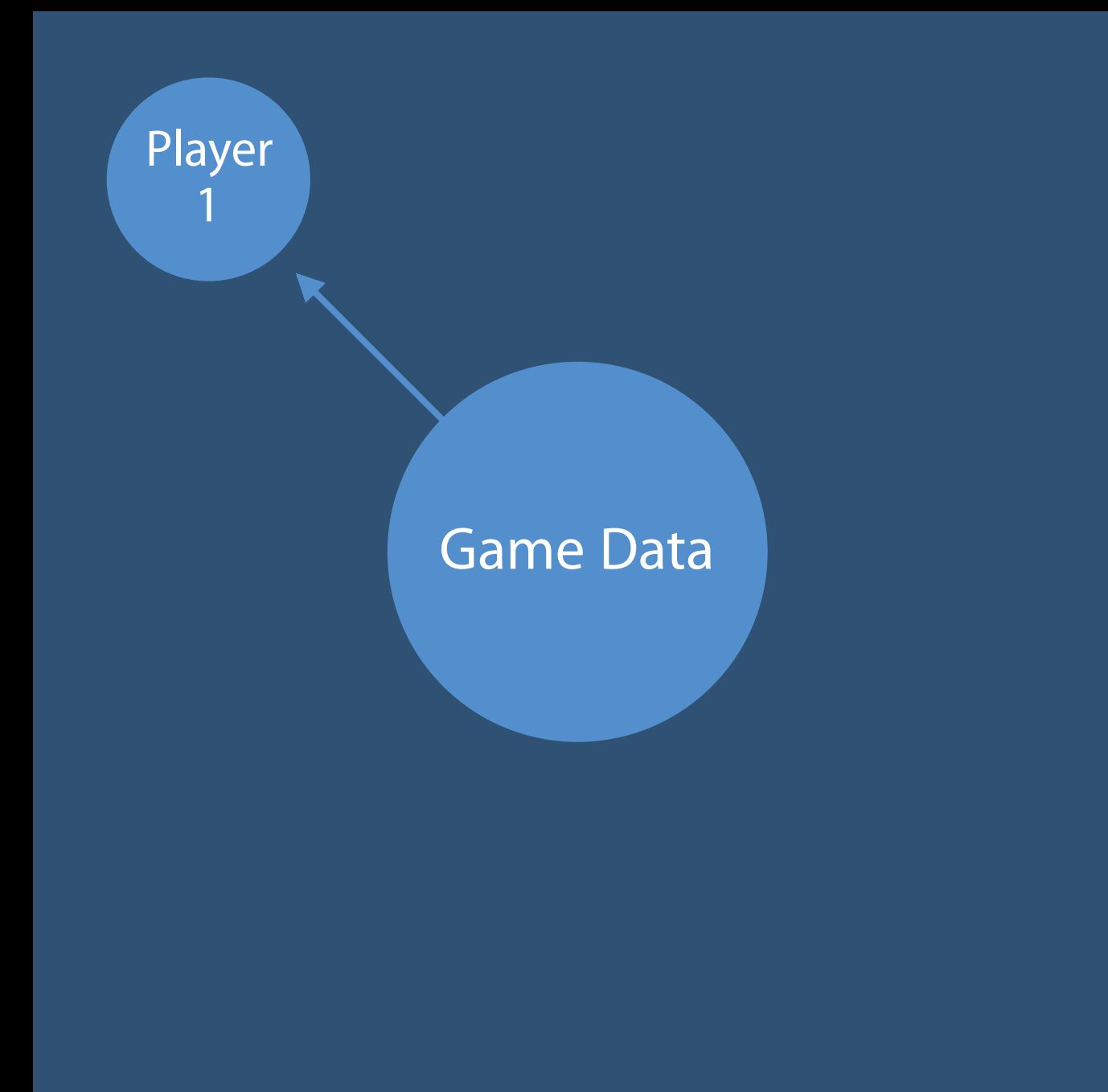
# Session Data

## Loading and saving

Any player in session can access game data

Metadata also provided

- Last modified date
- Last modified player



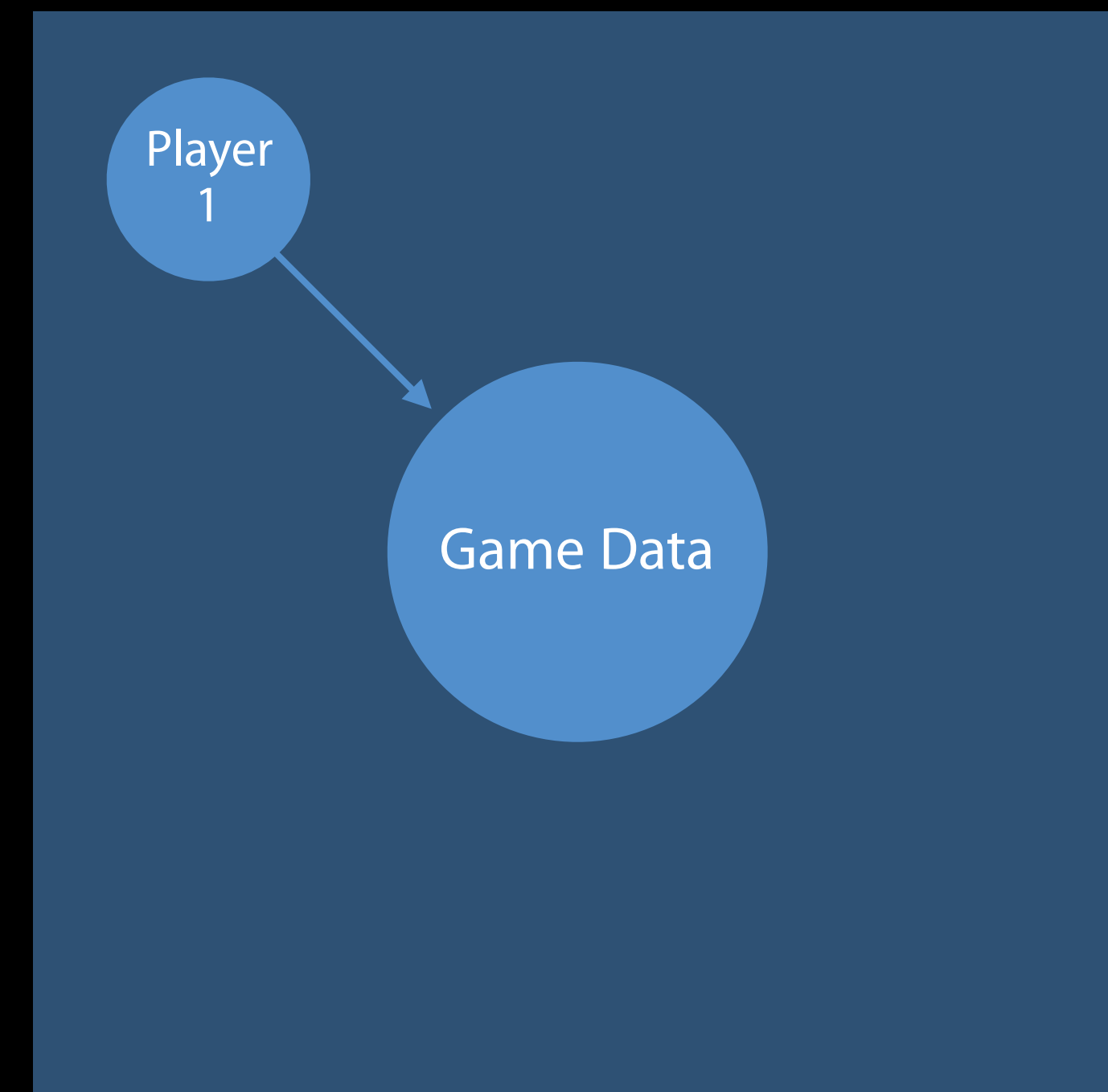
```
// Load game data
- (void)loadDataWithCompletionHandler:(void(^)(NSData *data, NSError
*error))completionHandler;
```

# Session Data

## Loading and saving

Simple method for storing data

- Up to 512KB



```
// Save game data
- (void)saveData:(NSData *)data completionHandler:
    (void(^)(NSData *conflictingData, NSError *error))completionHandler;
```

# Session Data

## Loading and saving

Simple method for storing data

- Up to 512KB



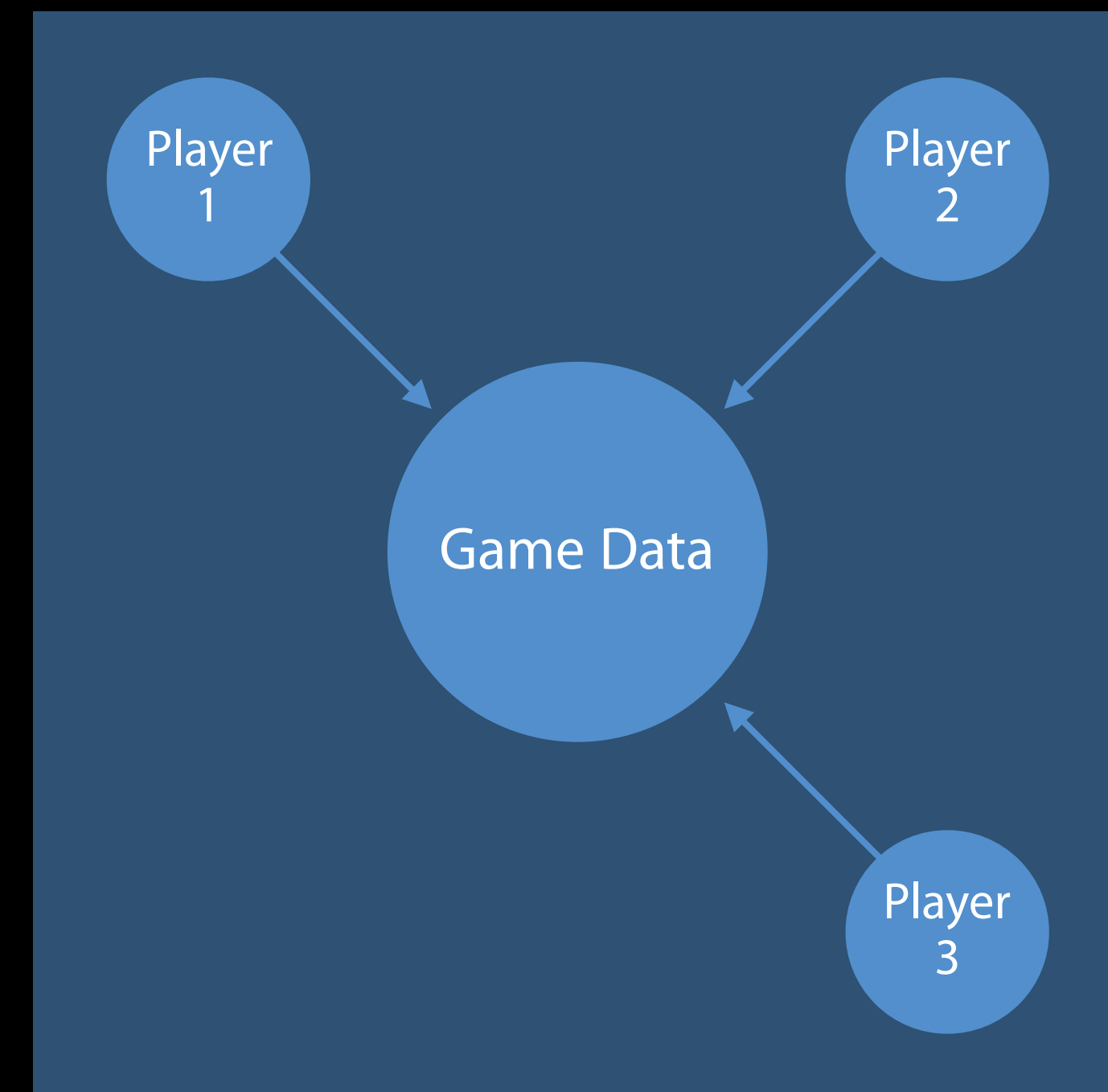
```
// Event Listener  
- (void)session:(GKGameSession *)session  
    player:(GKCloudPlayer *)player  
    didSaveData:(NSData *)data;
```

# Session Data

## Loading and saving

Save conflicts may occur

- App must resolve and resave
- Possible for resolved data to still be conflicted
- Continue to resolve, and attempt to resave until no error is returned



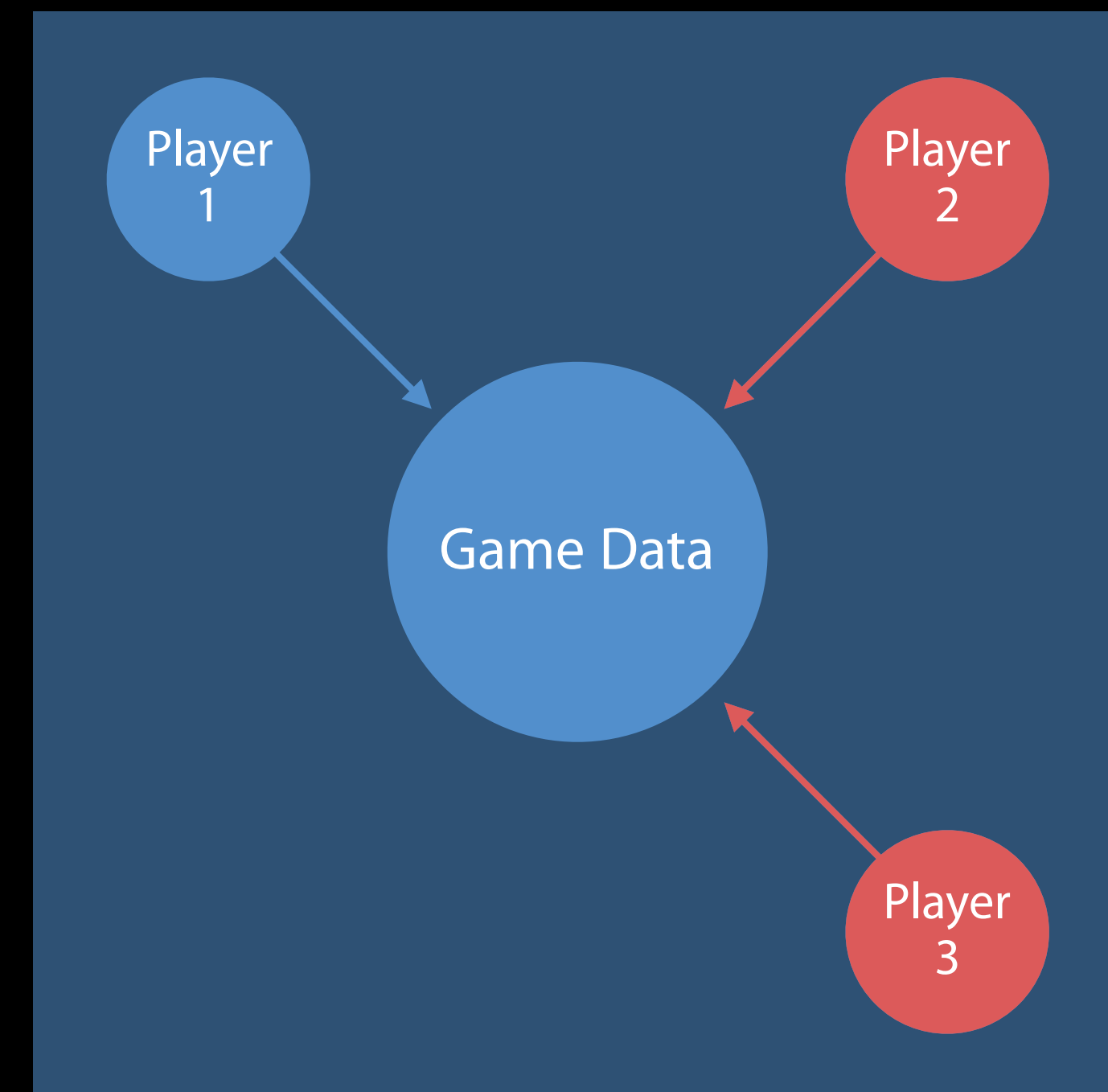


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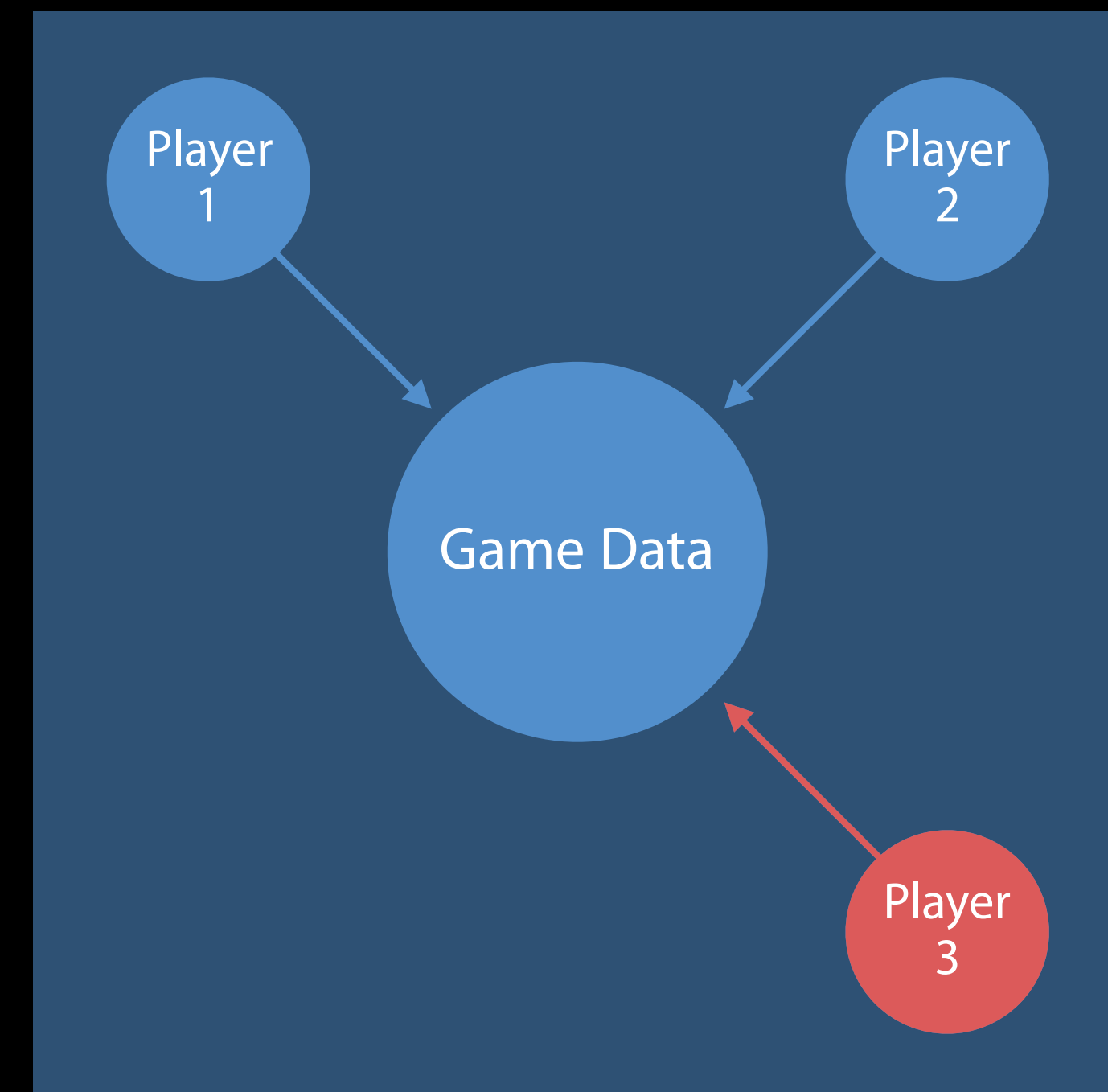


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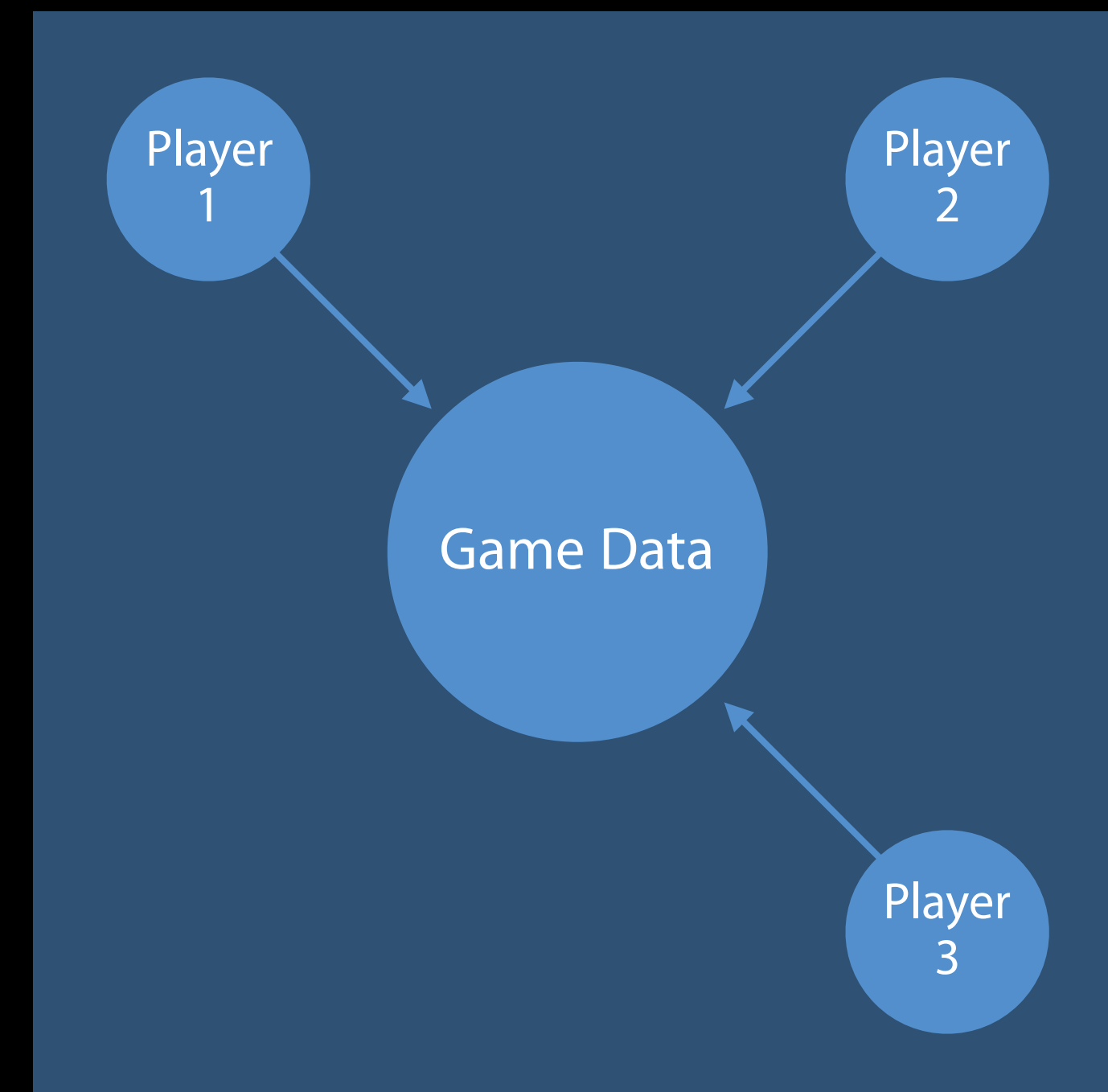


