

# FRAG

Framework for Realtime Ad-hoc Games





# Tutorial outline

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- Motivation
- FRAG based game worlds
- FRAG structure
- Core FRAG components



# Problem

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- Distributed games
- Ad-hoc networking
- True Peer-To-Peer (no dedicated servers)



# Solution

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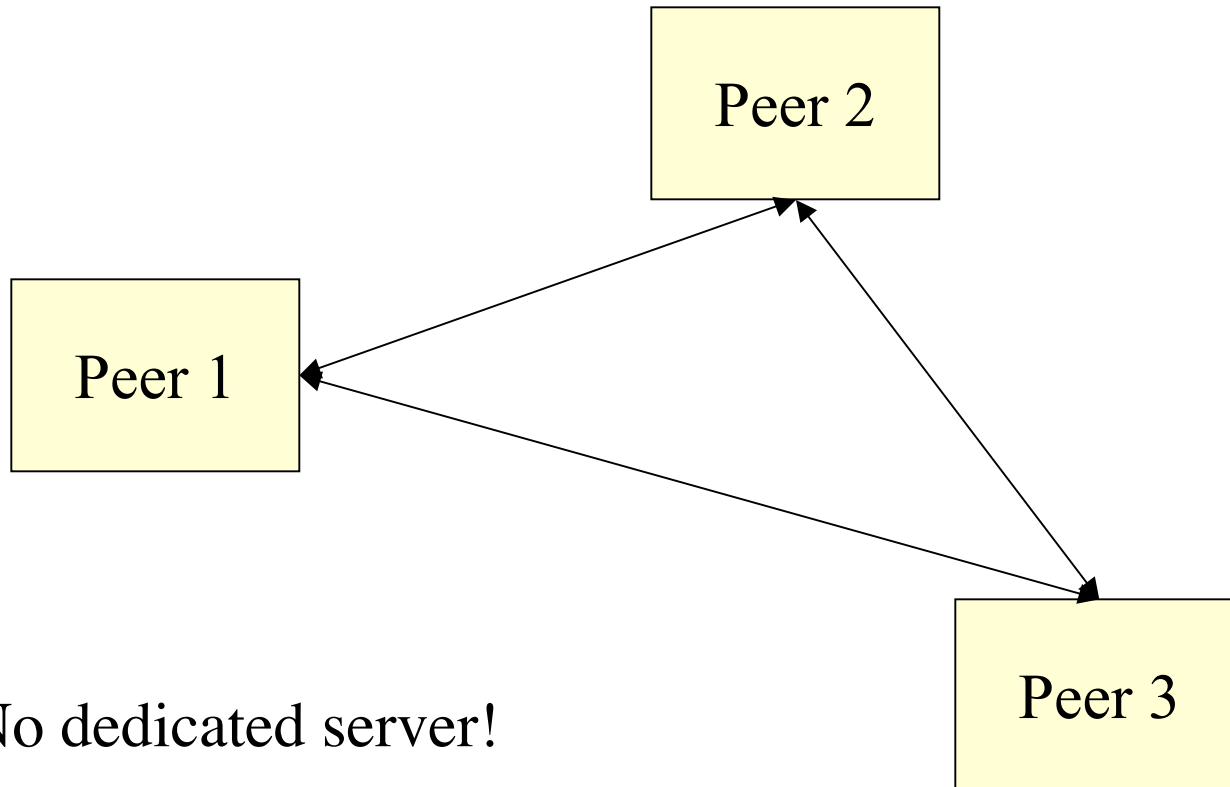
## FRAG

- Object management
- Network communication
- Distributed control
- Load balancing
- Game state replication
- Peer management



