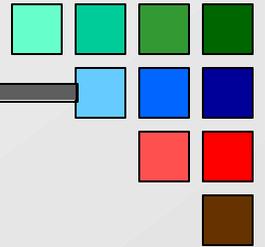


# Sistemas Distribuídos

**Ricardo Ribeiro dos Santos**

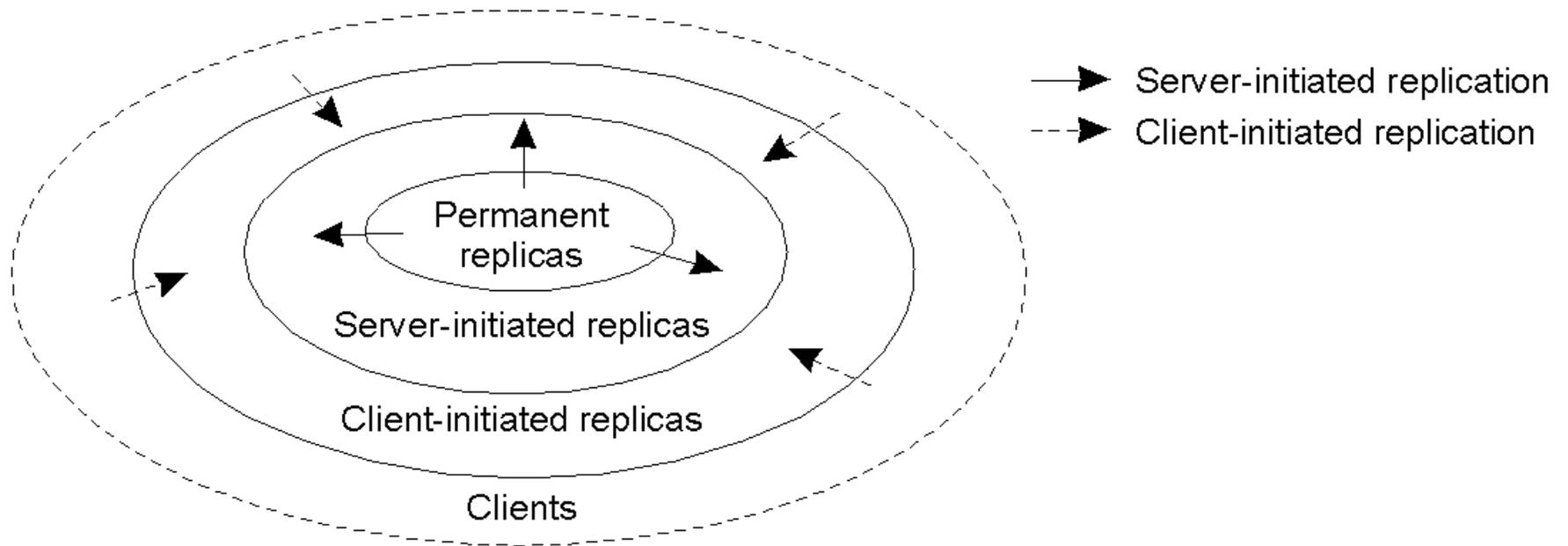
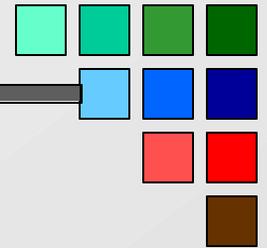
**[ricrs@ec.ucdb.br](mailto:ricrs@ec.ucdb.br)**

# Tópicos



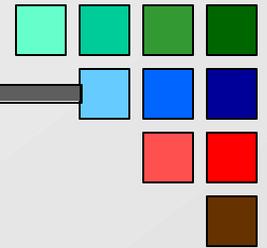
- Protocolos de distribuição de réplicas
  - Réplicas iniciadas pelo servidor
  - Réplicas iniciadas pelo cliente
- Protocolos de consistência