# Session Data

## Loading and saving

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# Sharing a Session

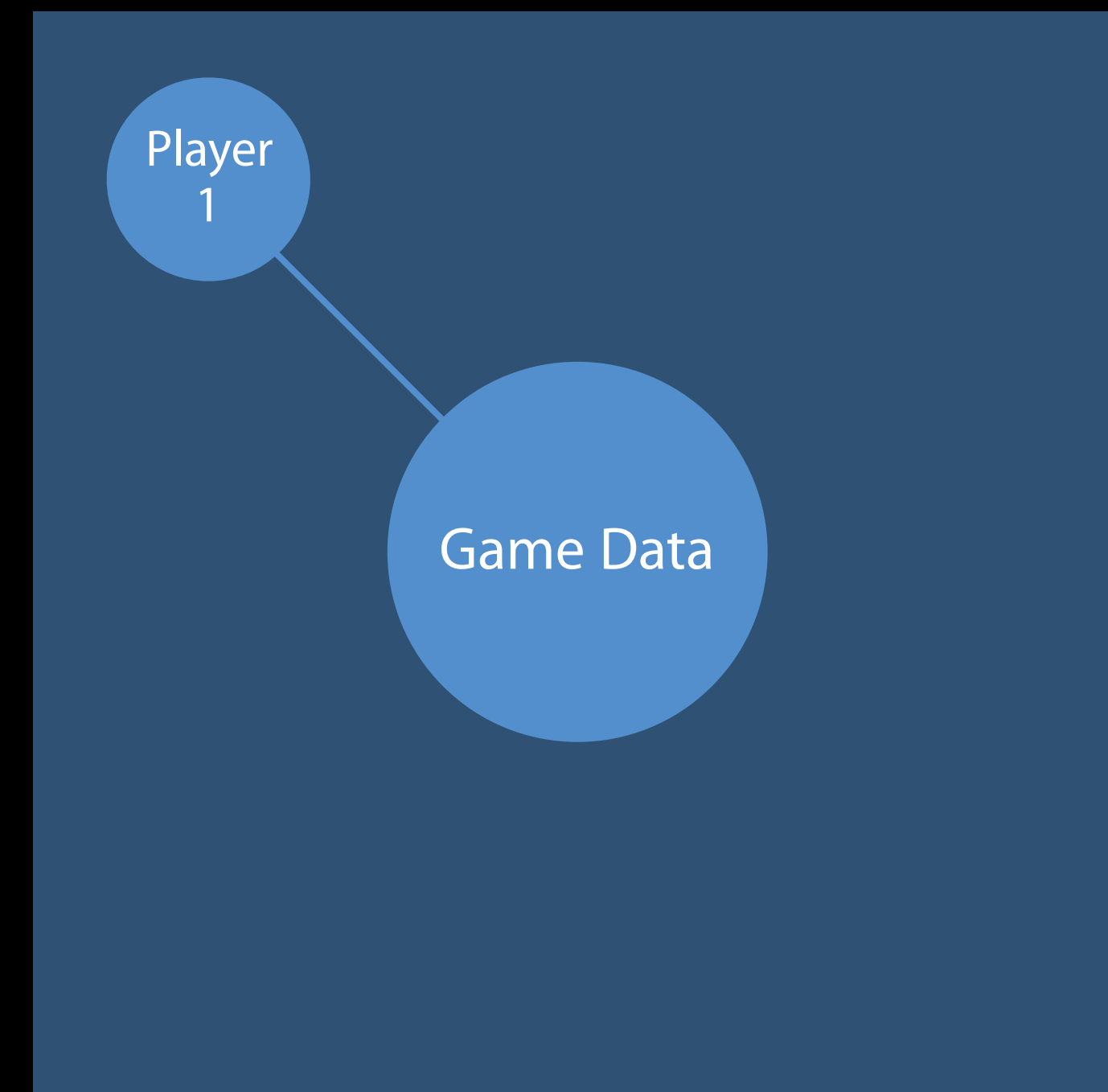
## Adding a player

Any player can invite other players to join a session

Provided via unique session "URL"

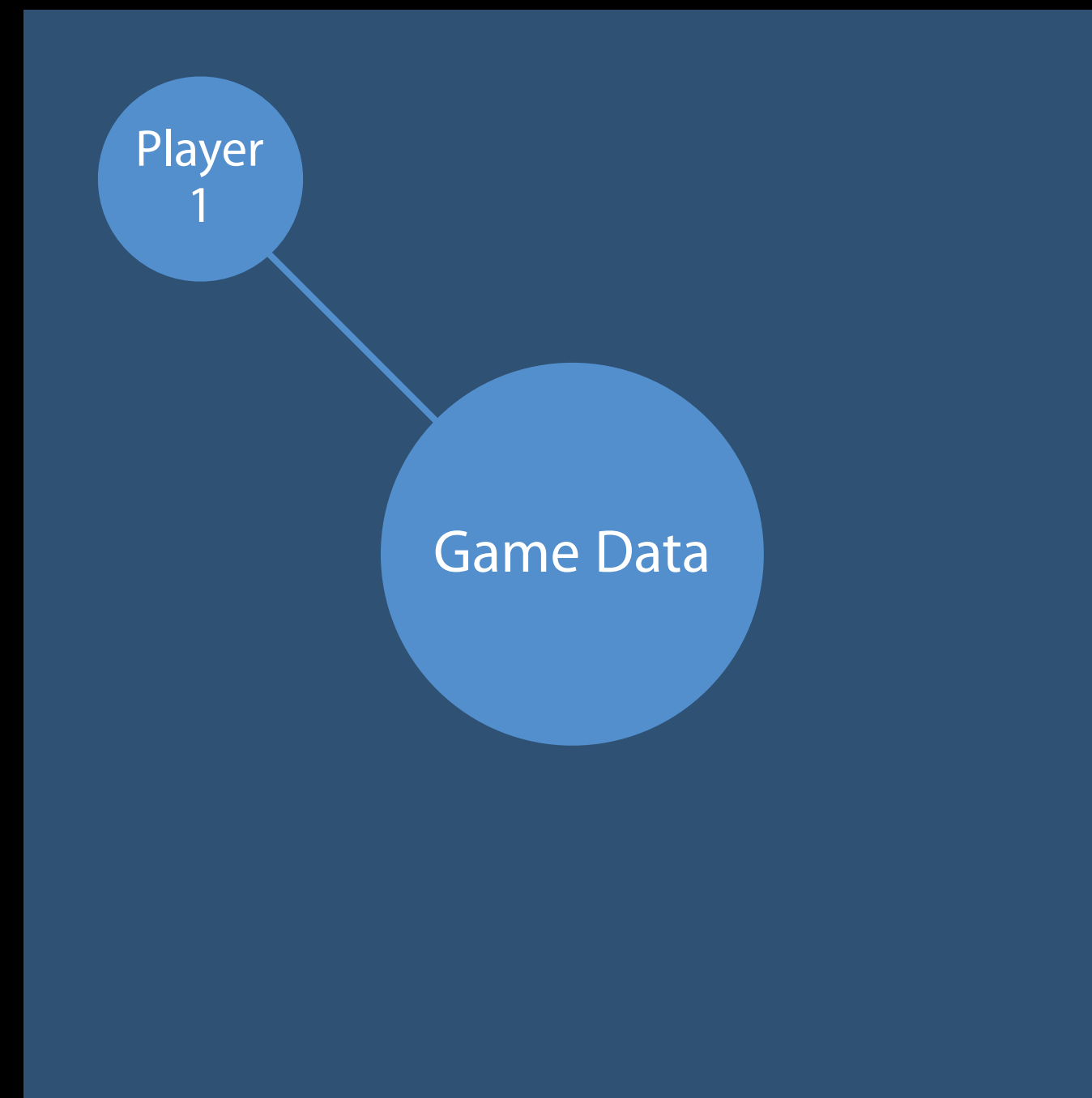
Send via iMessage, Email, Twitter

Recipient joins session by tapping link



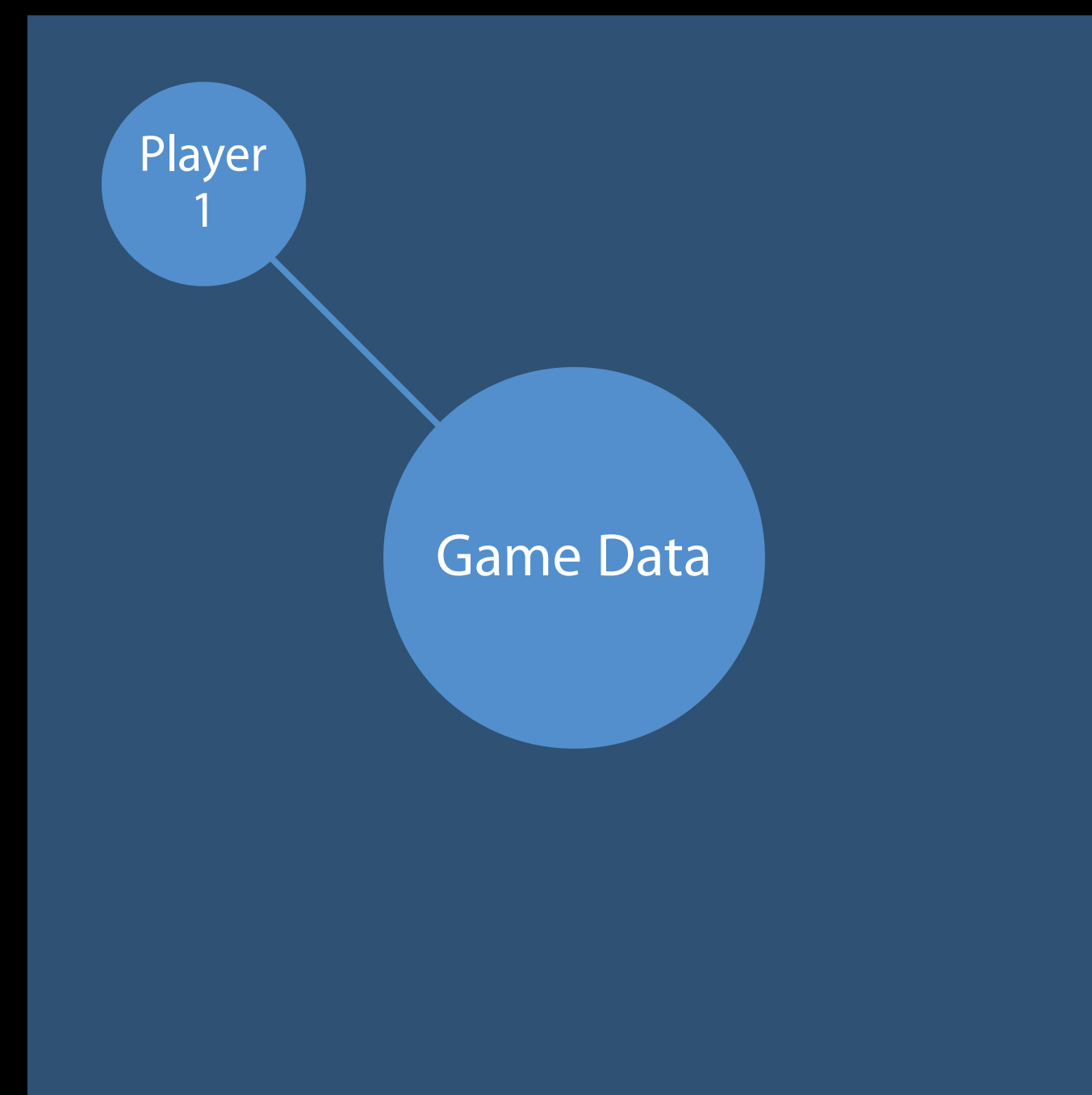
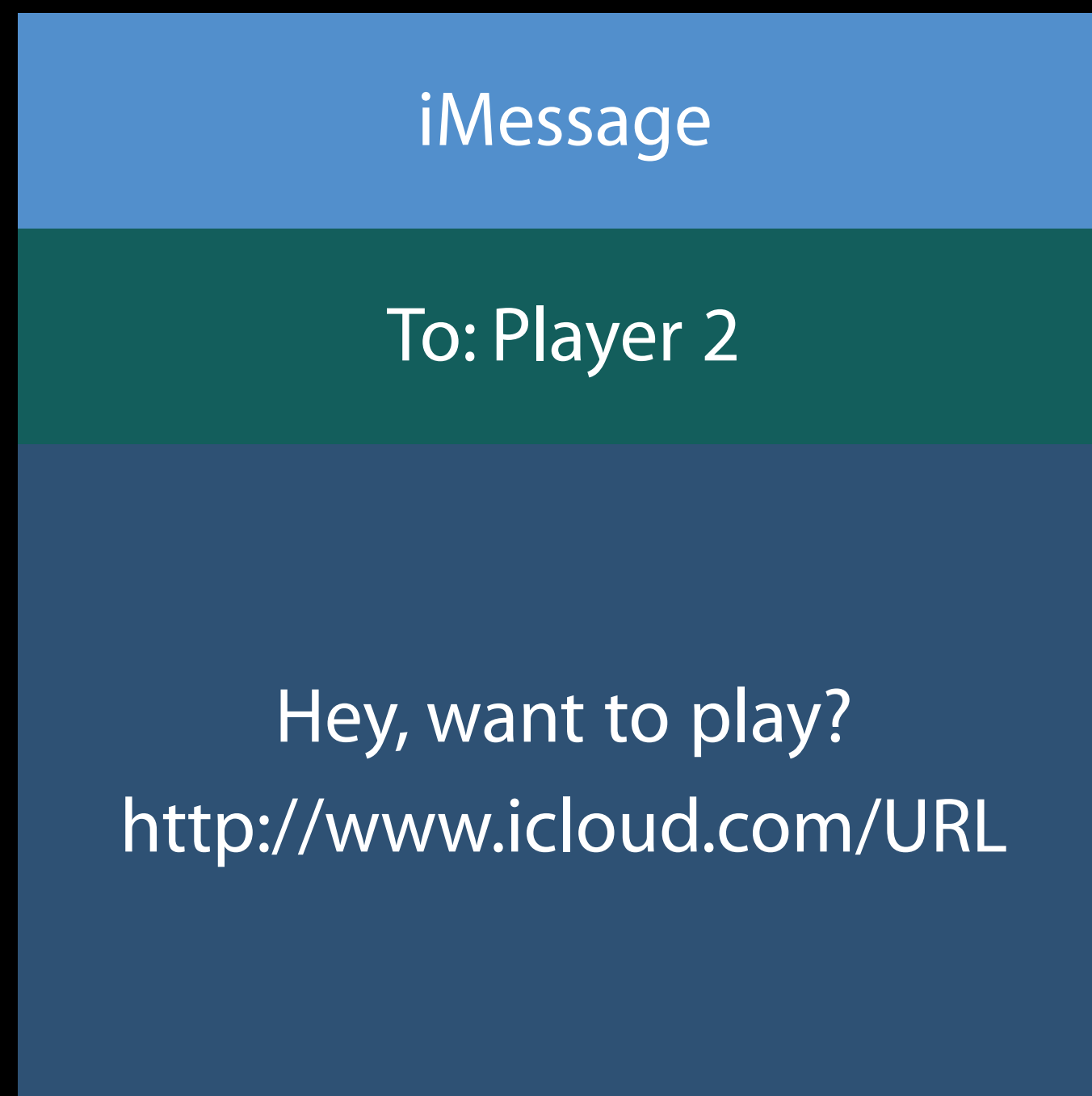
# Sharing a Session

Adding a player



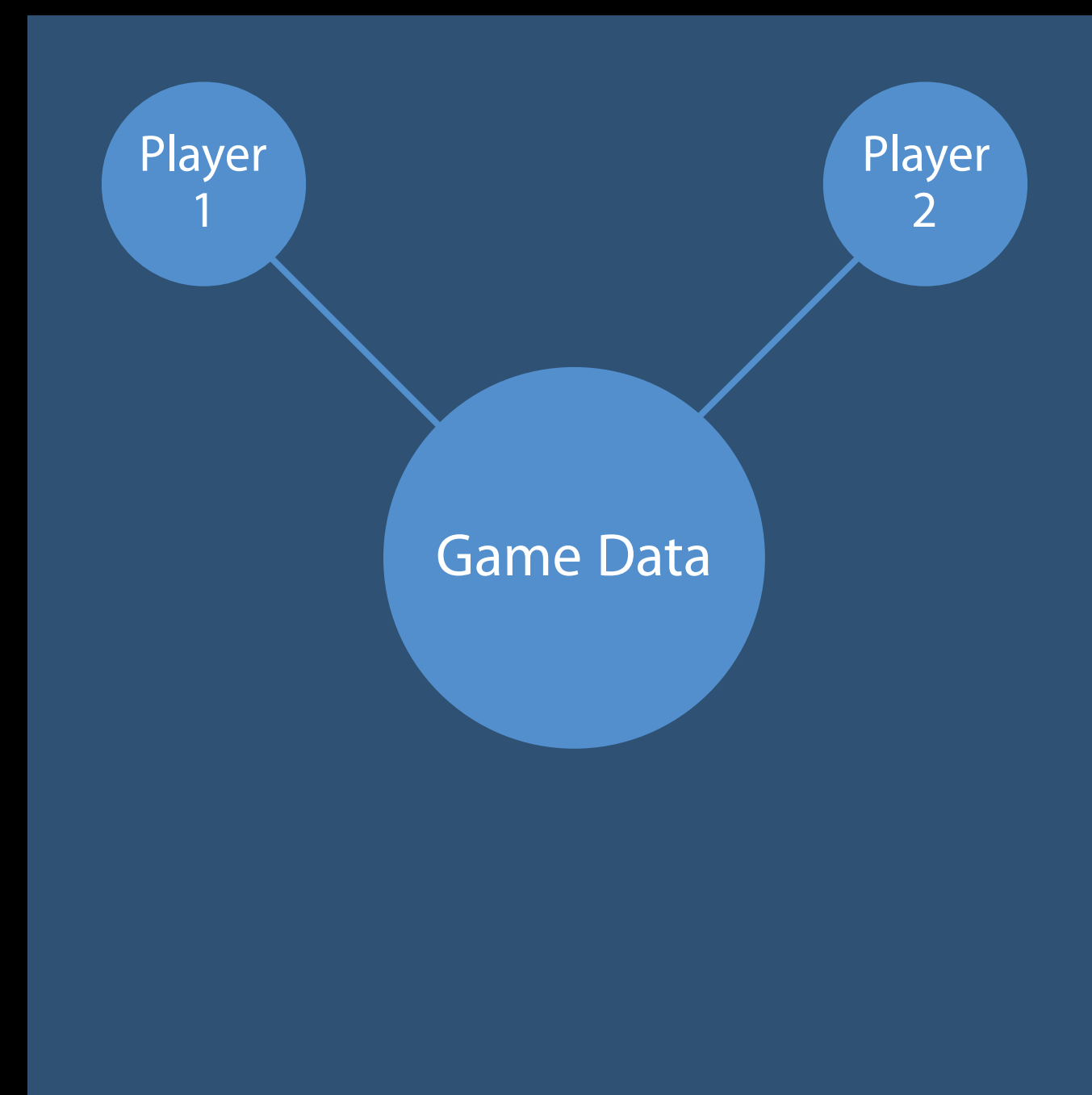
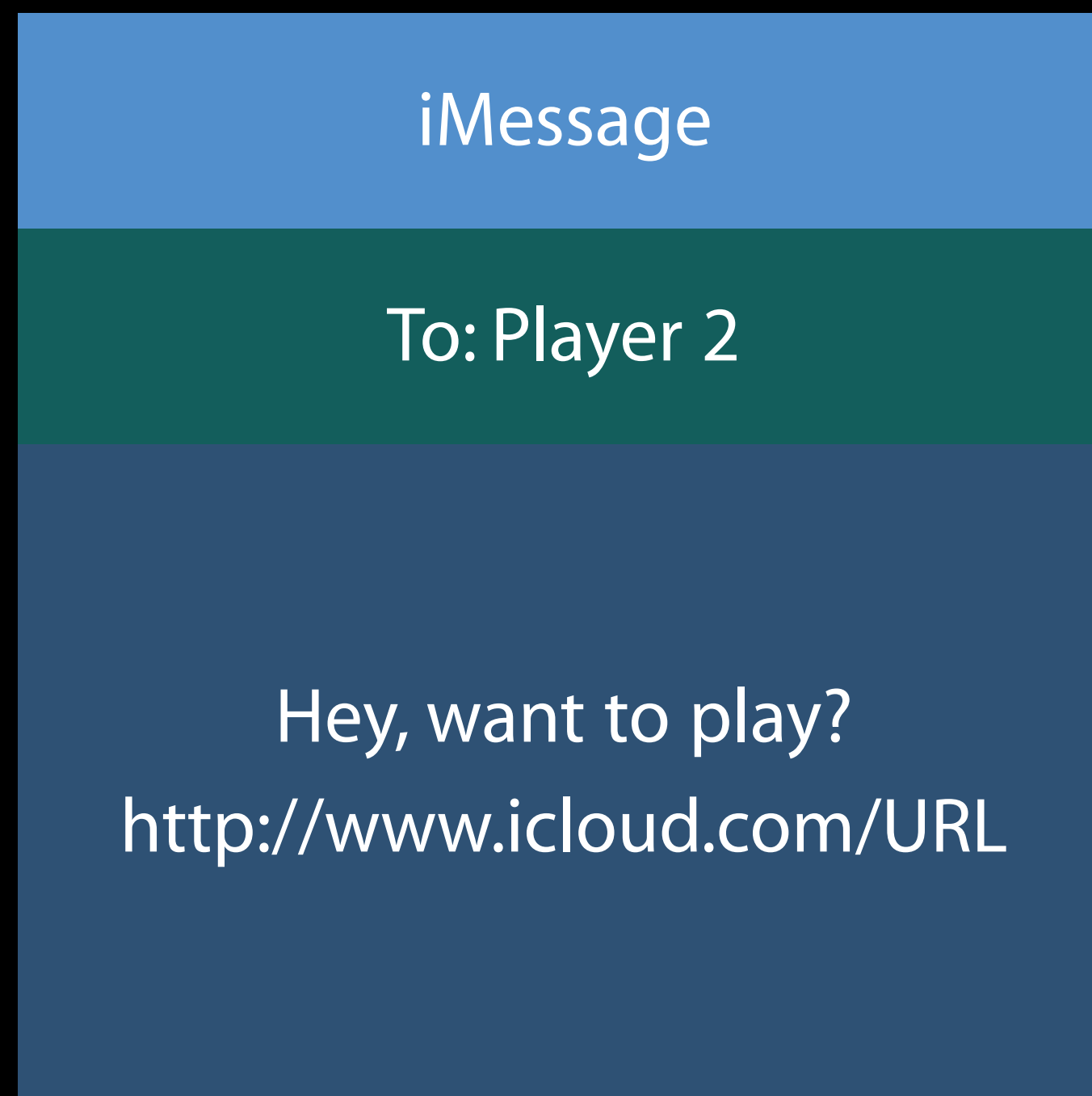
# Sharing a Session

Adding a player



# Sharing a Session

Adding a player



```
// Sharing a Session
```

```
// Get URL for this session
```

```
- (void)getShareURLWithCompletionHandler:(void(^)(NSURL *url, NSError  
*error))completionHandler;
```

```
// Event Listener
```

```
- (void)session:(GKGameSession *)session didAddPlayer:(GKCloudPlayer *)player;
```



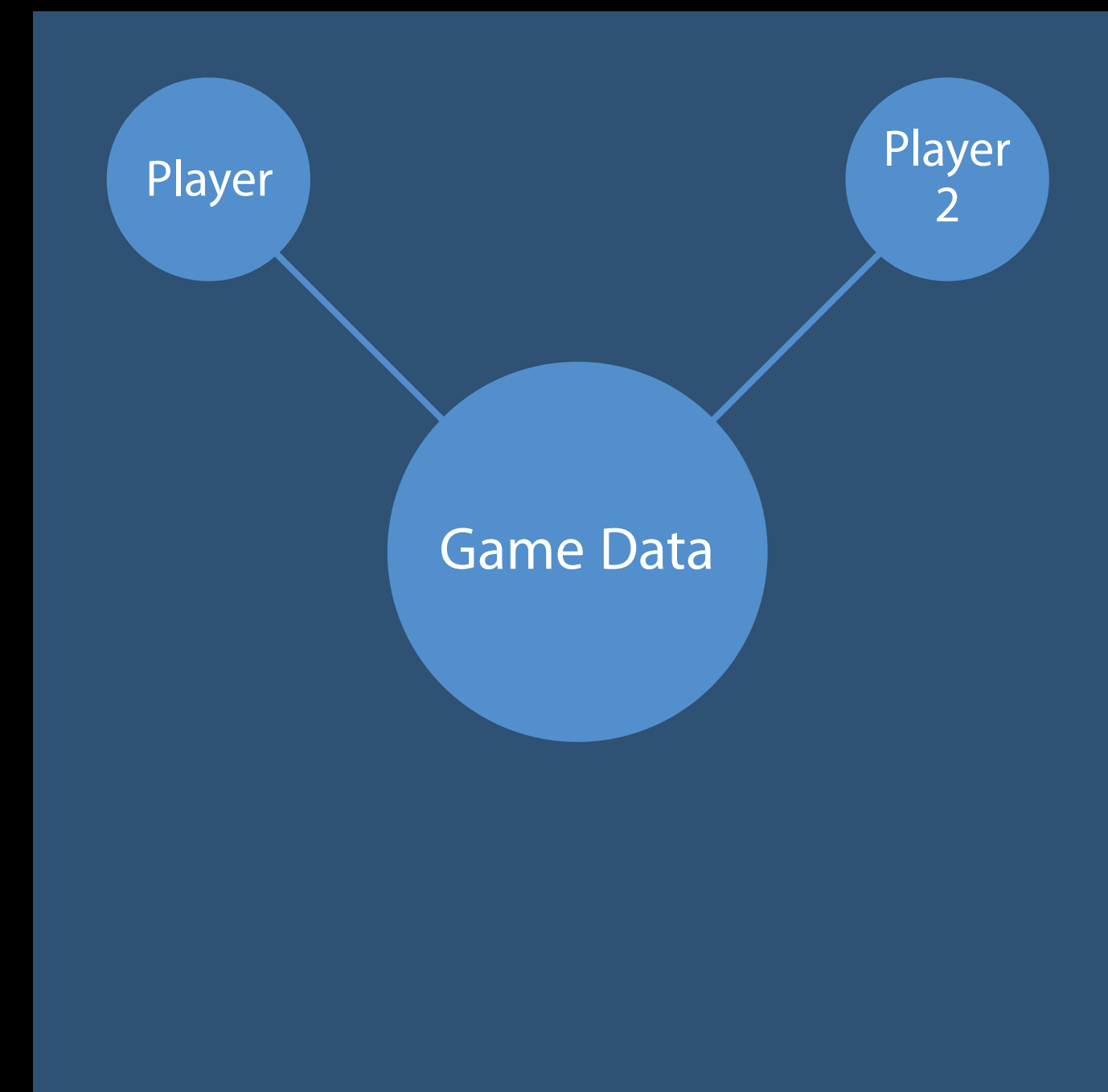
# GKCloudPlayer

Each player is a GKCloudPlayer

- PlayerID unique to app container
- DisplayName

Not a GKPlayer object

- Only for use with GKGameSessions
- Not for GKScore, GKAchievement...