# Peer-to-Peer network

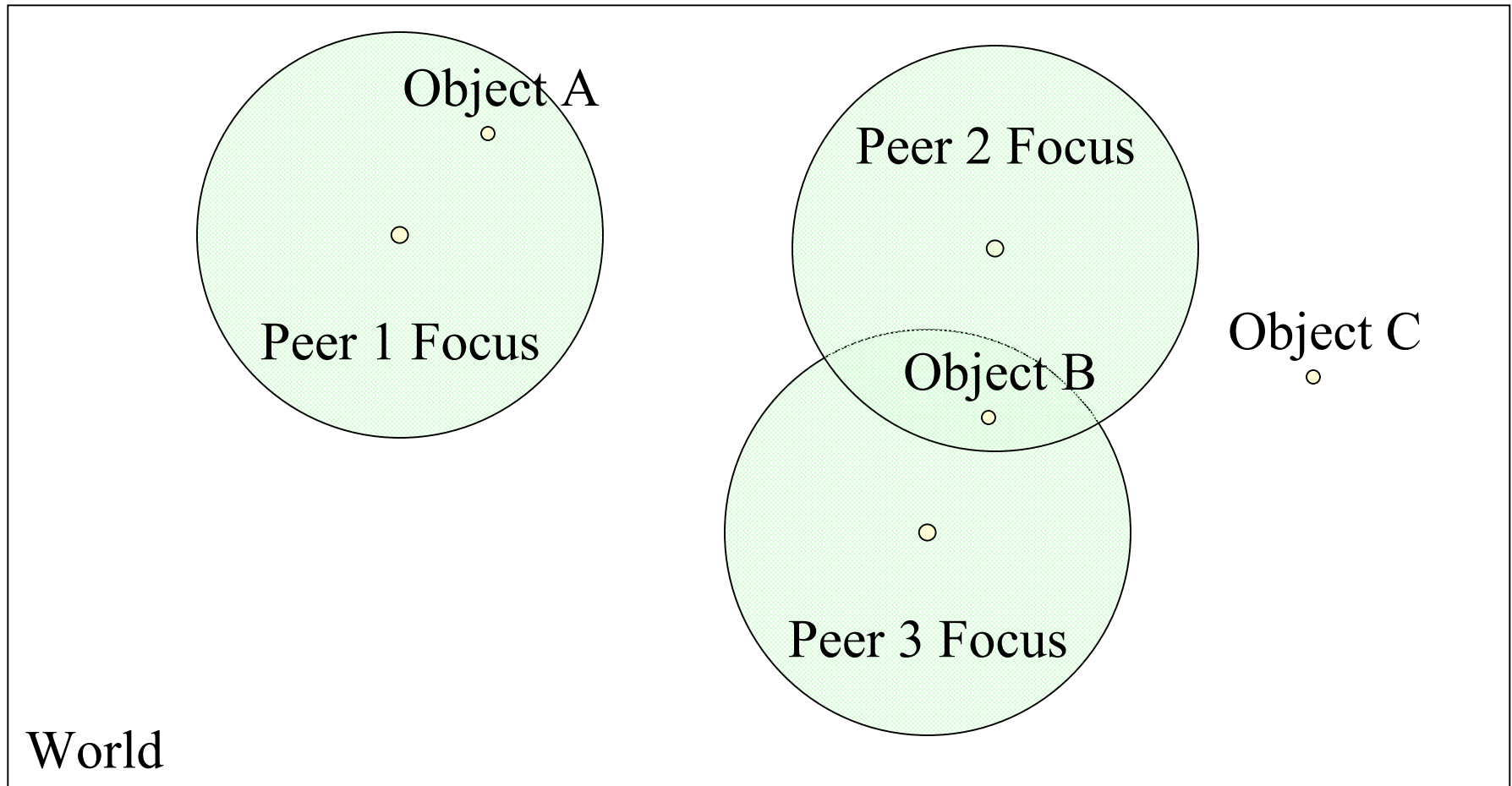
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No dedicated server!