# Getting Cloud Players

Get current player

- See who owns the session

Get players in session

- Send messages and set badges

```
// Player Signed into iCloud on device  
+ (void)getCurrentSignedInPlayer:(void(^)(GKCloudPlayer *player, NSError *error))handler;
```

```
// Players current in Session  
@property (nonatomic, readonly) NSArray<GKCloudPlayer *> *players;
```

# Messages and Badges

# Sending and Receiving Messages

## Overview

Messages arrive as Game Center Notifications

All players can send messages at any time

Messages are localizable

Can send relevant data

Optional badging for message recipients

```
// Sending Messages
```

```
- (void)sendMessageWithLocalizedFormatKey:(NSString *)key  
    arguments:(NSArray<NSString *> *)arguments  
    data:(NSData *)data  
    toPlayers:(NSArray<GKCloudPlayer *> *)players  
    badgePlayers:(BOOL)badgePlayers  
    completionHandler:(void(^)(NSError *error))completionHandler;
```

```
// Event Listener on Receiving side
```

```
- (void)session:(GKGameSession *)session didReceiveMessage:(NSString *)message withData:  
(NSData *)data fromPlayer:(GKCloudPlayer *)player;
```

# Badges

Badge may be included with message

One badge increment per session

App icon will show overall tally

```
// Clear badges programmatically  
- (void)clearBadgeForPlayers:(NSArray<GKCloudPlayer *> *)players completionHandler:(void(^)(  
(NSError *error))completionHandler;
```

# Managing Sessions

# Loading Sessions

Load all sessions local player is a part of

```
+ (void)loadSessionsInContainer:(NSString *)containerName completionHandler:(void(^)(NSArray<GKGameSession *> *sessions, NSError *error))completionHandler;
```

Load the data and players for a specific session

```
+ (void)loadSessionWithIdentifier:(NSString *)identifier completionHandler:(void(^)(GKGameSession *session, NSError *error))completionHandler;
```



# Deleting a Session

Removes player from a session they do not own

Deletes session data if originating player

```
+ (void)removeSessionWithIdentifier:(NSString *)identifier completionHandler:(void(^)  
(NSError *error))completionHandler;
```

Event Listener

```
- (void)session:(GKGameSession *)session didRemovePlayer:(GKCloudPlayer *)player;
```

# Game Session Streams

# Game Session Streams

## Overview

Connect to current players

See status of players in connection

Send data to all players in connection

Add and drop players without restarting connection

# Connection State

Setting state automatically creates connections

Will fail if max players has already been reached

```
- (void)setConnectionState:(GKConnectionState)state completionHandler:(void(^)(NSError *error))completionHandler;
```

Show players with specific state

```
- (NSArray<GKCloudPlayer * > *)playersWithConnectionState:(GKConnectionState)state;
```

Event Listener

```
- (void)session:(GKGameSession *)session player:(GKCloudPlayer *)player  
didChangeConnectionState:(GKConnectionState)newState;
```

# Sending Stream Data

Data sent to all connected players

Reliable or unreliable transport

```
- (void)sendData:(NSData *)data withTransportType:(GKTransportType)transport  
completionHandler:(void(^)(NSError *error))completionHandler;
```

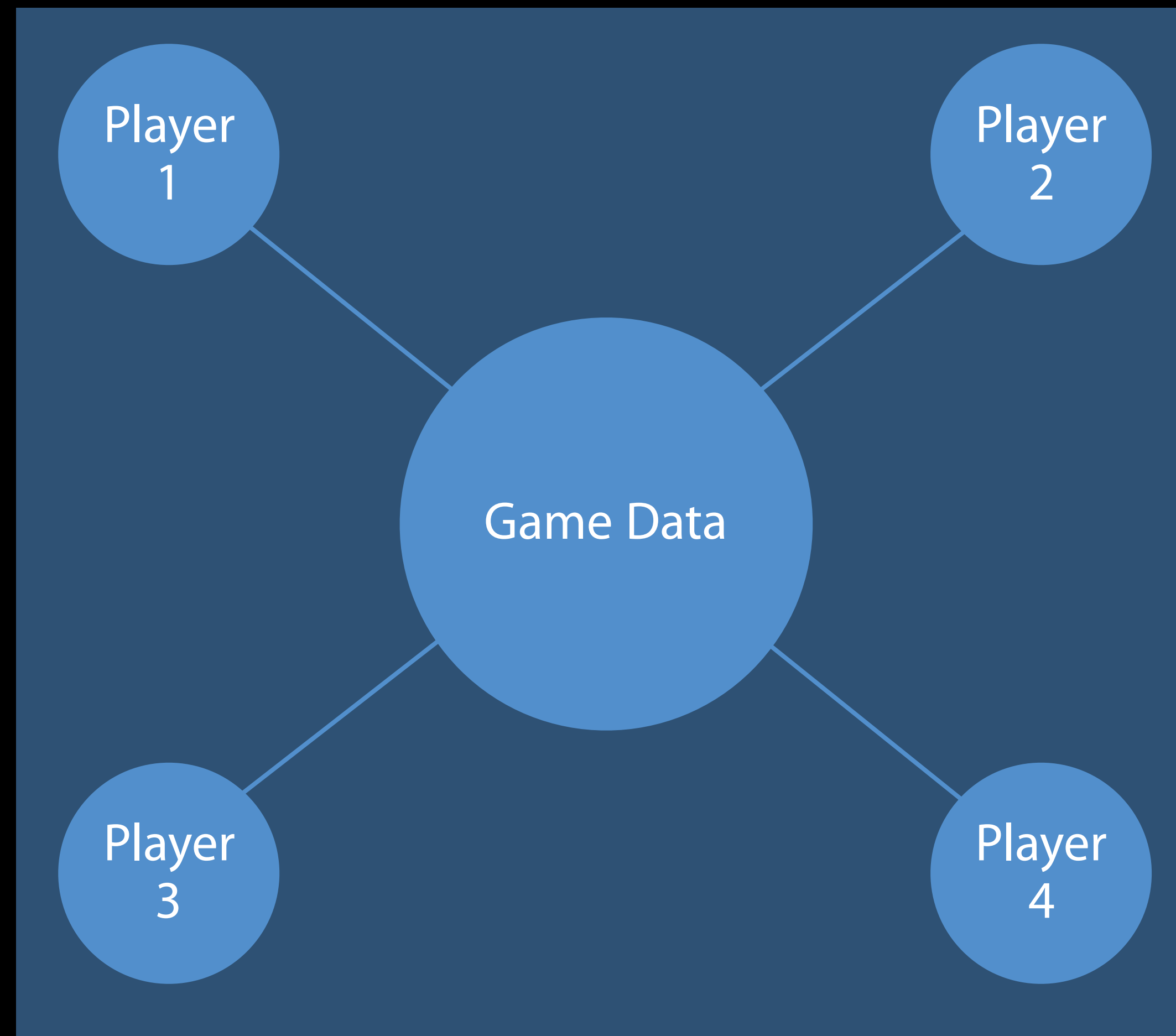
Event Listener

```
- (void)session:(GKGameSession *)session didReceiveData:(NSData *)data fromPlayer:  
(GKCloudPlayer *)player;
```

# Game Session Examples

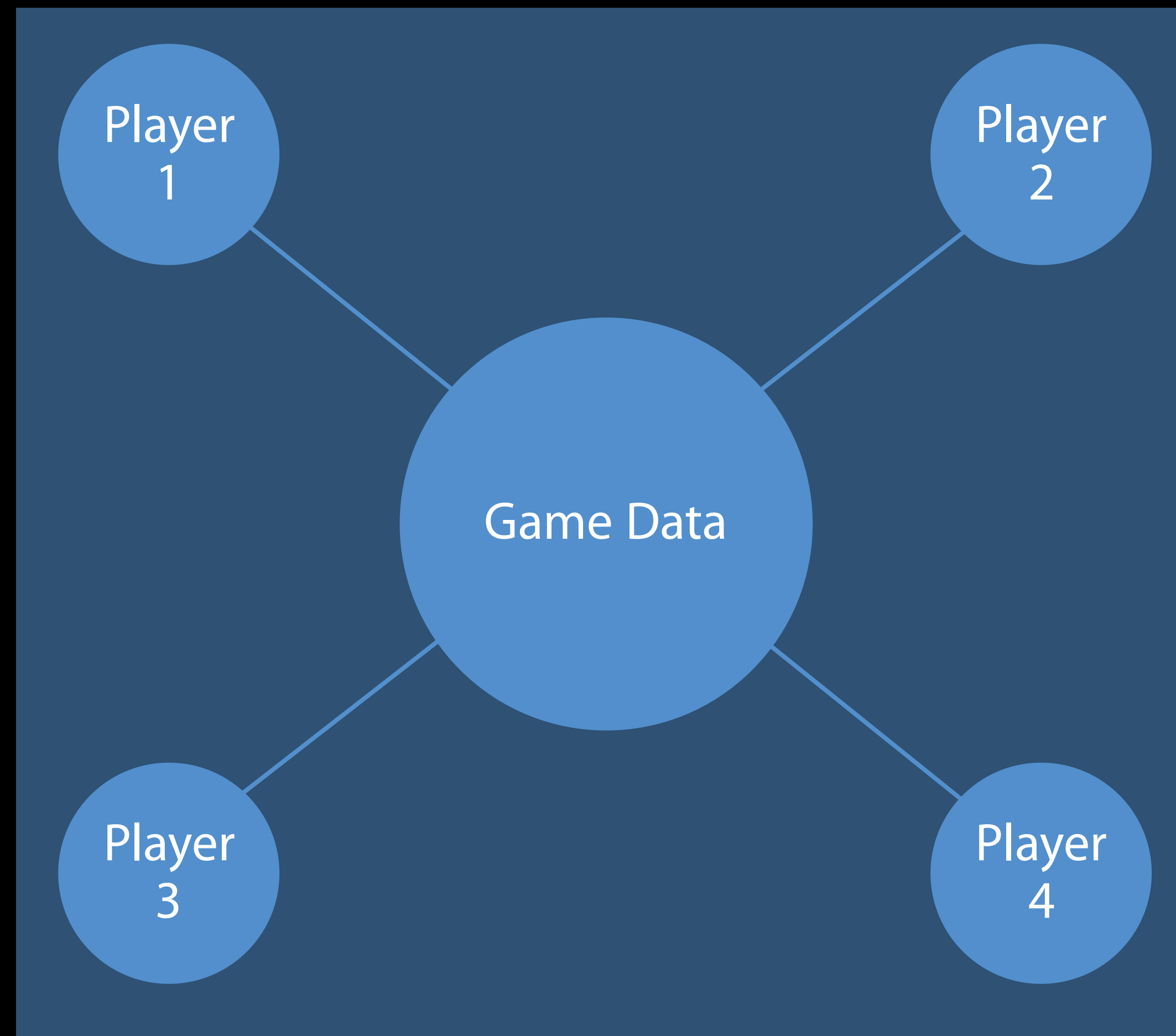
# Turn-Based Game

## Example



# Turn-Based Game

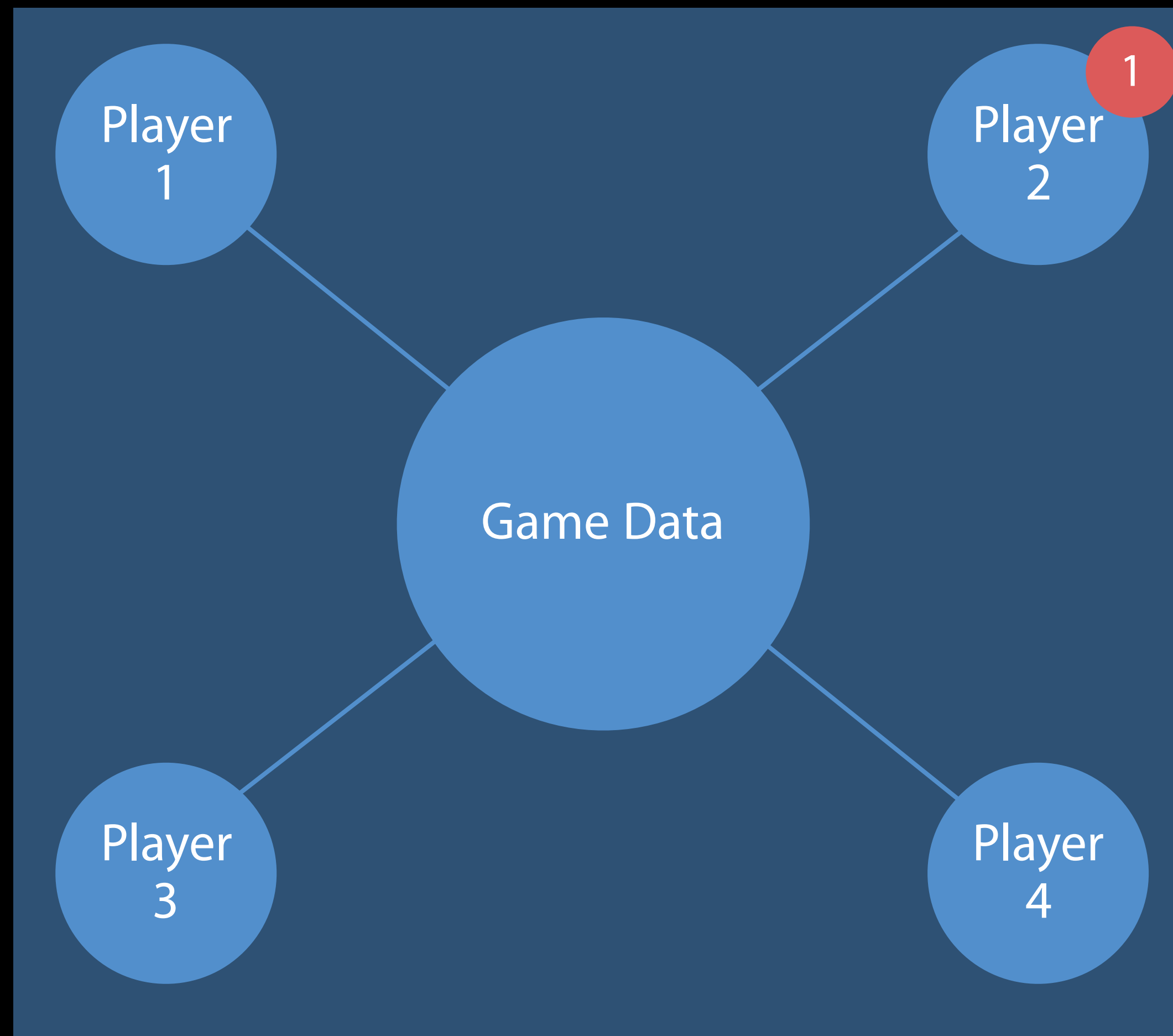
## Example





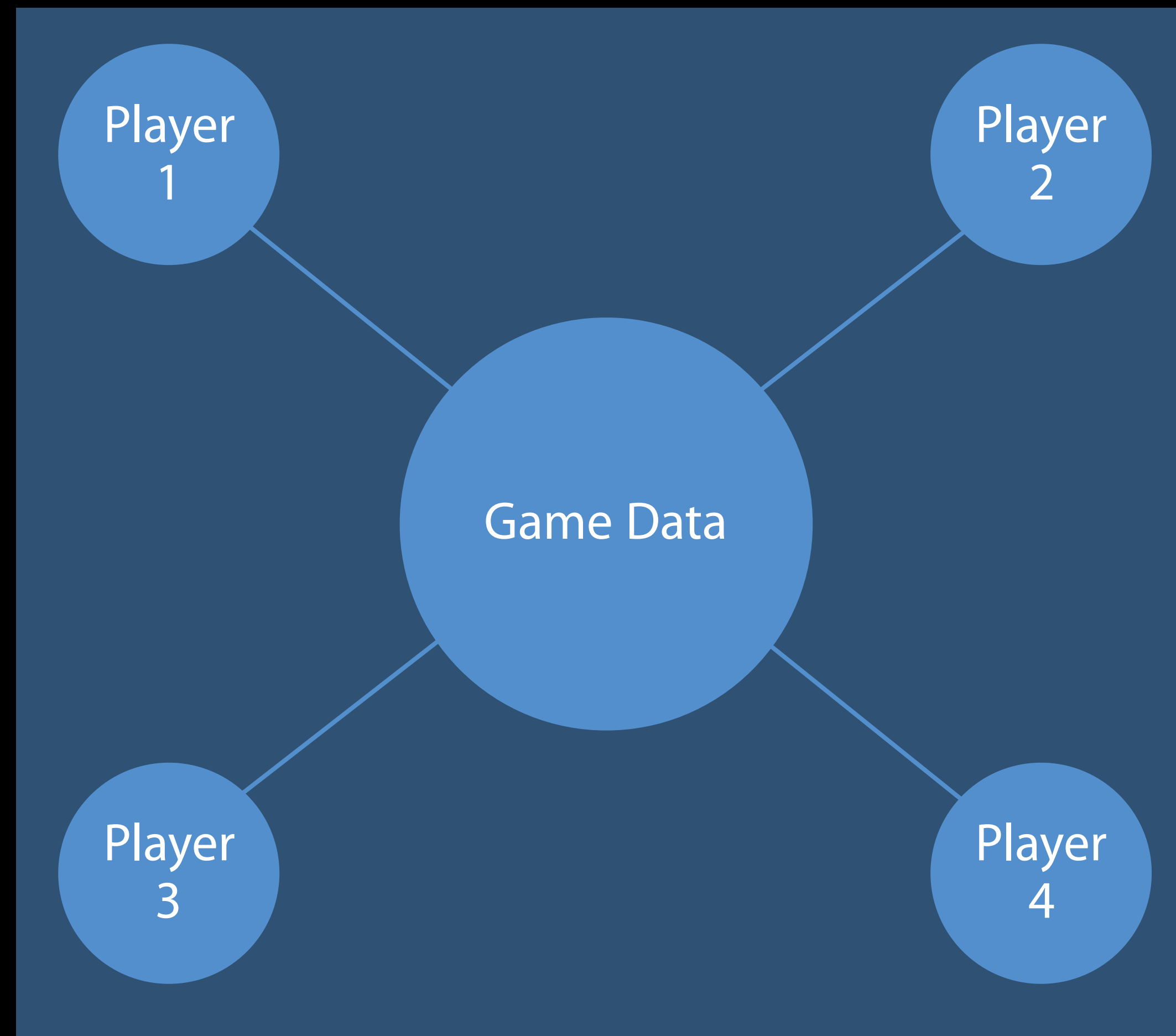
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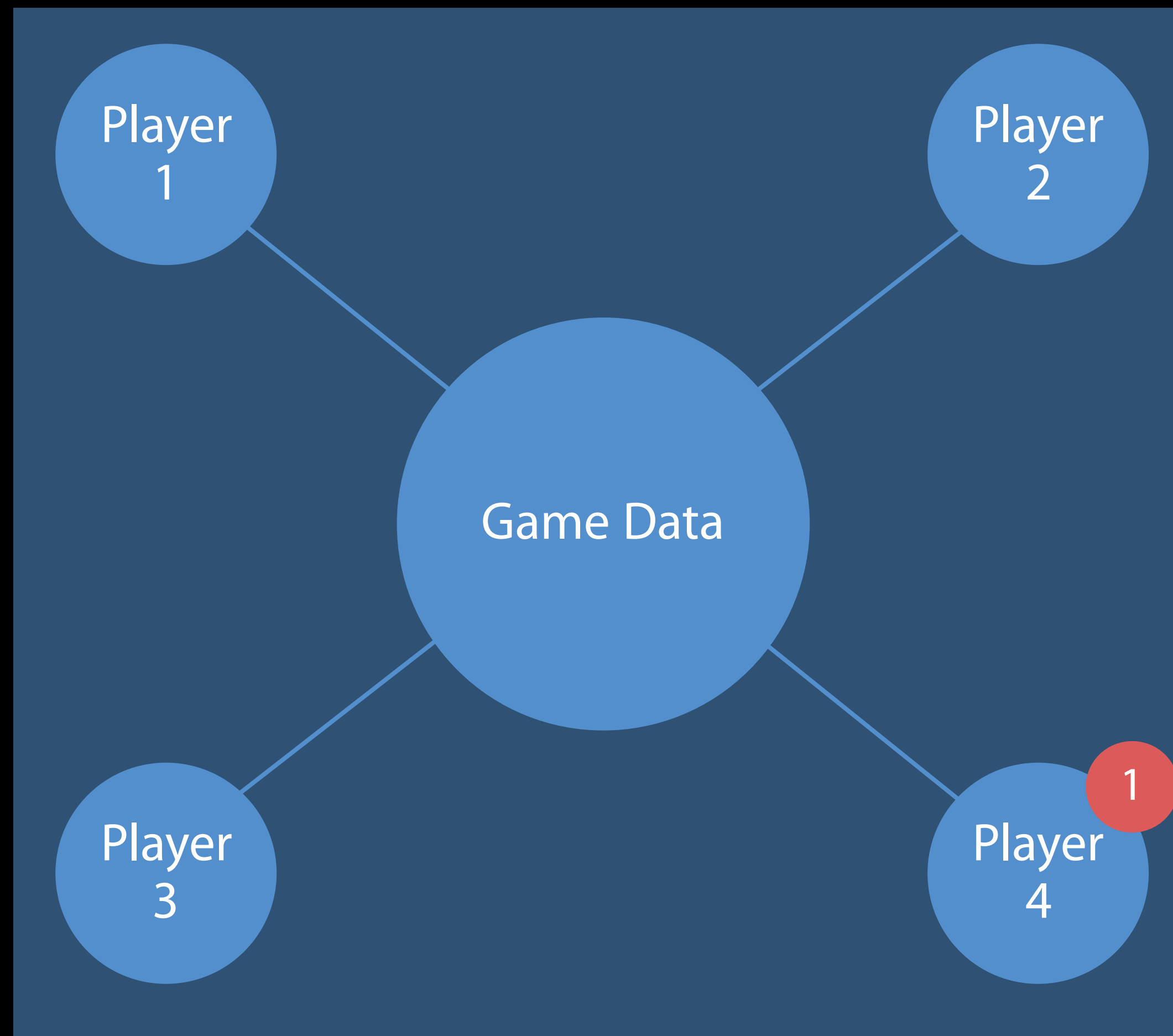
# Turn-Based Game

## Example



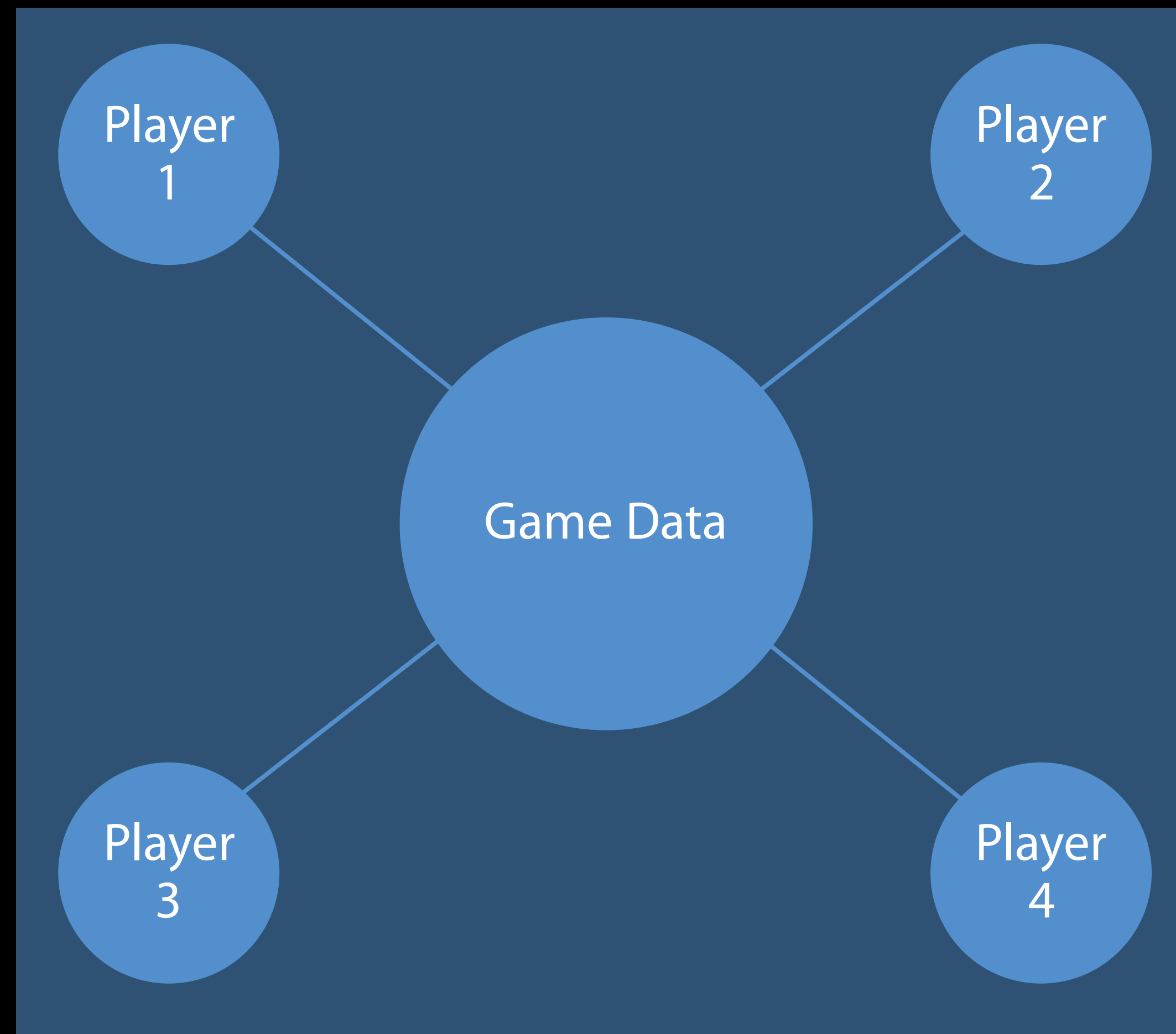
# Turn-Based Game

## Example



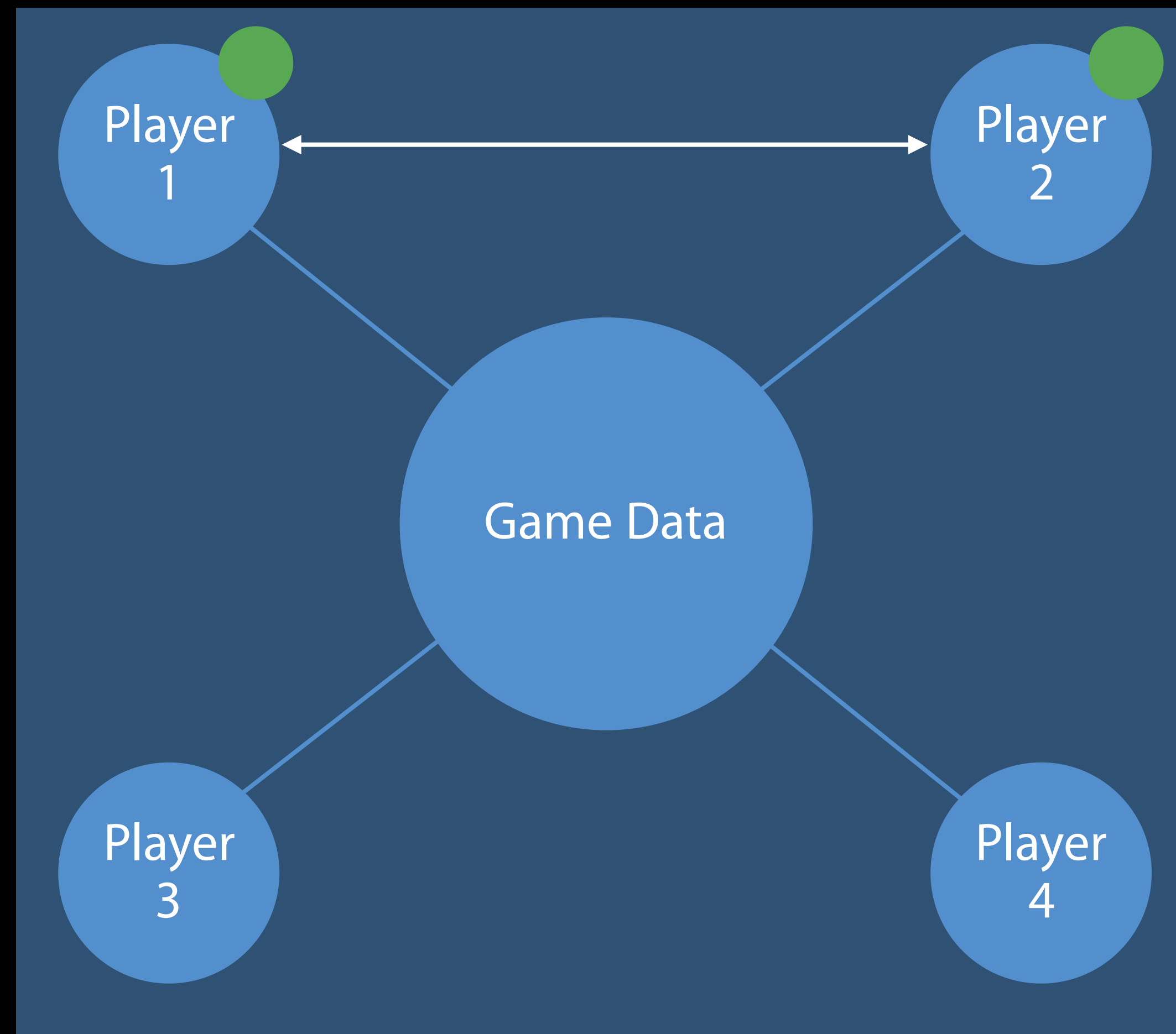
# Real-Time Game

## Example



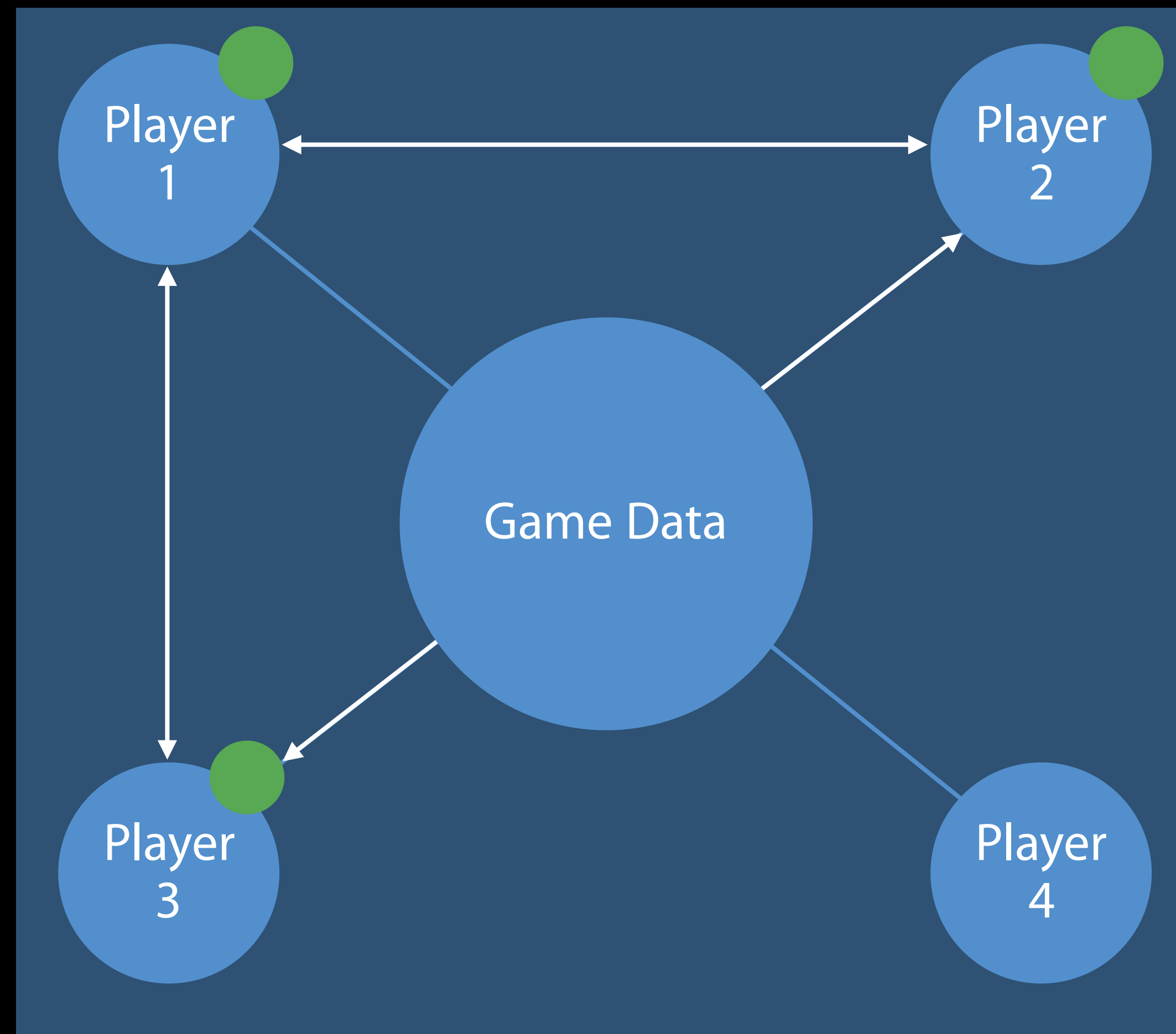
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## Example



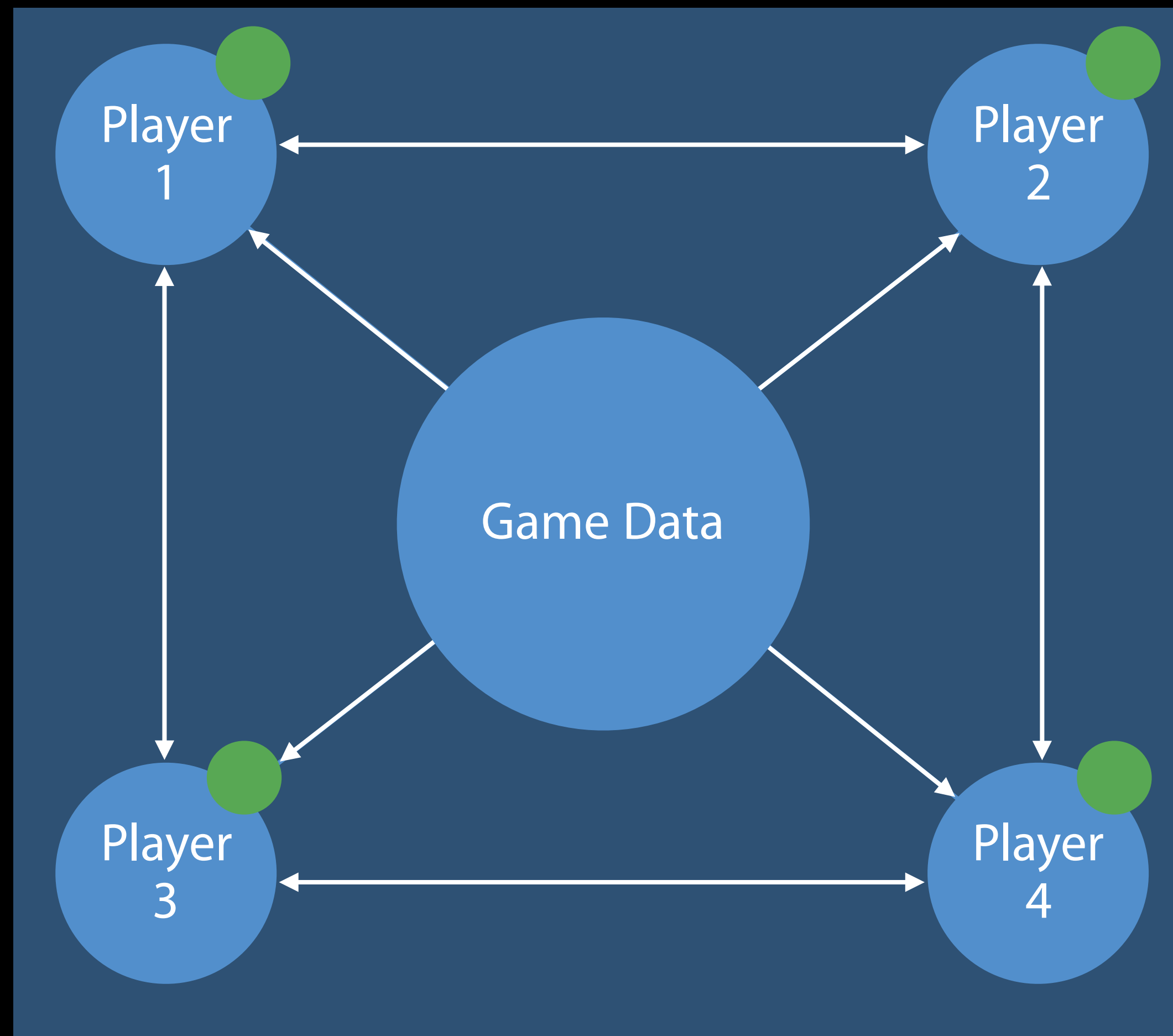
# Real-Time Game

## Example



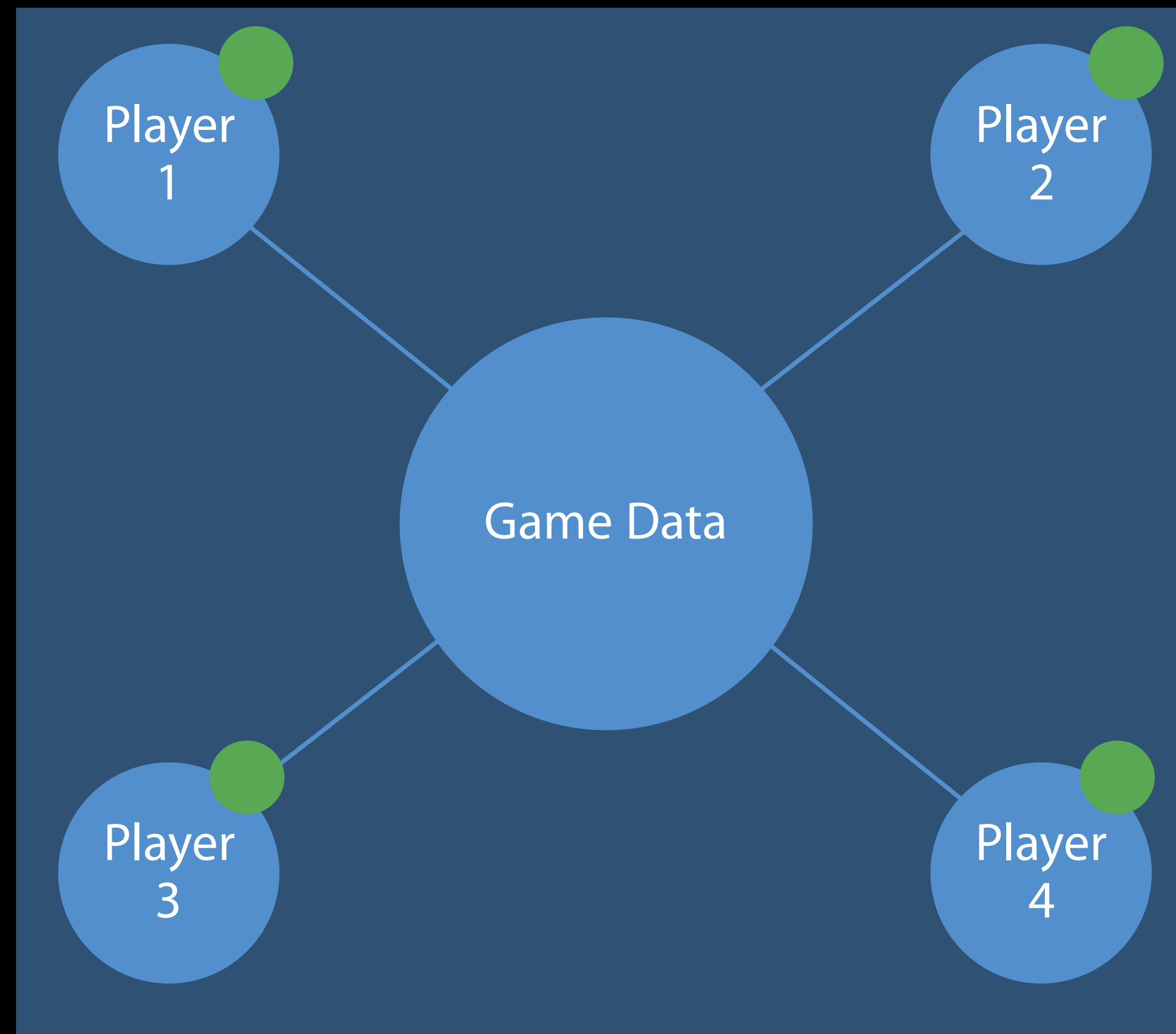
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## Example