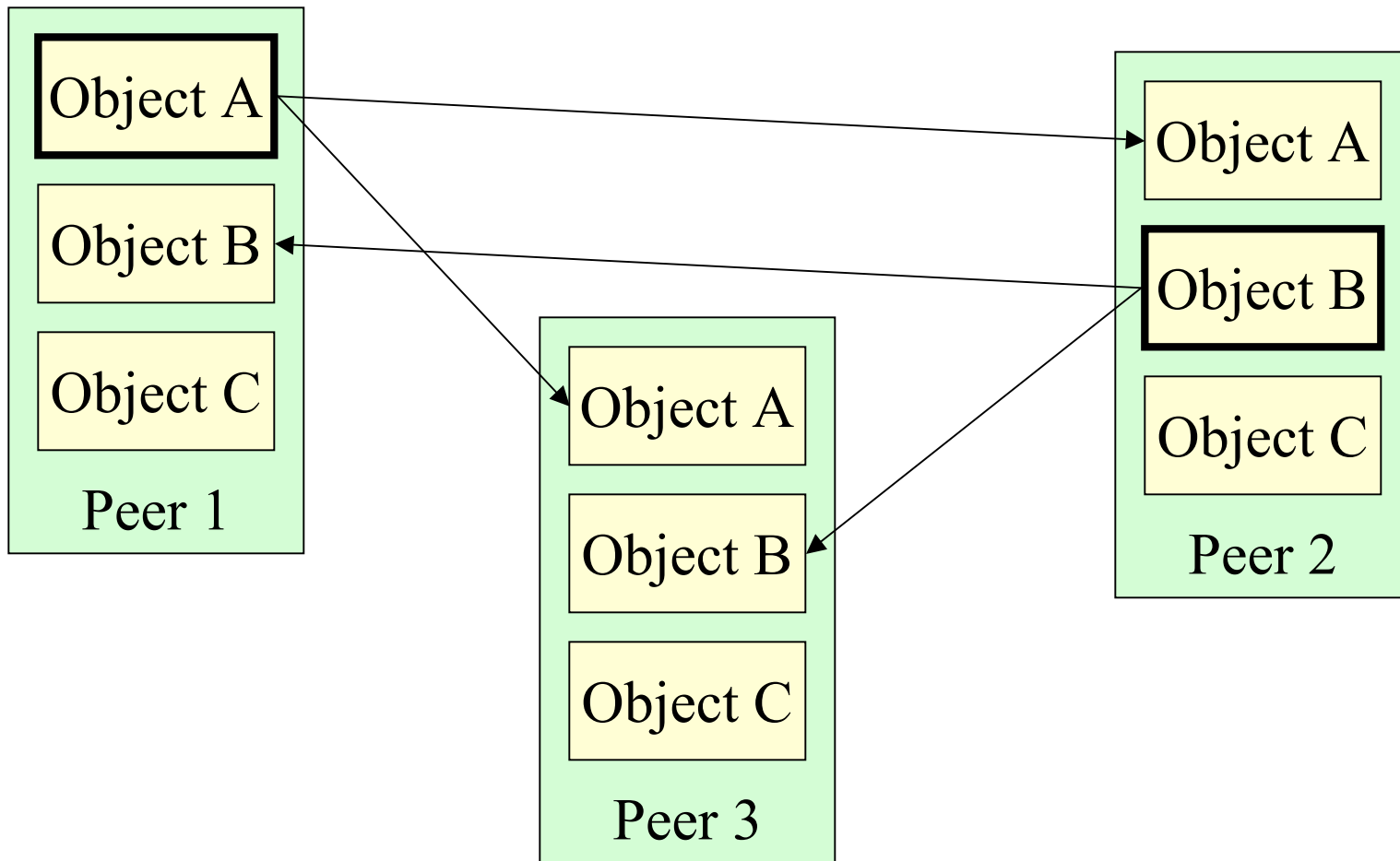


# World overview



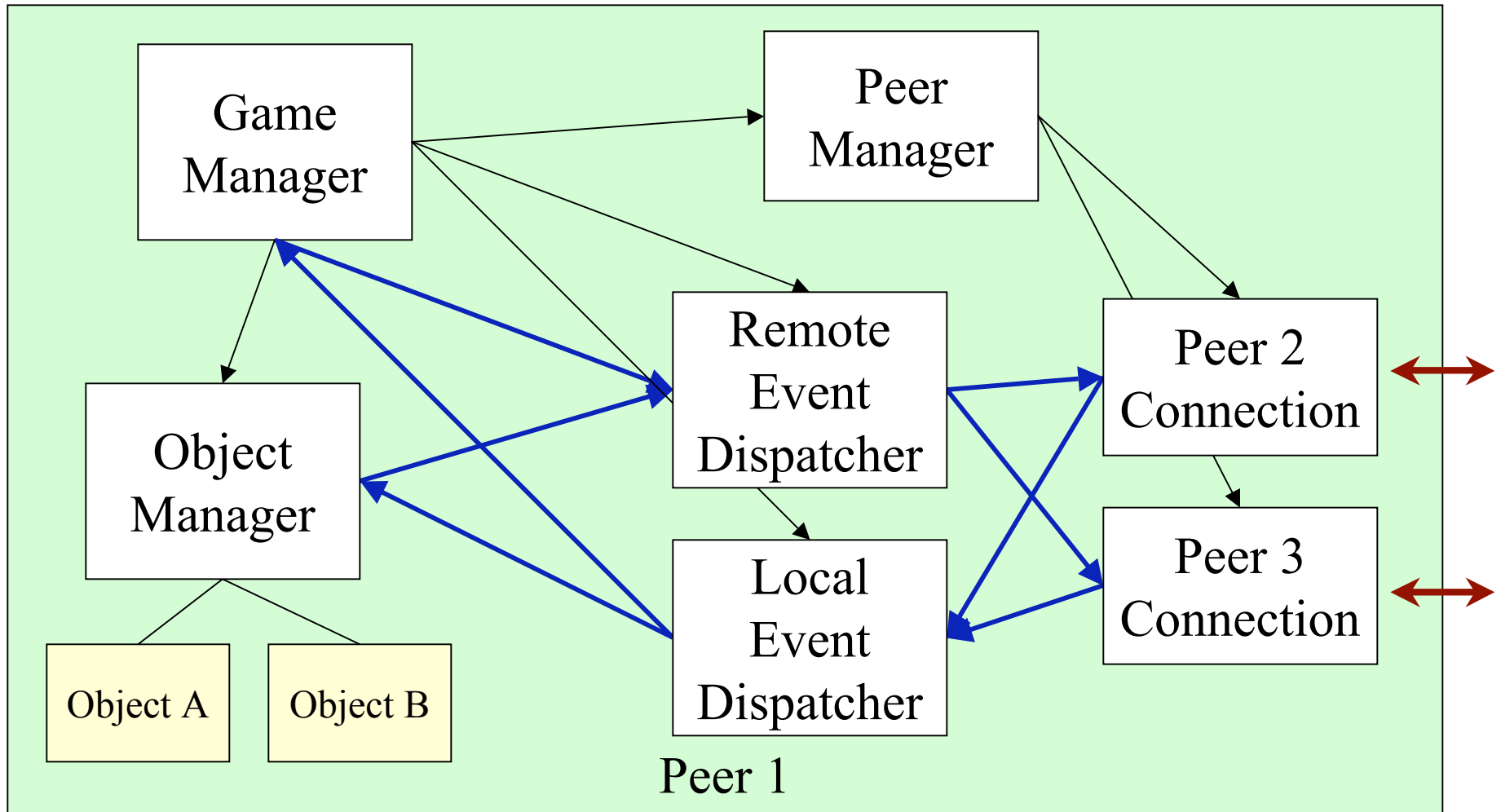


# State replication





# FRAG structure







# Game Manager

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- Handles game creation and joining
- Initializes the game world
- Transmits initial world copies to joining peers
- Serves as interface between FRAG and the underlying network/ARENA layer (peer discovery and connection)



# Object Manager

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- Maintains objects hashtable and object states
- Handles incoming state updates
- Generates state updates for controlled objects
- Chooses which objects to control
- Resolves controller conflicts between peers
- Provides object lists for the visualization components

The logo for ARENA, featuring the word "ARENA" in a bold, metallic, 3D-style font. The letters are dark with a lighter, reflective top surface, giving them a heavy, industrial appearance. The background behind the text is a textured, golden-brown surface that looks like sand or a fine-grained material, with some faint, curved lines suggesting a landscape or a specific material grain.

# ARENA Information Sources

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- FRAG source code (still undocumented) in the ARENA CVS repository, module ***frag***
- Me (nagel@in.tum.de)