# Real-Time Game

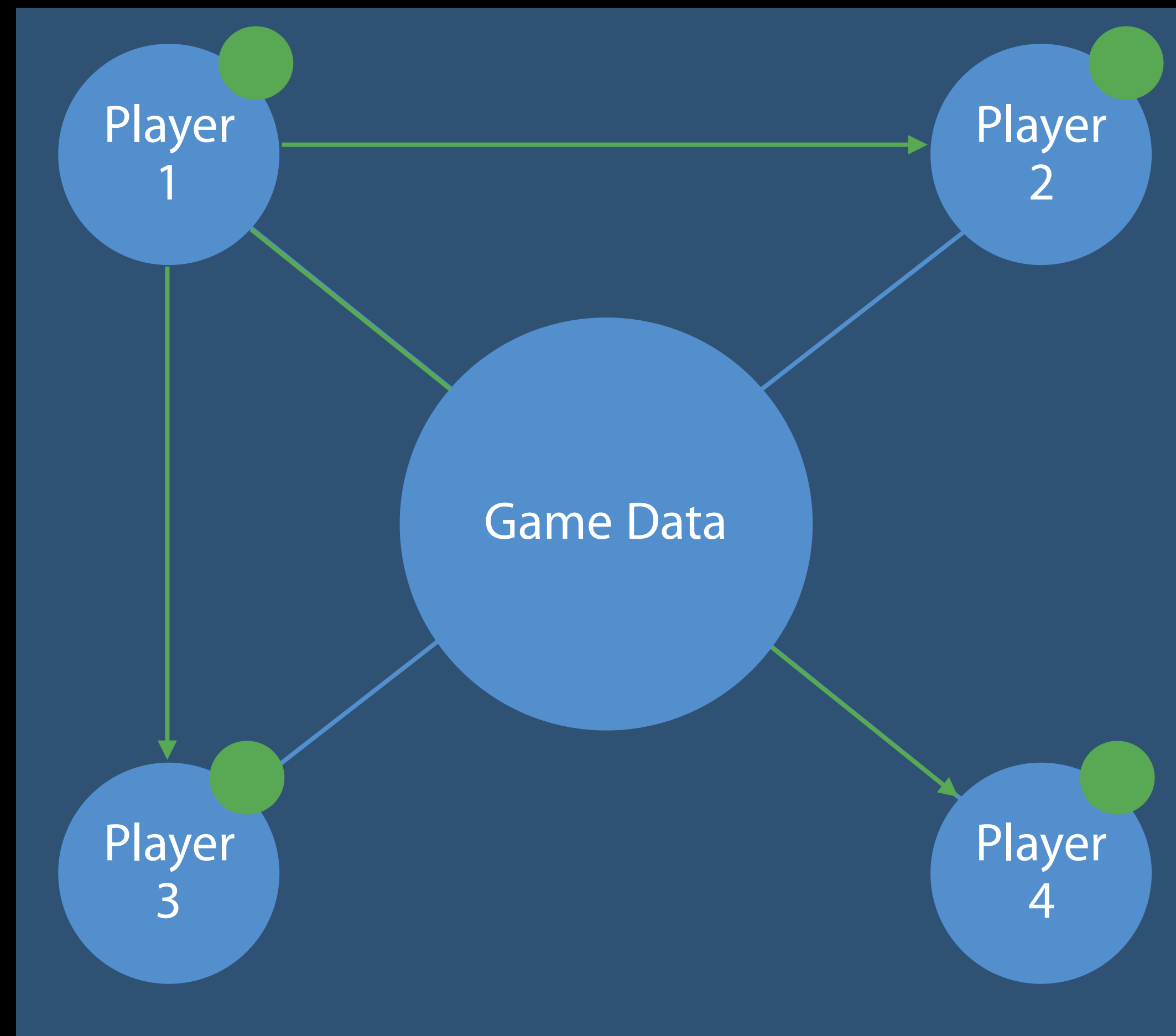
## Example





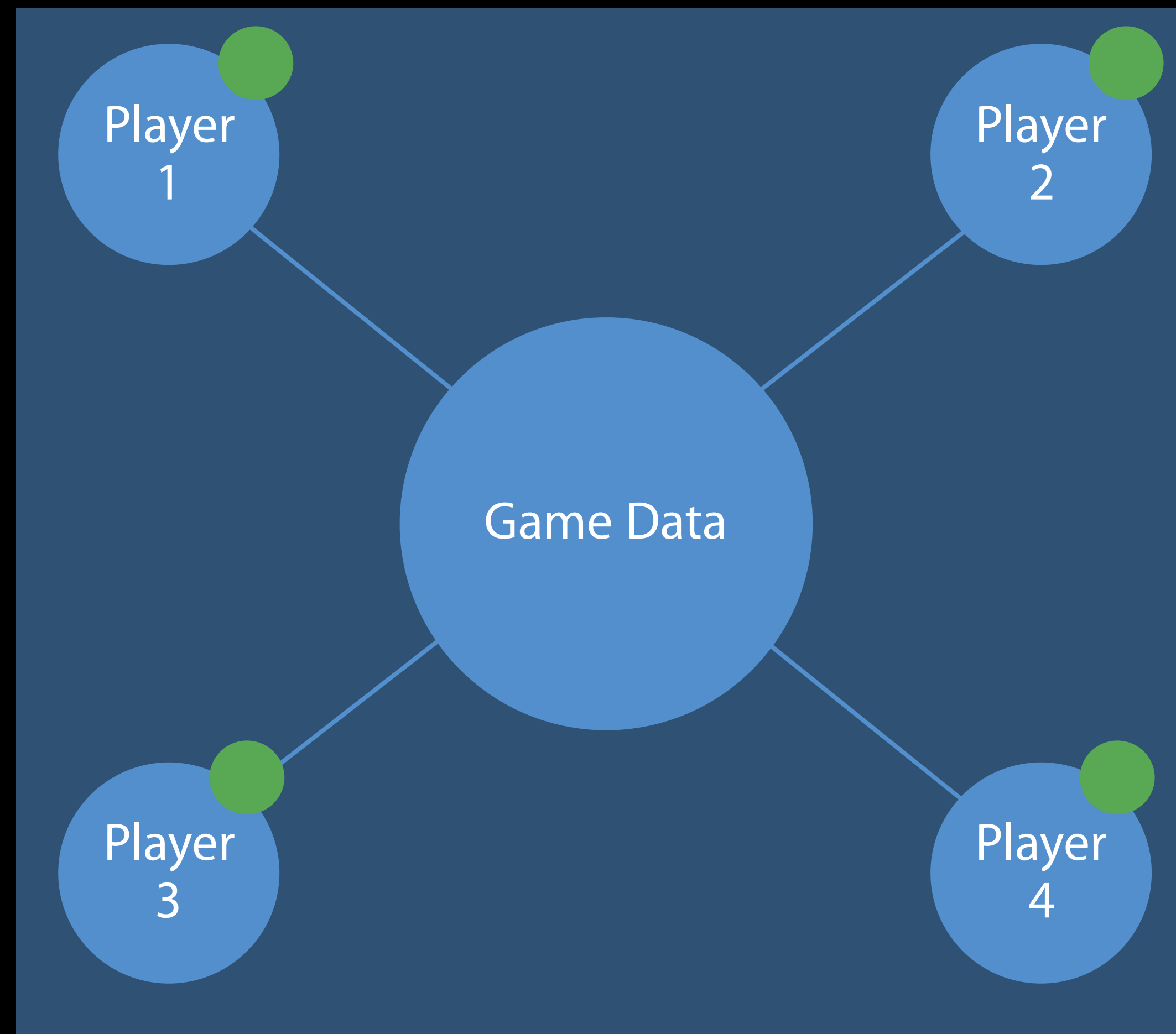
# Real-Time Game

## Example



# Real-Time Game

## Example

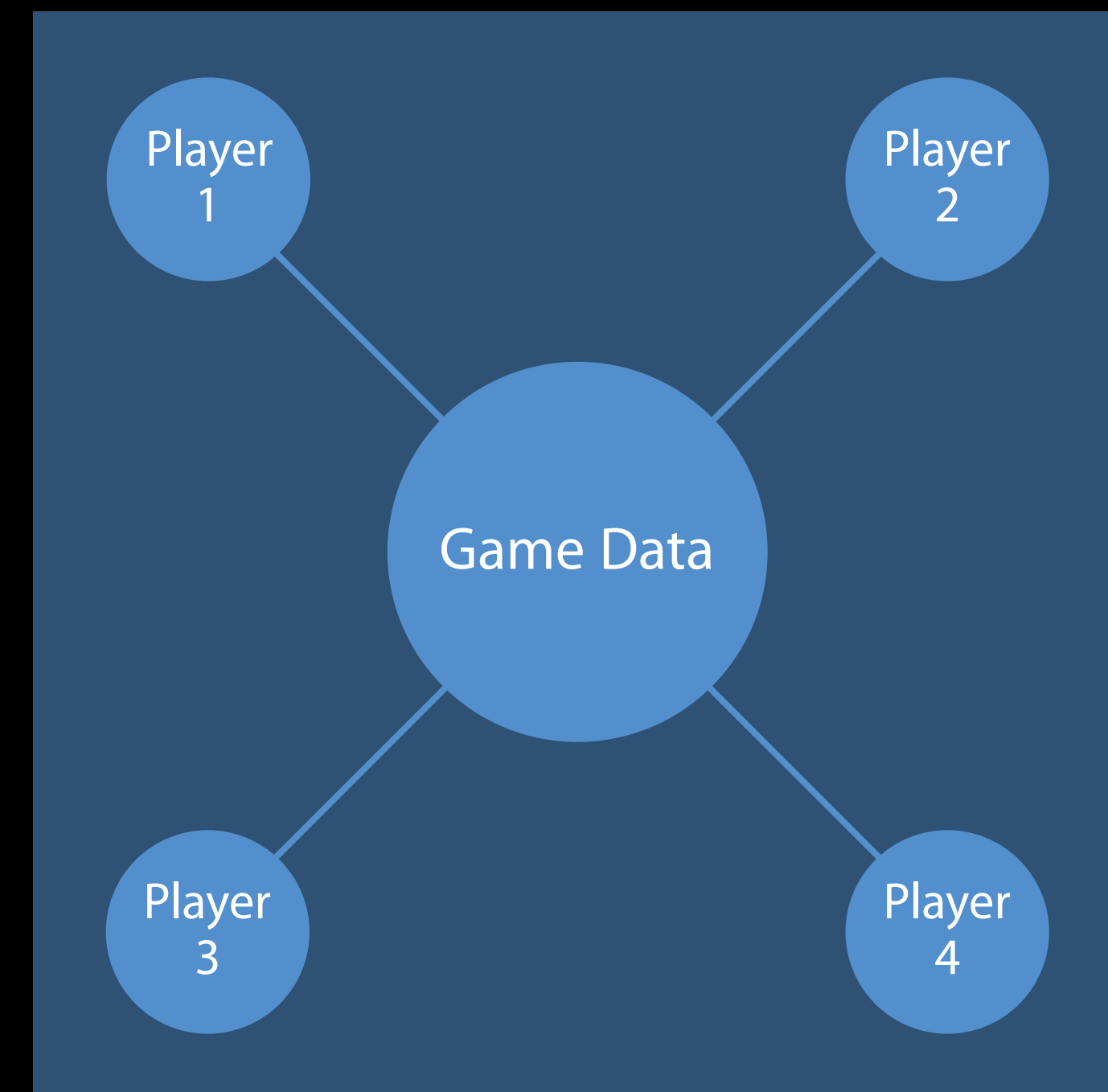


# Game Sessions

Use case: complex turns

Players trading cards

- Players want to trade with others during their turn
- Send a message with relevant data
- Players can respond with their own offers
- Resolve on the current players device, finish turn, and save data

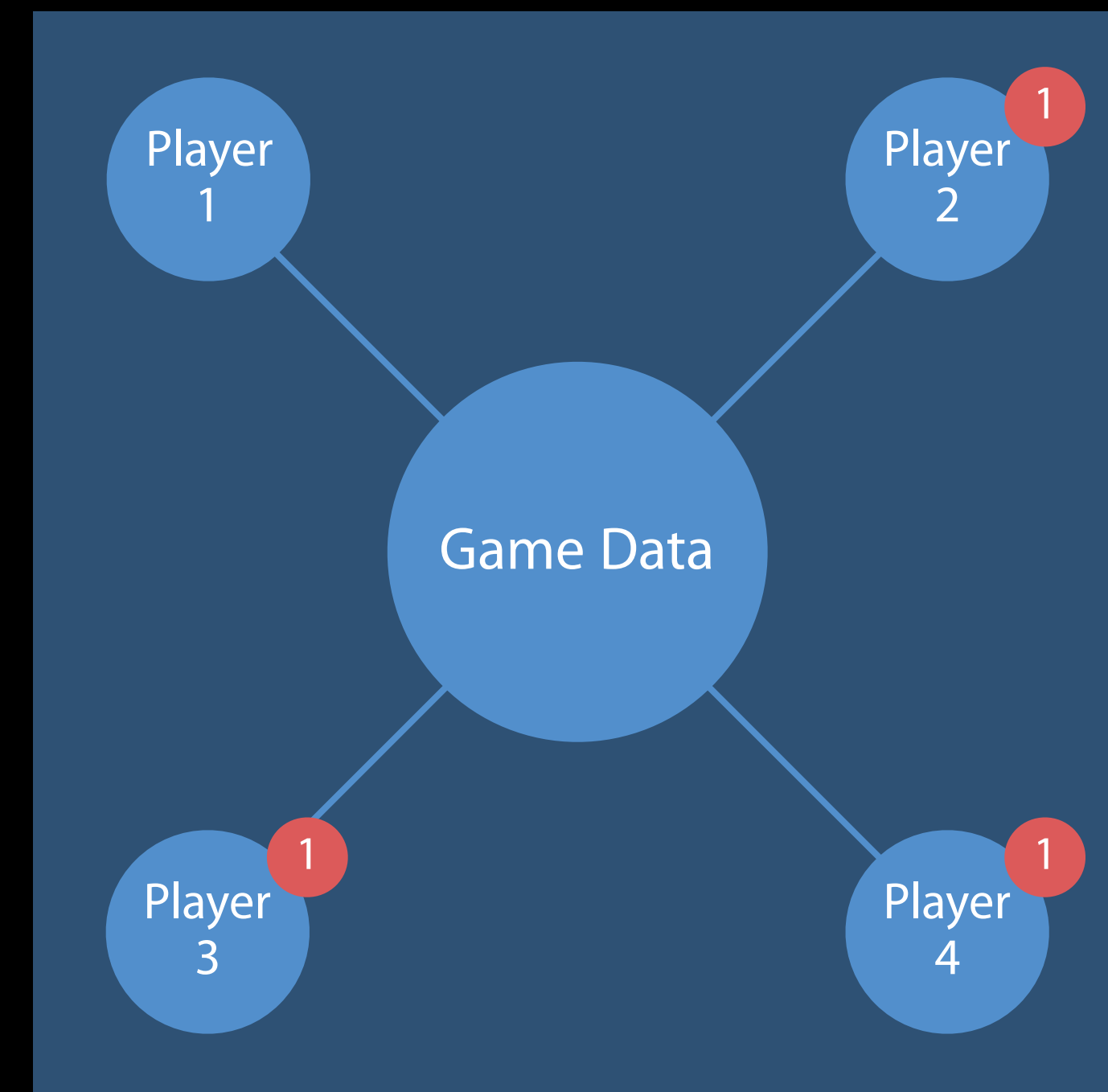


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Use case: complex turns

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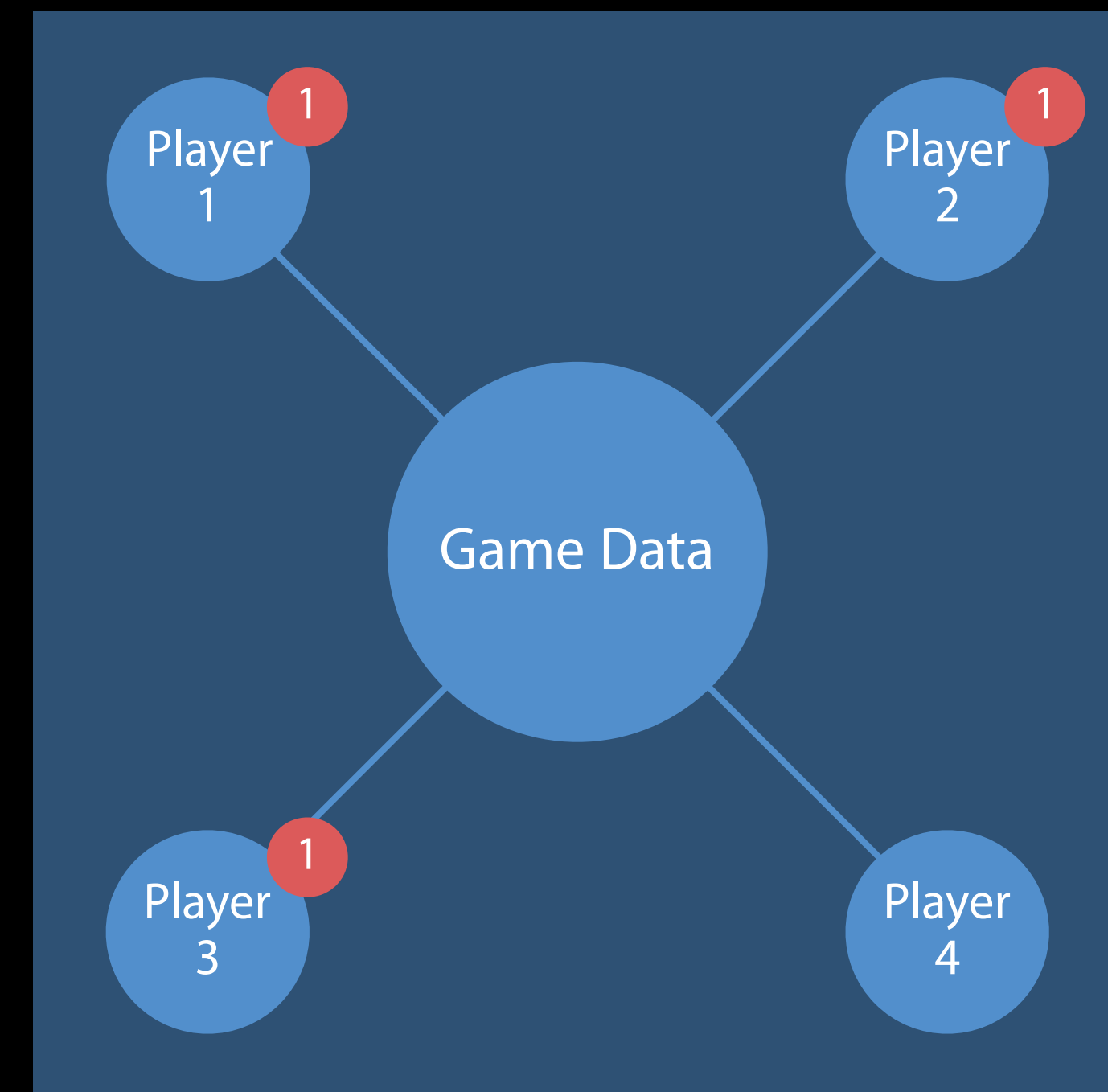


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Use case: complex turns

Players trading cards

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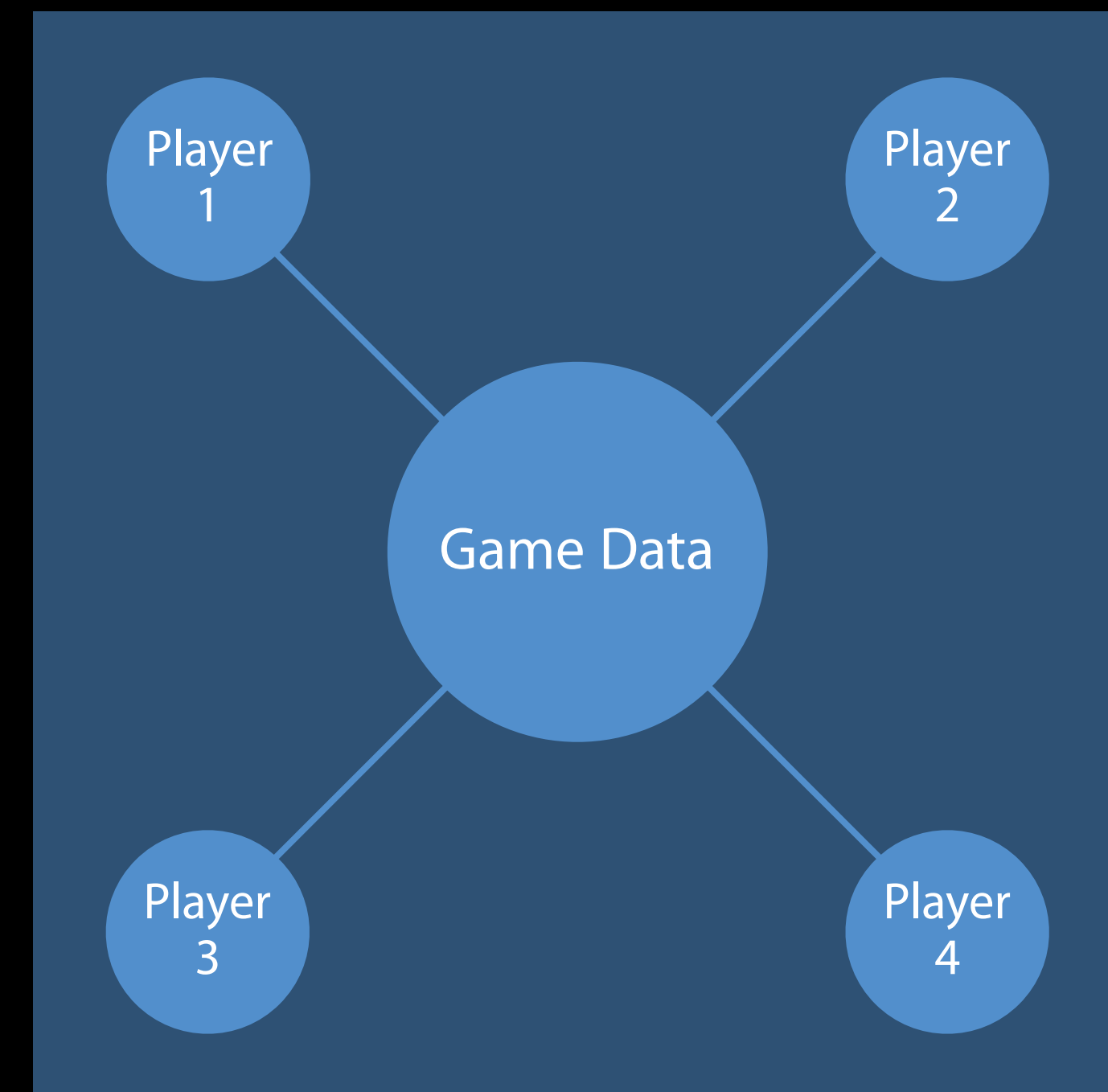


# Game Sessions

Use case: complex turns

Players trading cards

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# Game Sessions

Use case: mid-stream join multiplayer

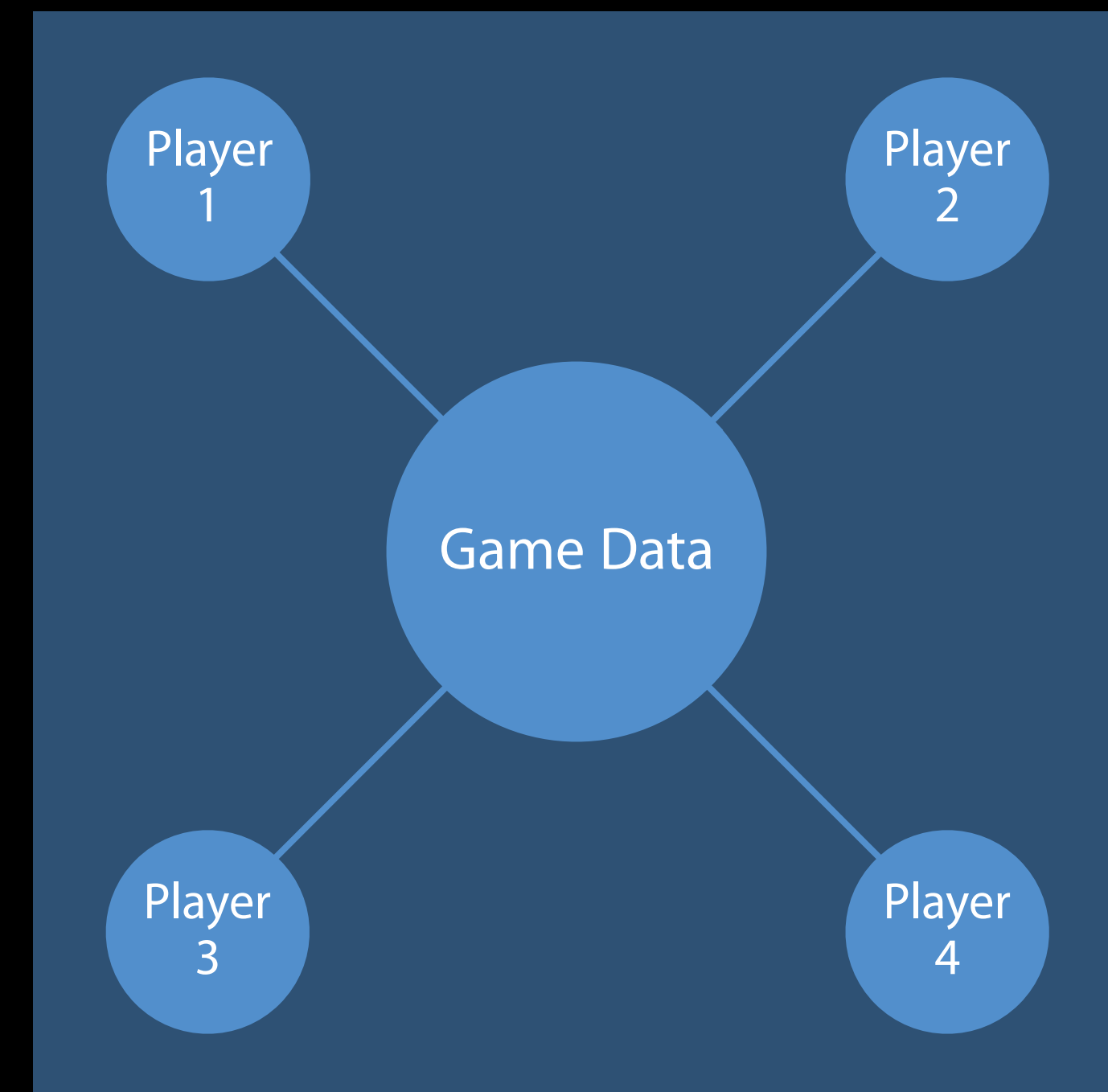
Invite many people to the session

Start a stream

Another player joins, enter a fight

As soon as one player is eliminated, the next is allowed to connect, and fight

No wait between fights, connections happen automatically



# Game Sessions

Use case: mid-stream join multiplayer

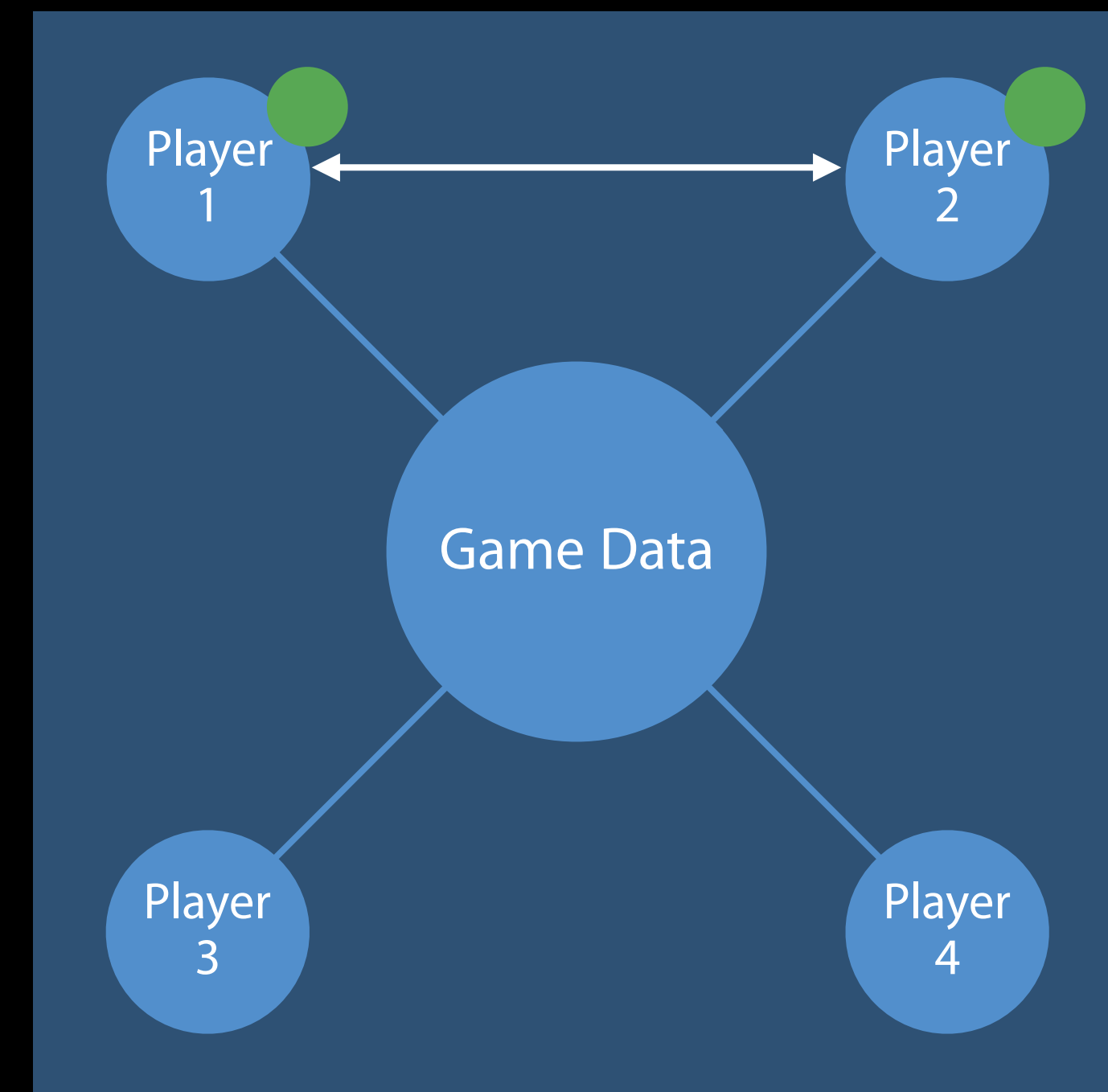
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# Game Sessions

Use case: mid-stream join multiplayer

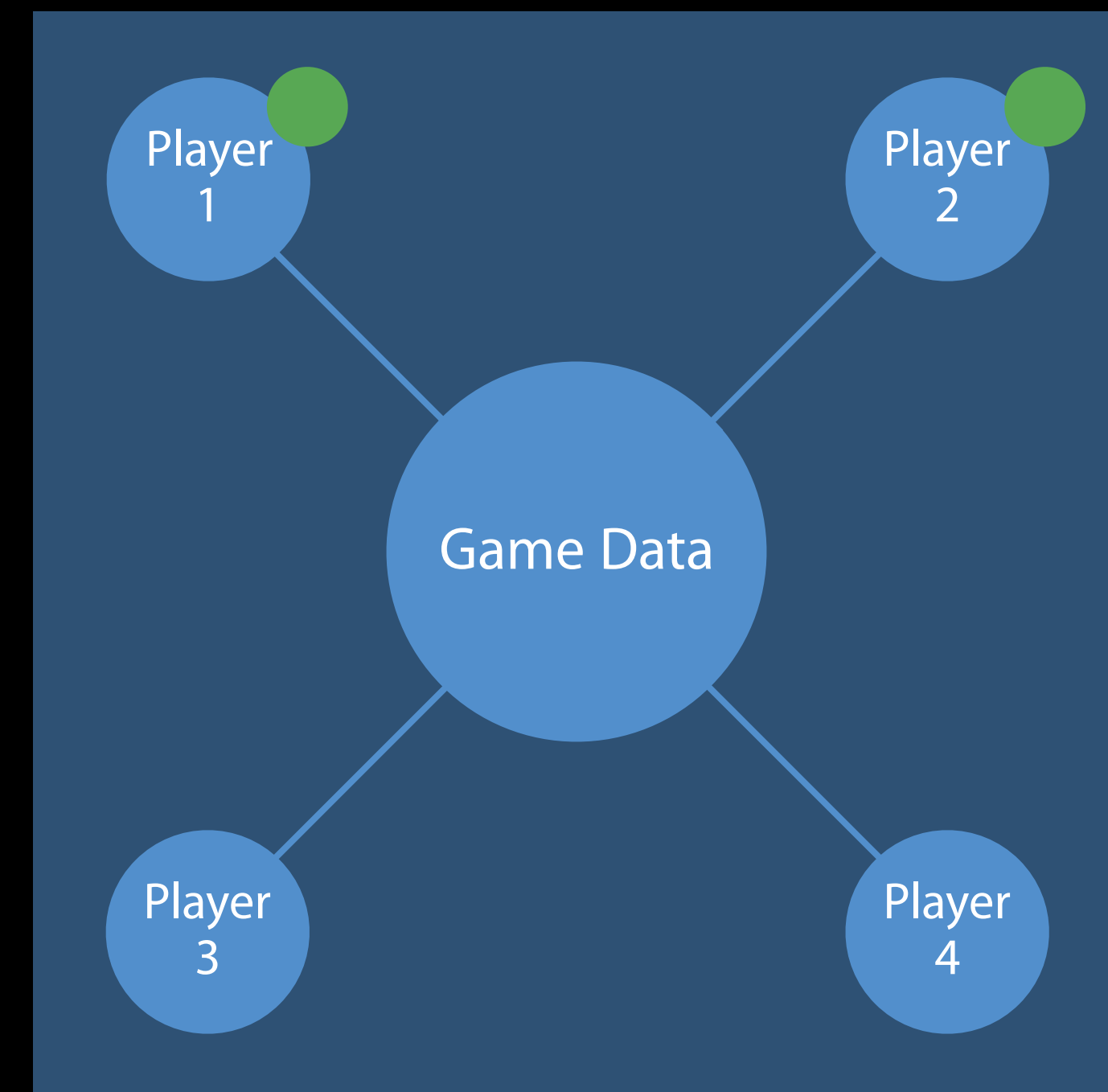
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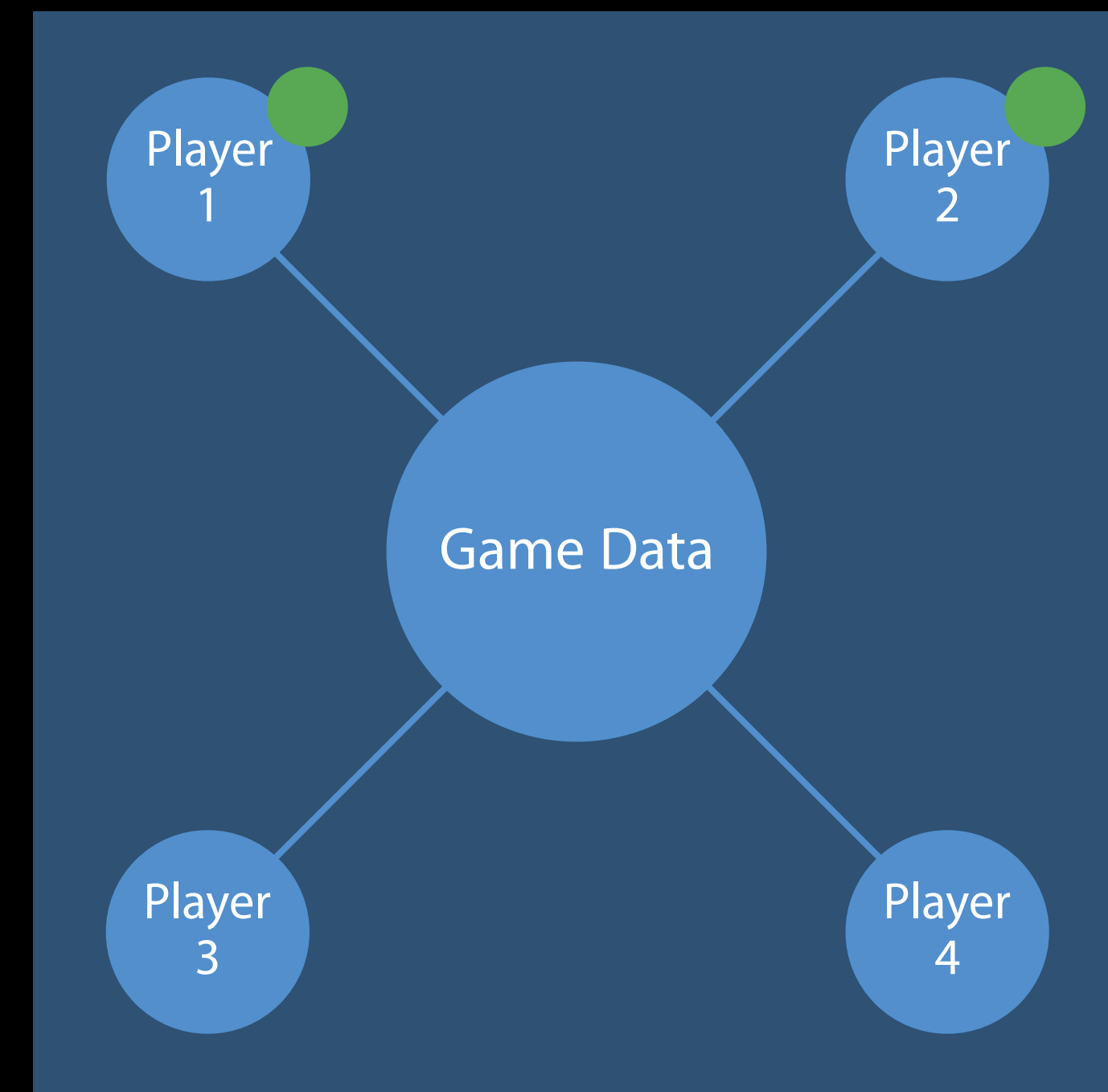
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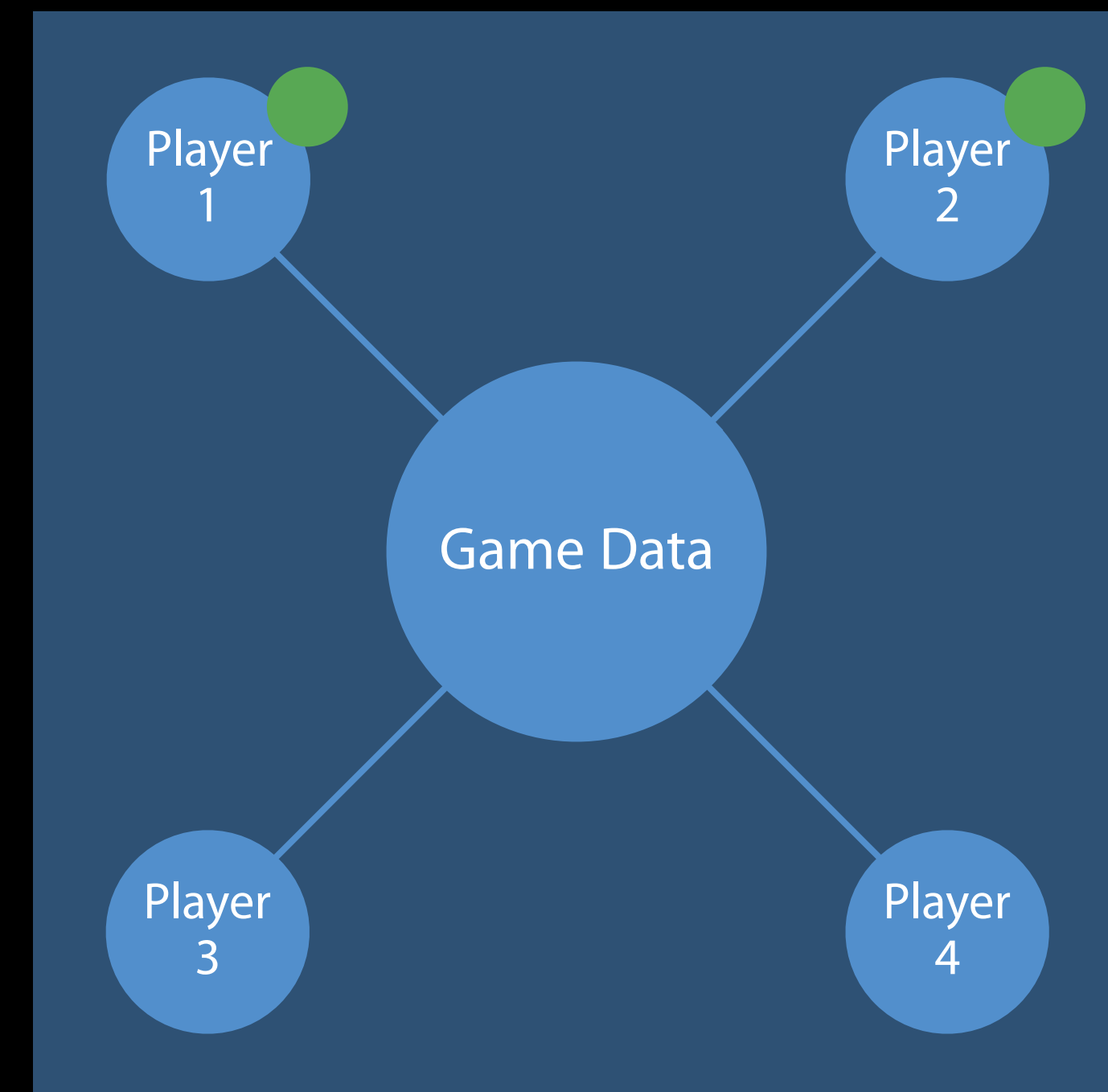
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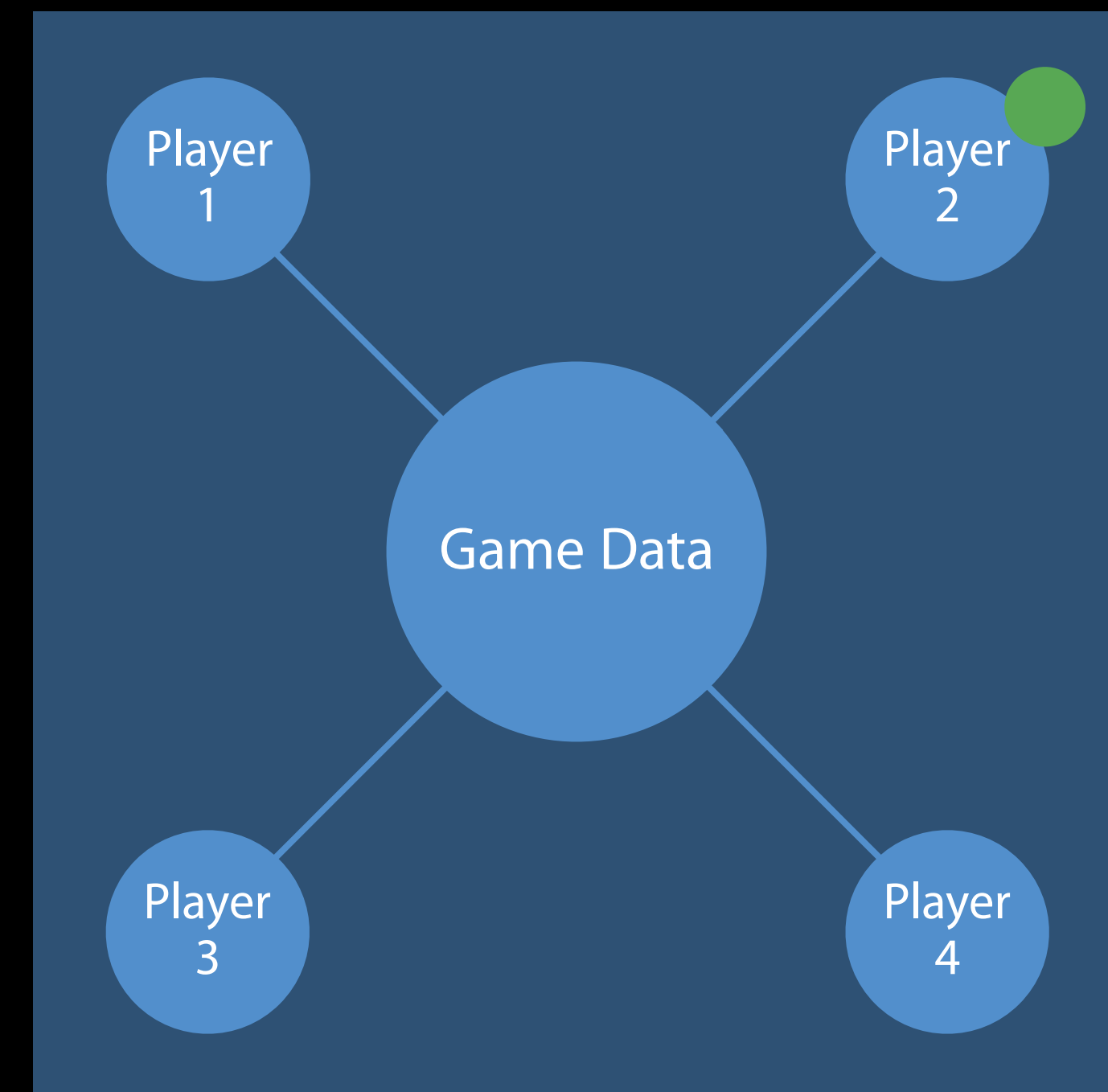
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# Game Sessions

Use case: mid-stream join multiplayer

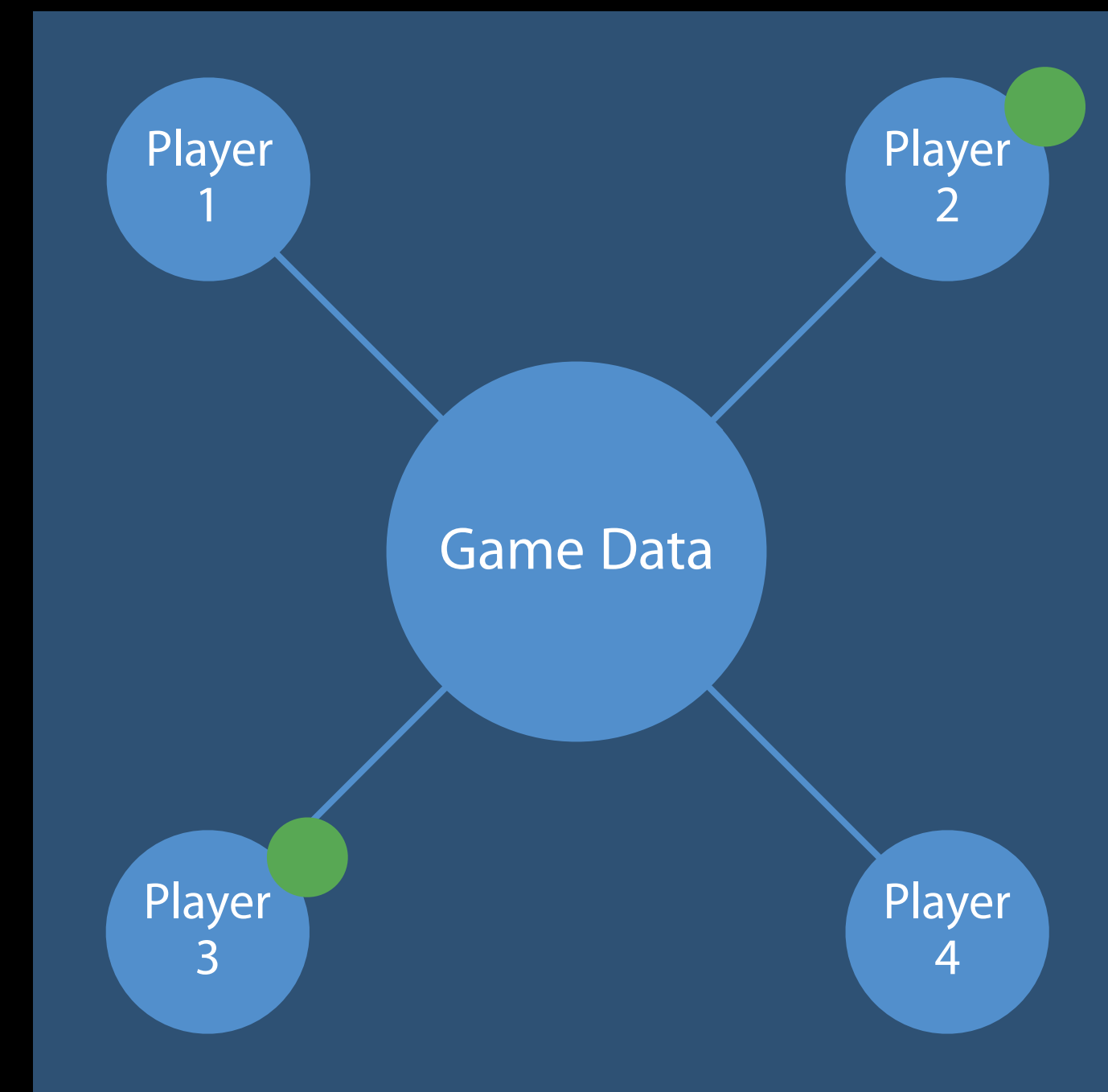
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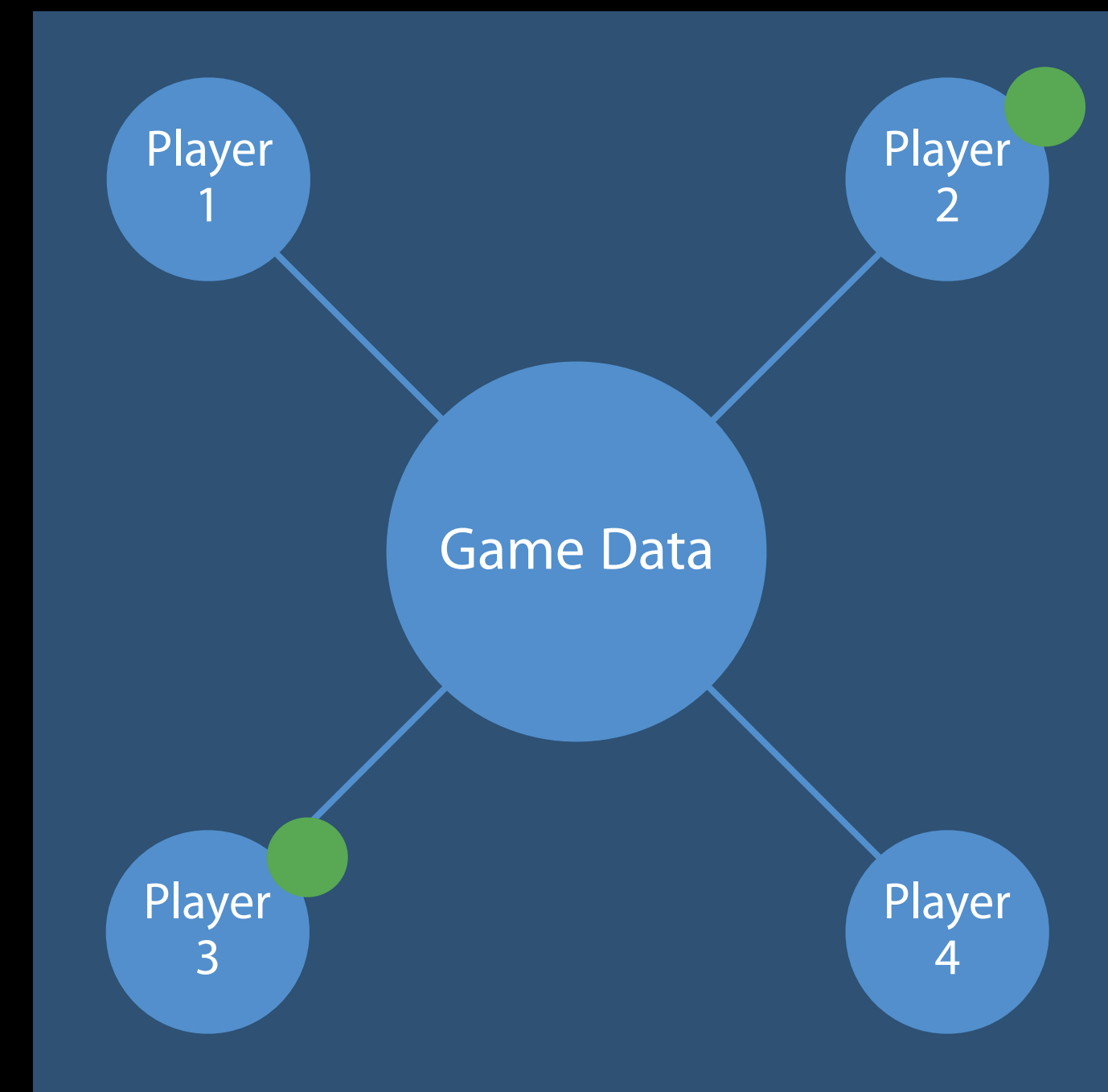
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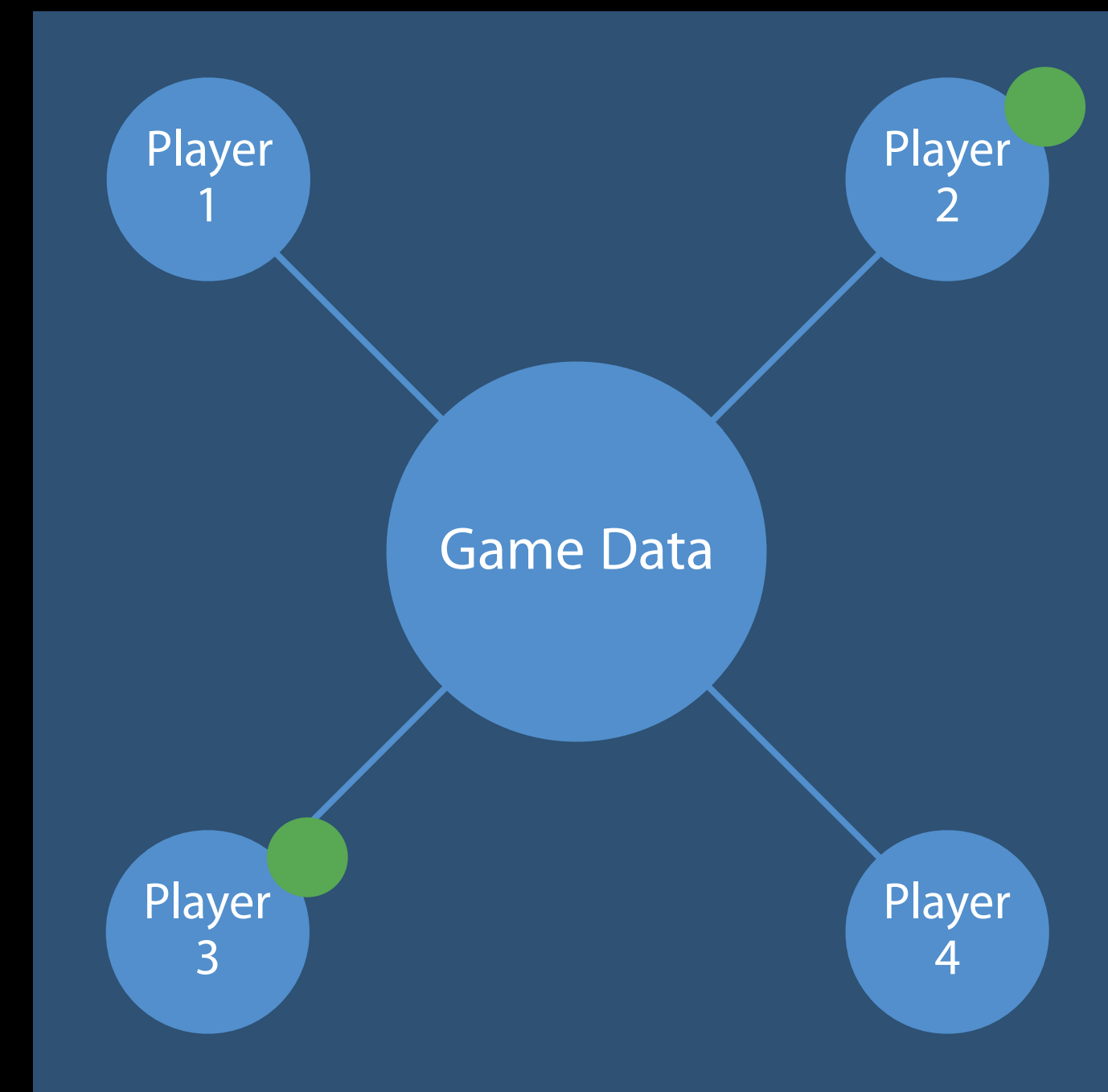
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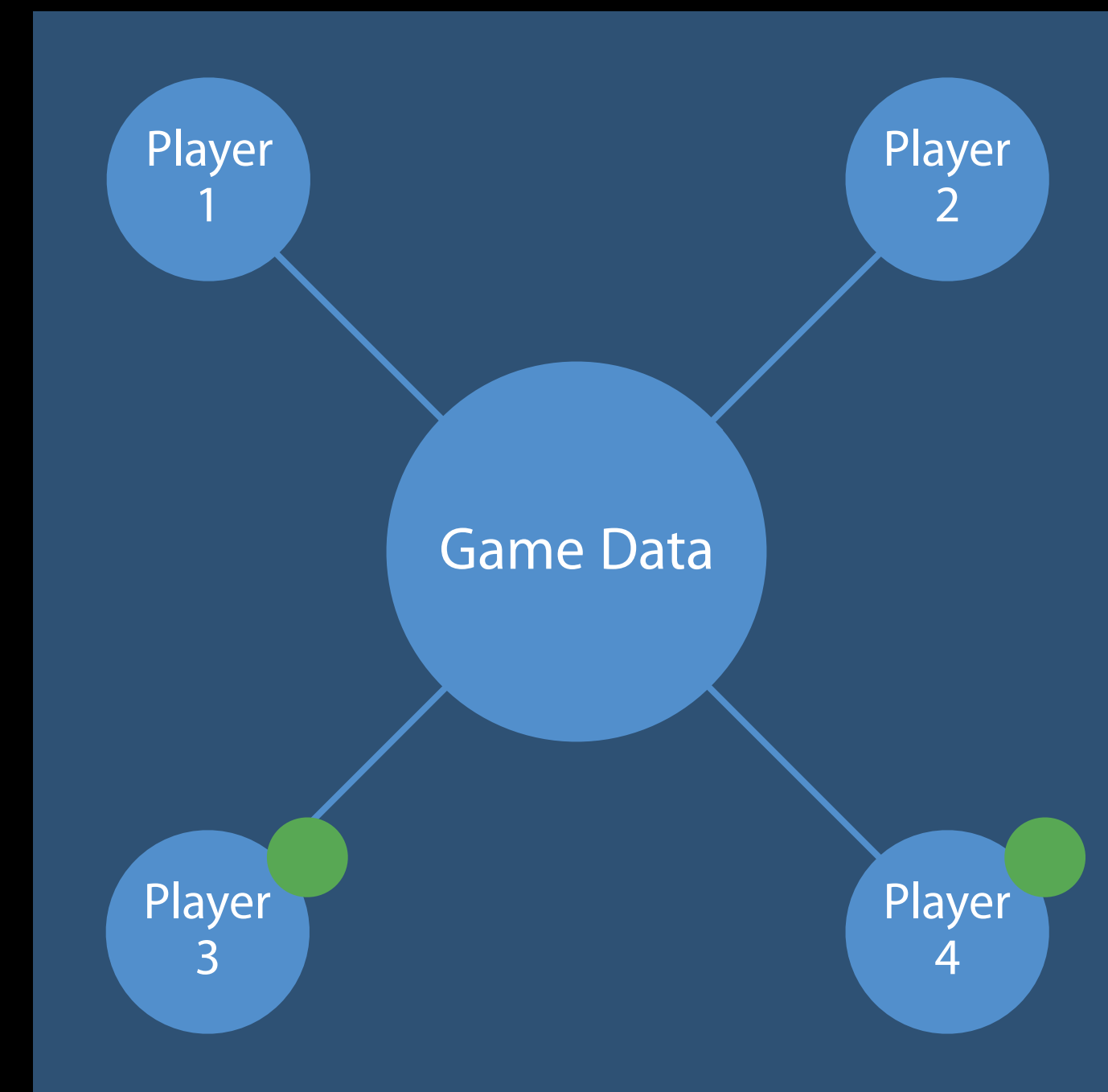
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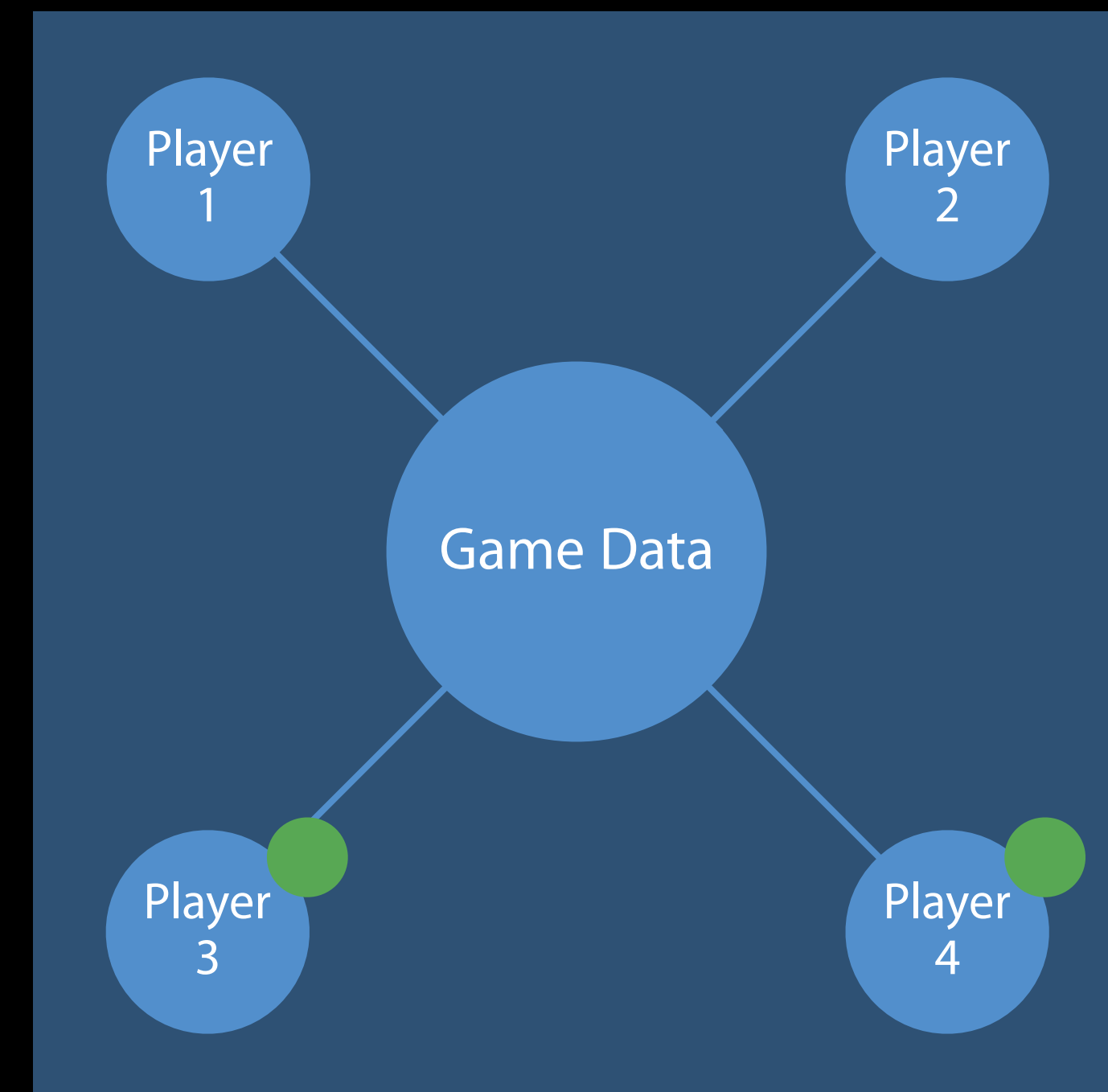
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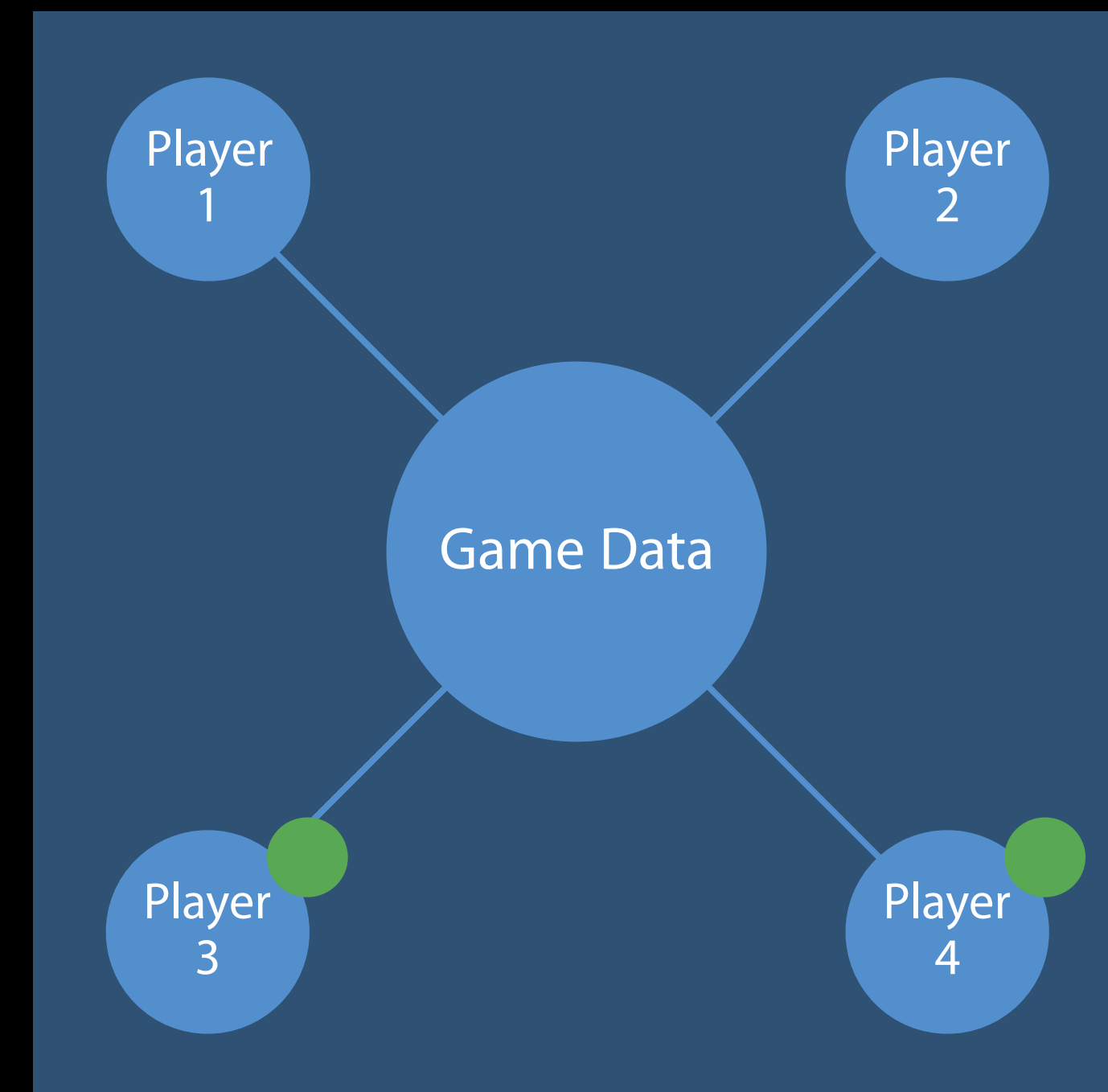
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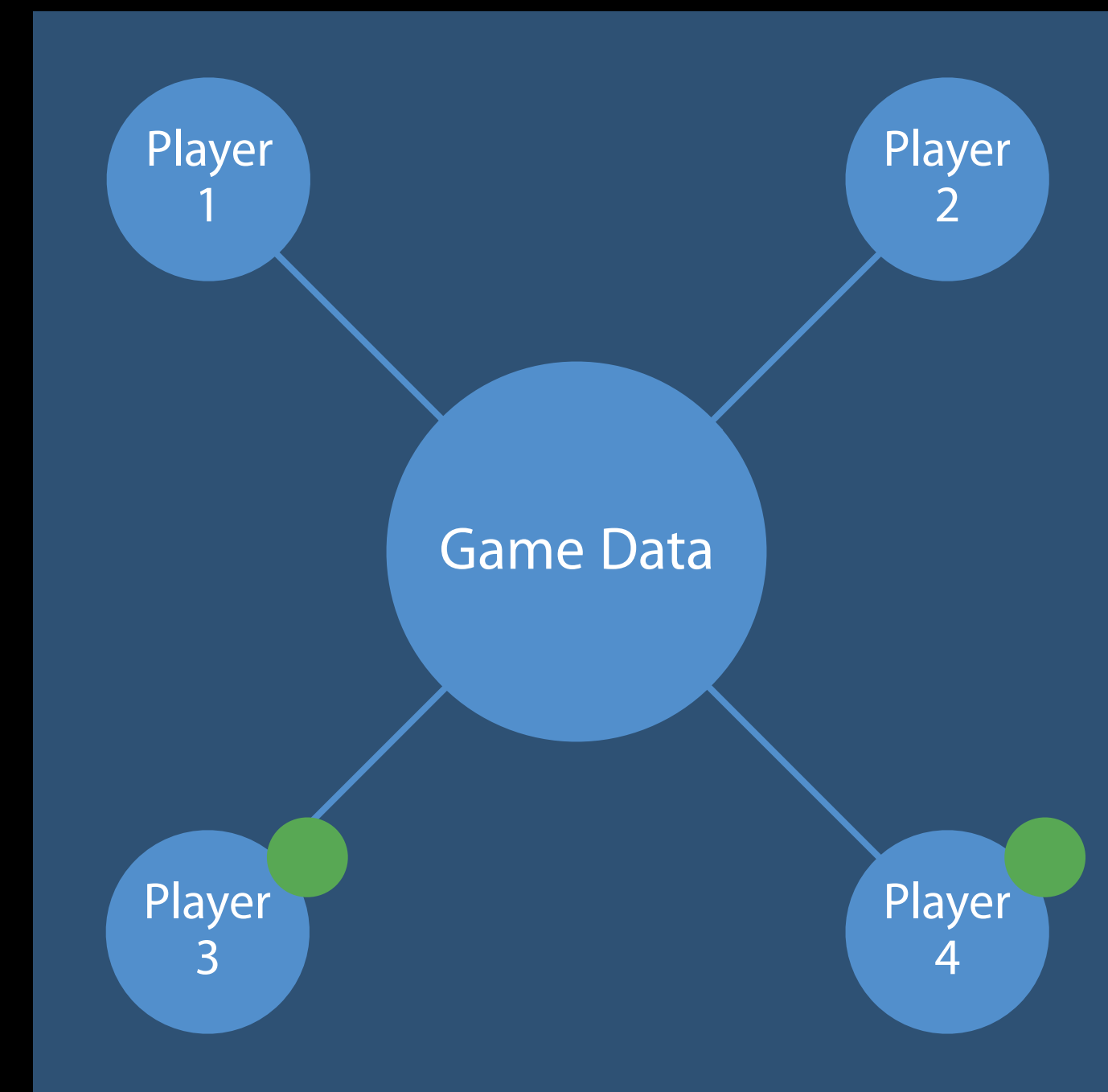
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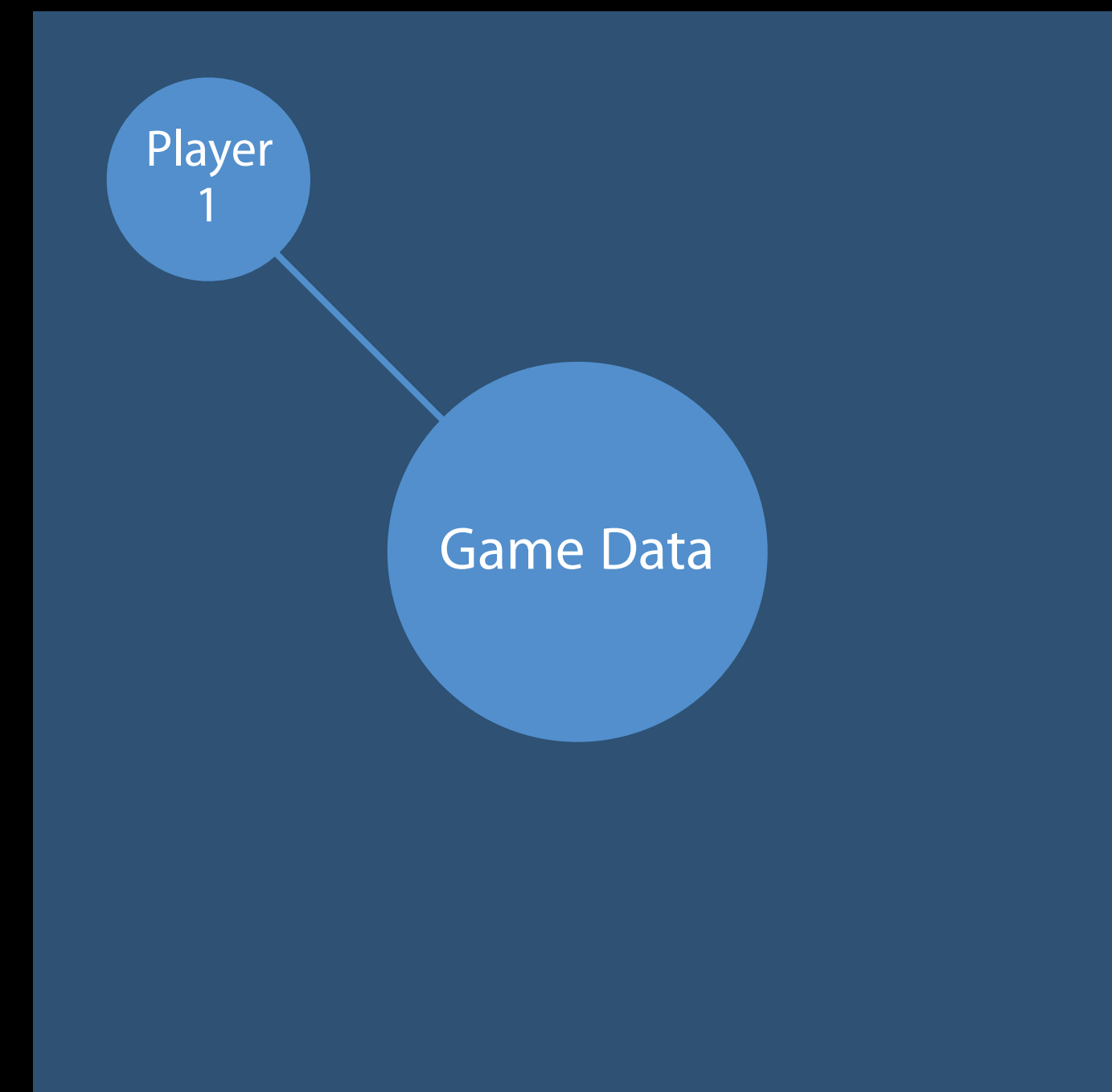
# Game Sessions

Use case: assisted single player

Playing a single player platformer

Can't get past a level

Share game with another player, allow them to help you advance



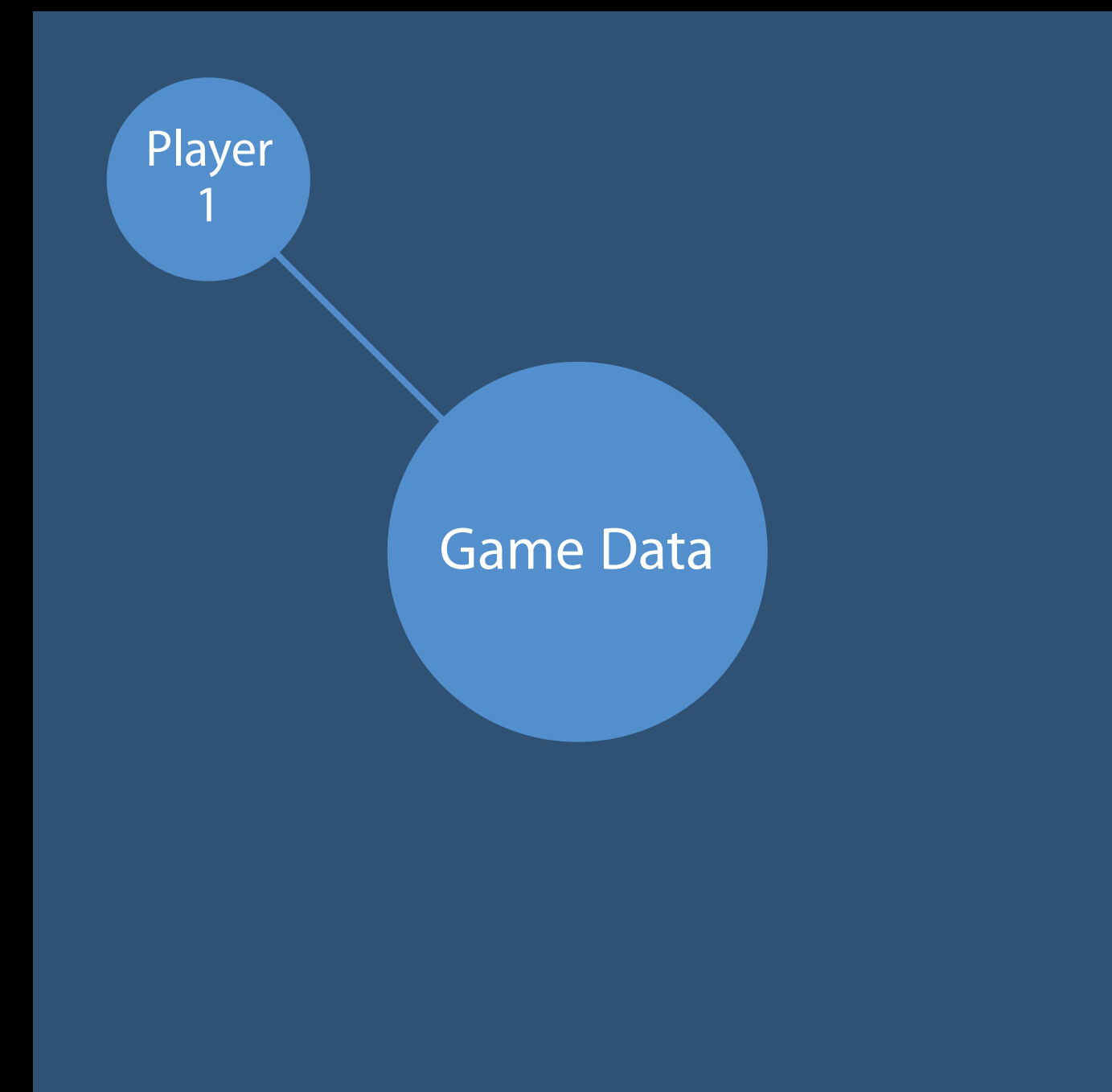
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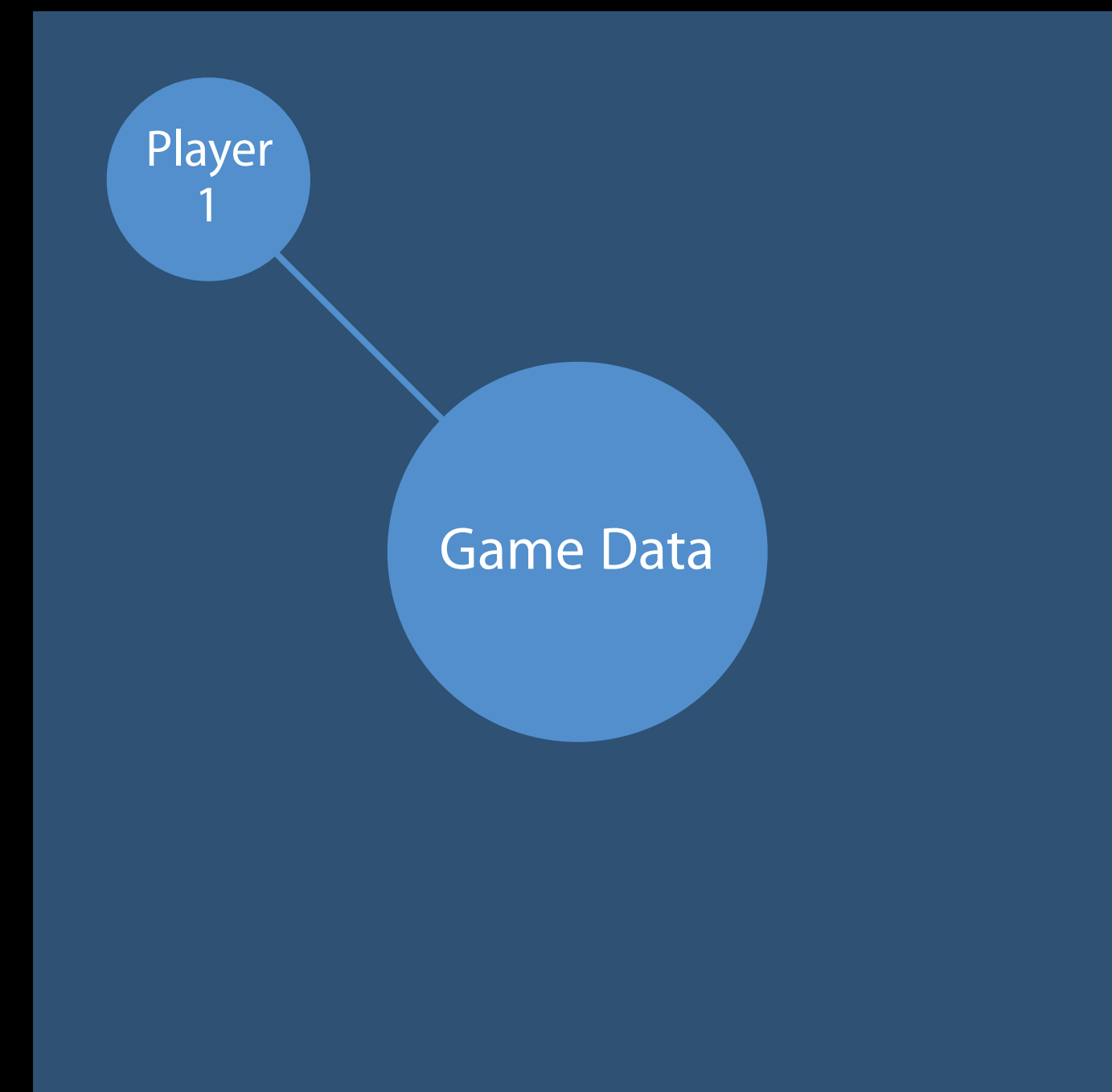
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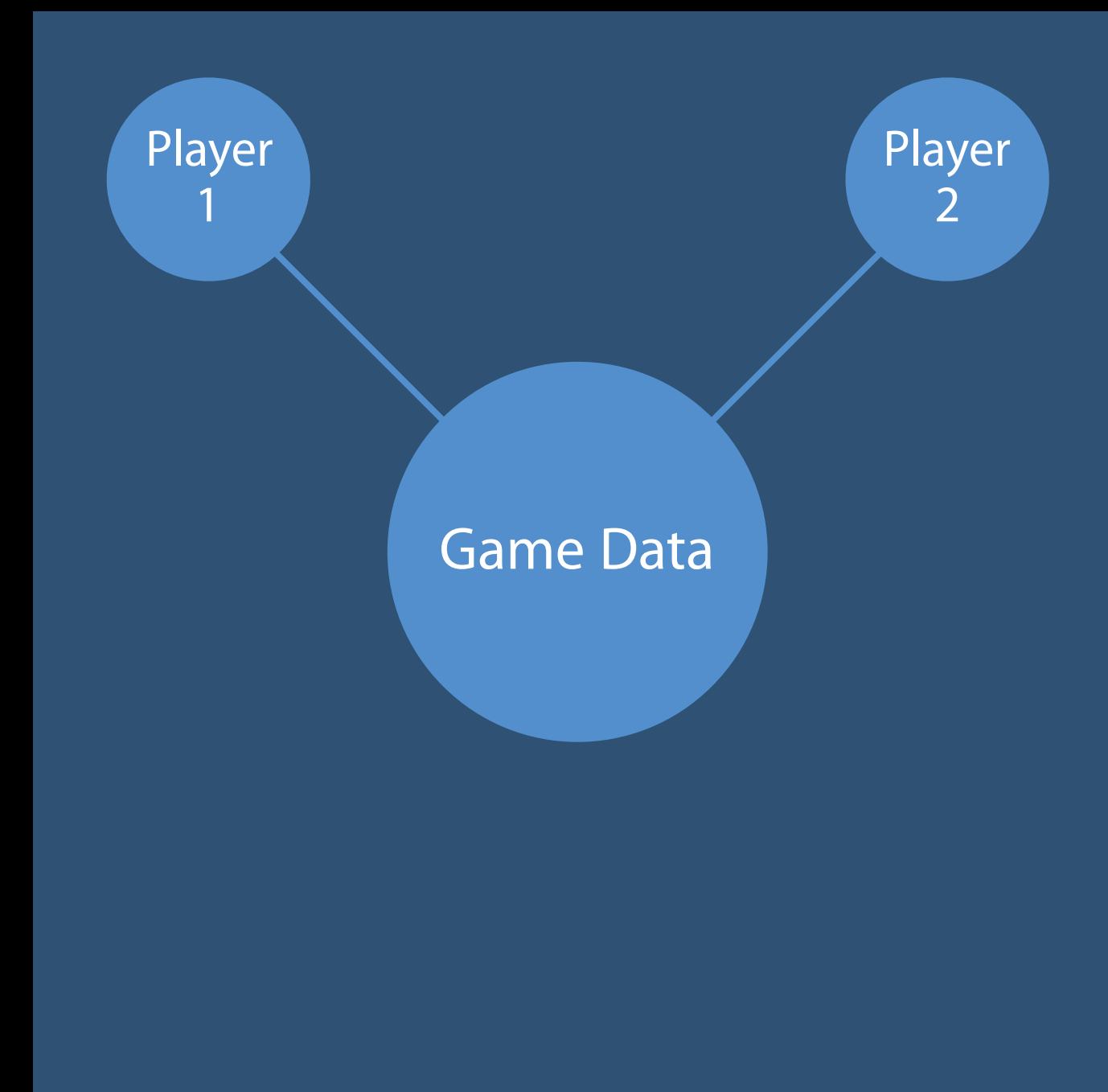
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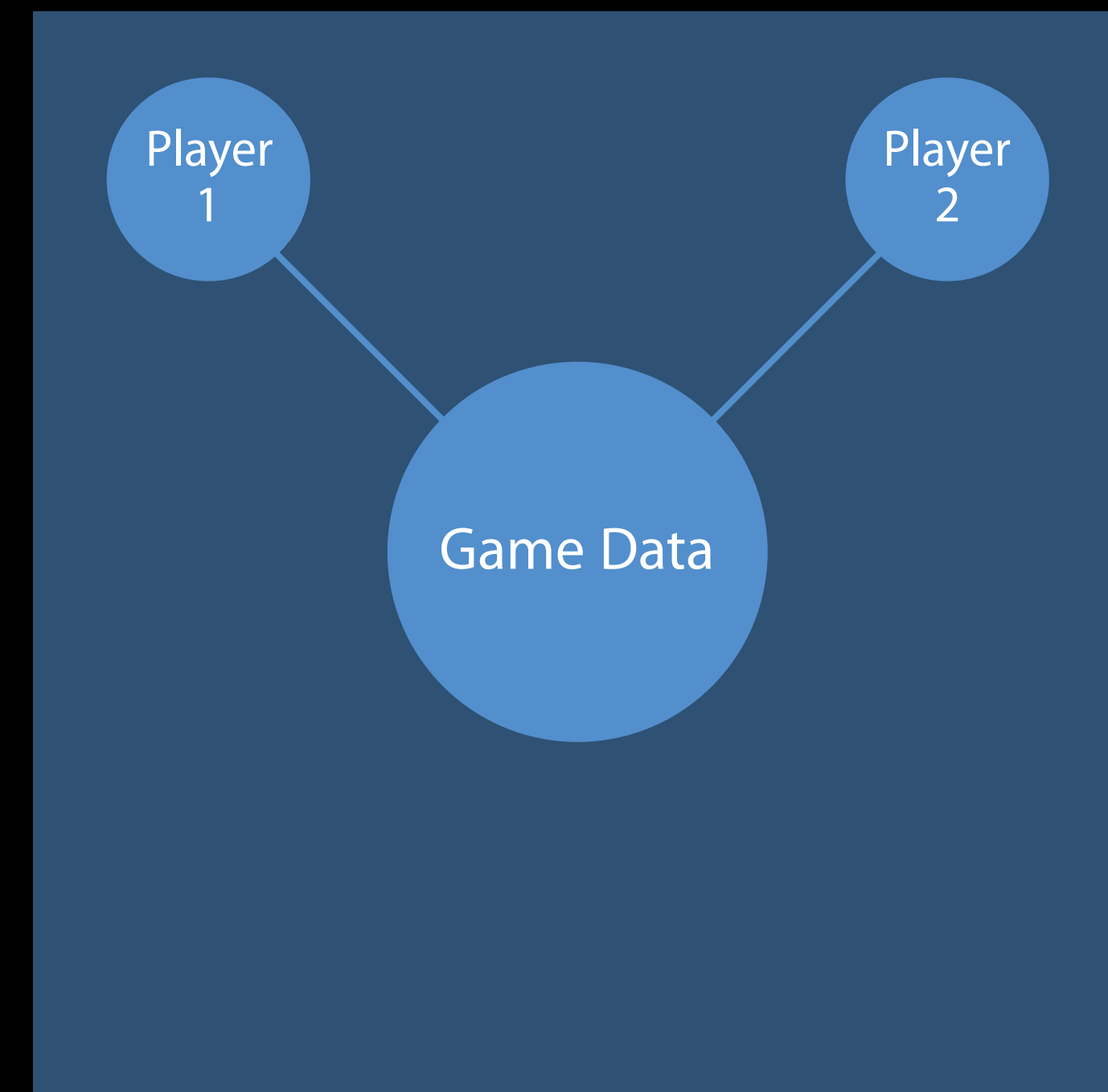
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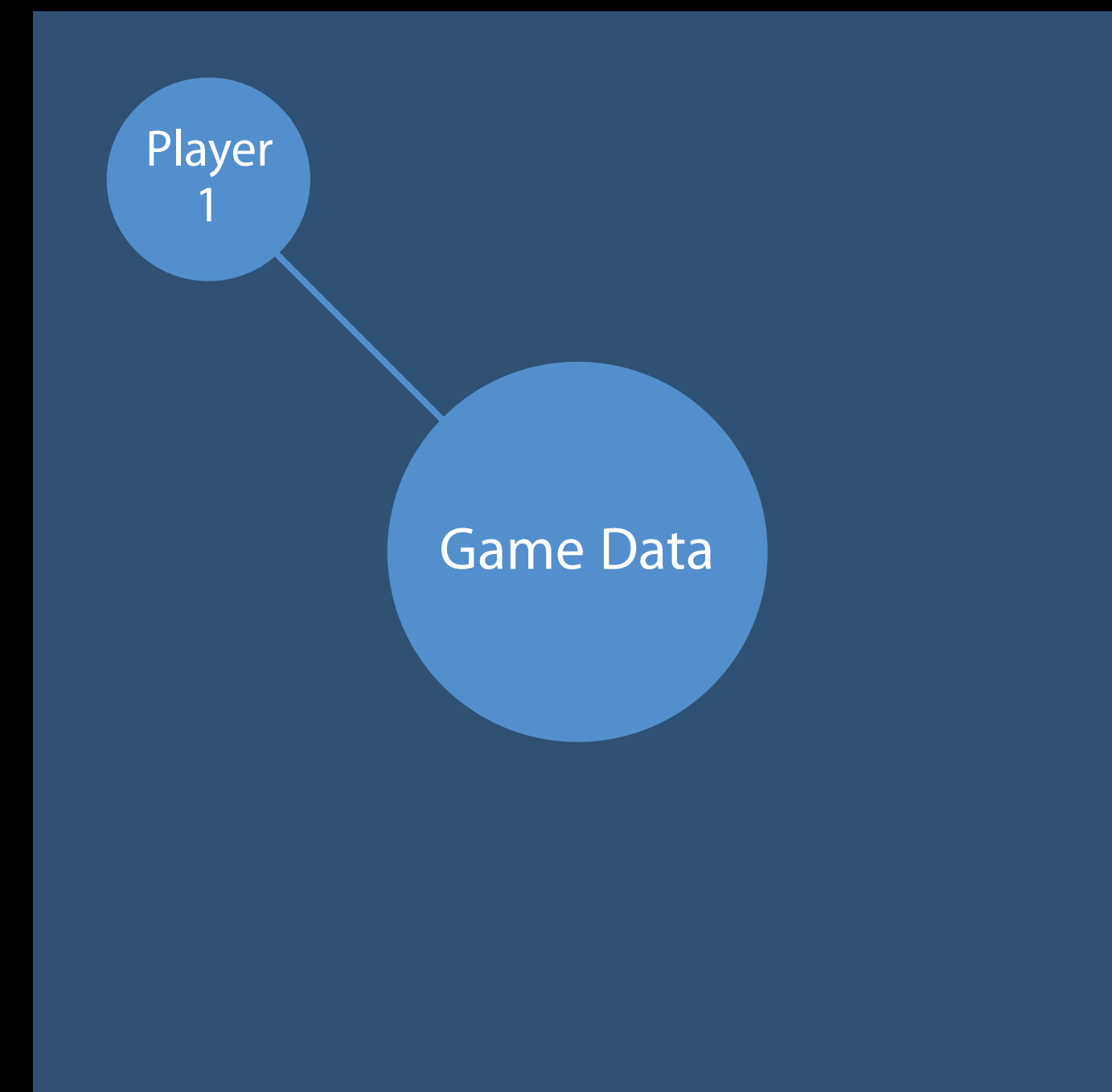
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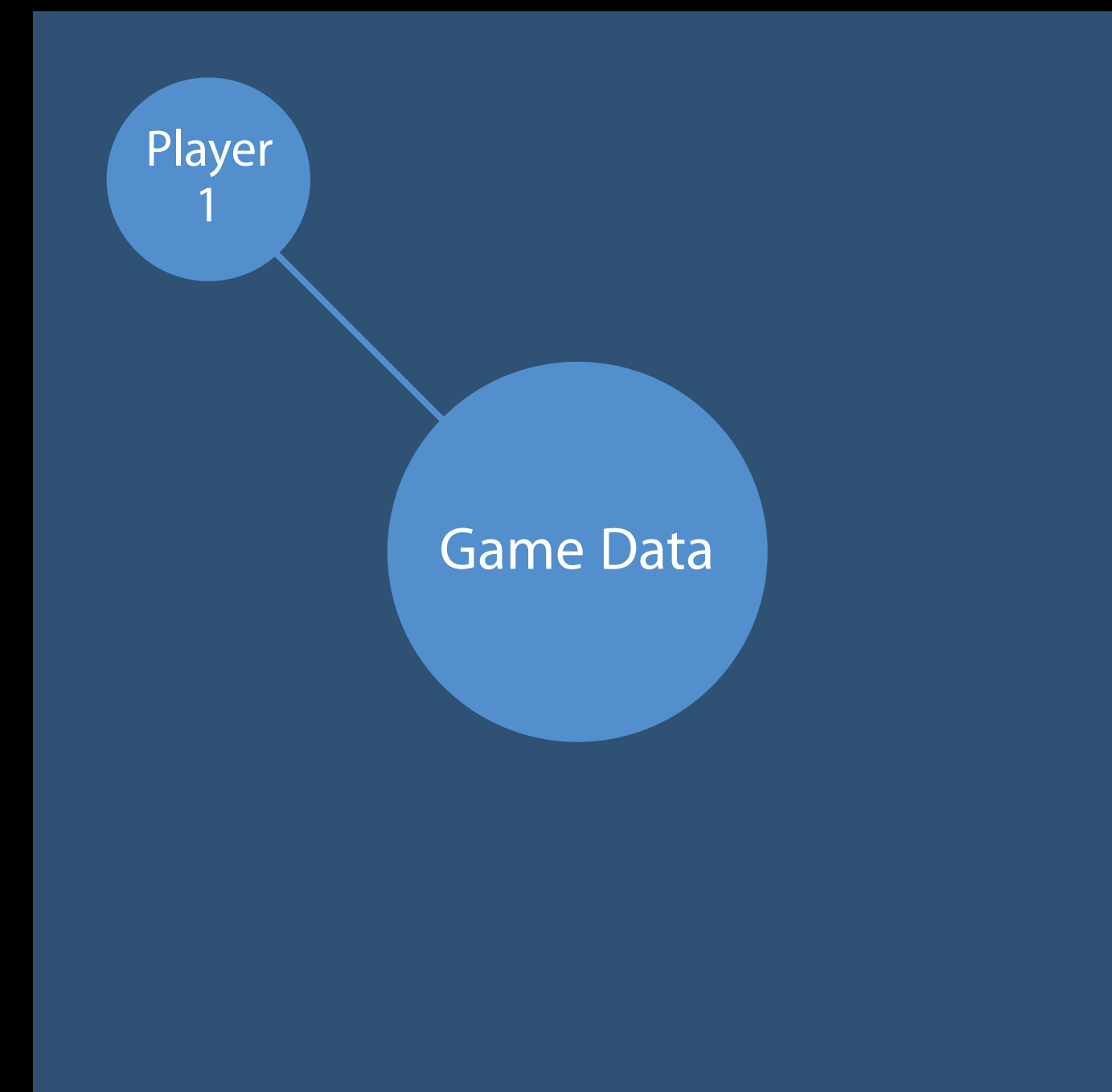
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# Game Sessions

## Summary

Play with anyone

More flexible game structure

Simple multiplayer connections

New possible game styles

# What's New in Game Center

Message based multiplayer invites

Removed Game Center app

Persistent Game Sessions

Apple Watch support

More Information

<https://developer.apple.com/wwdc16/611>

# Related Sessions

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Game Technologies for Apple Watch

Mission

Friday 3:00PM

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Go Live with ReplayKit

Mission

Tuesday 10:00AM

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What's New in SpriteKit

Presidio

Thursday 5:00PM

---

What's New in GameplayKit

Pacific Heights

Thursday 9:00AM

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Controlling Game Input for Apple TV

Mission

Wednesday 5:00PM

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# Labs

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Game Center Lab

Graphic, Games,  
and Media Lab A

Friday 12:00PM

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watchOS Graphics and Games

Graphic, Games,  
and Media Lab B

Friday 4:00PM

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