# Atualização de réplicas

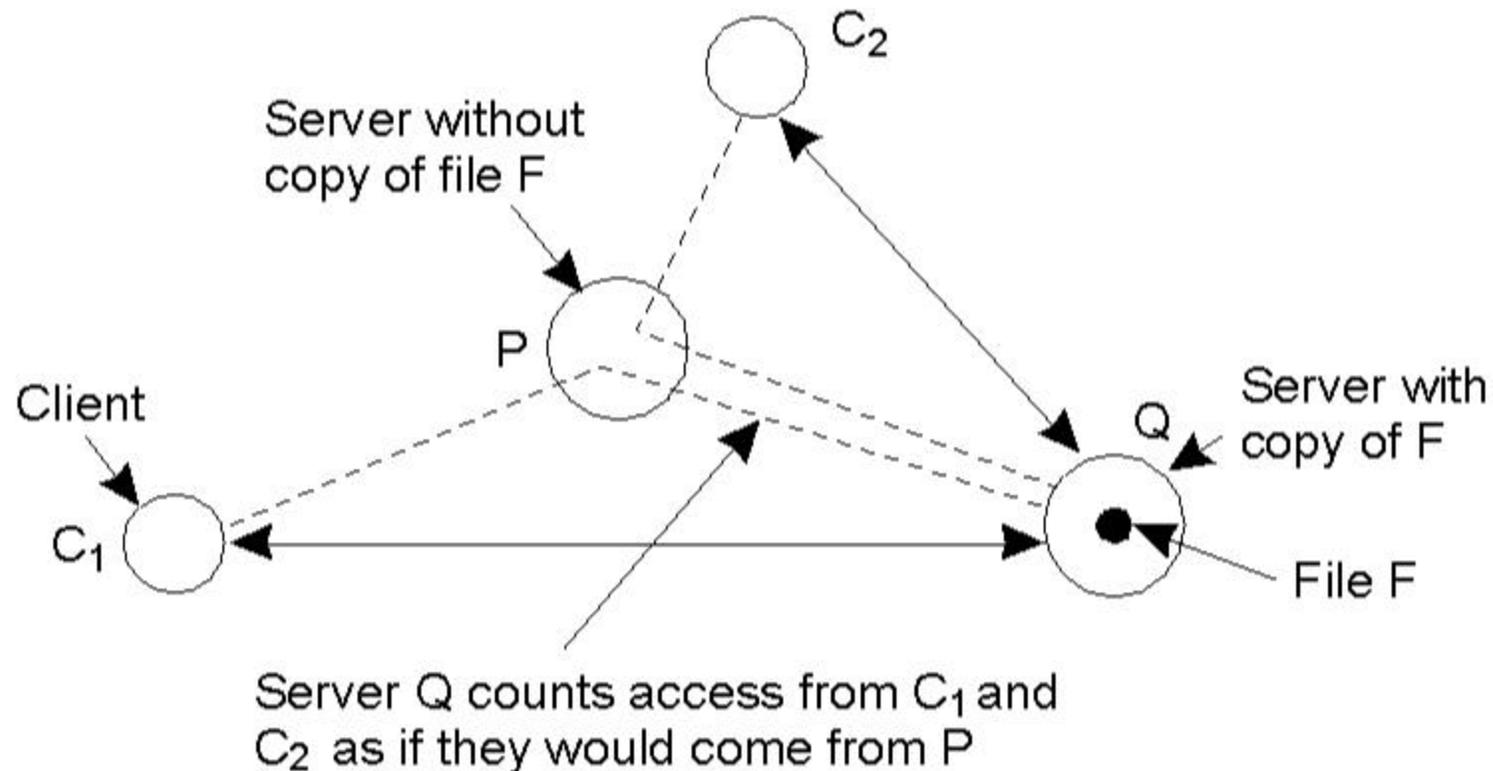


- Organização lógica de diferentes tipos de réplicas de um conjunto de dados em três anéis

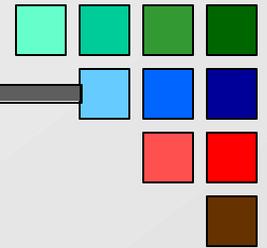
# Réplicas iniciadas pelo Servidor



- Contar requisições de acessos de diferentes clientes



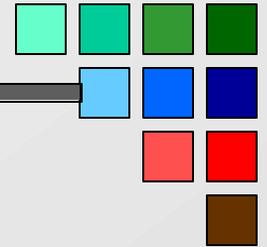
# Propagação da atualização



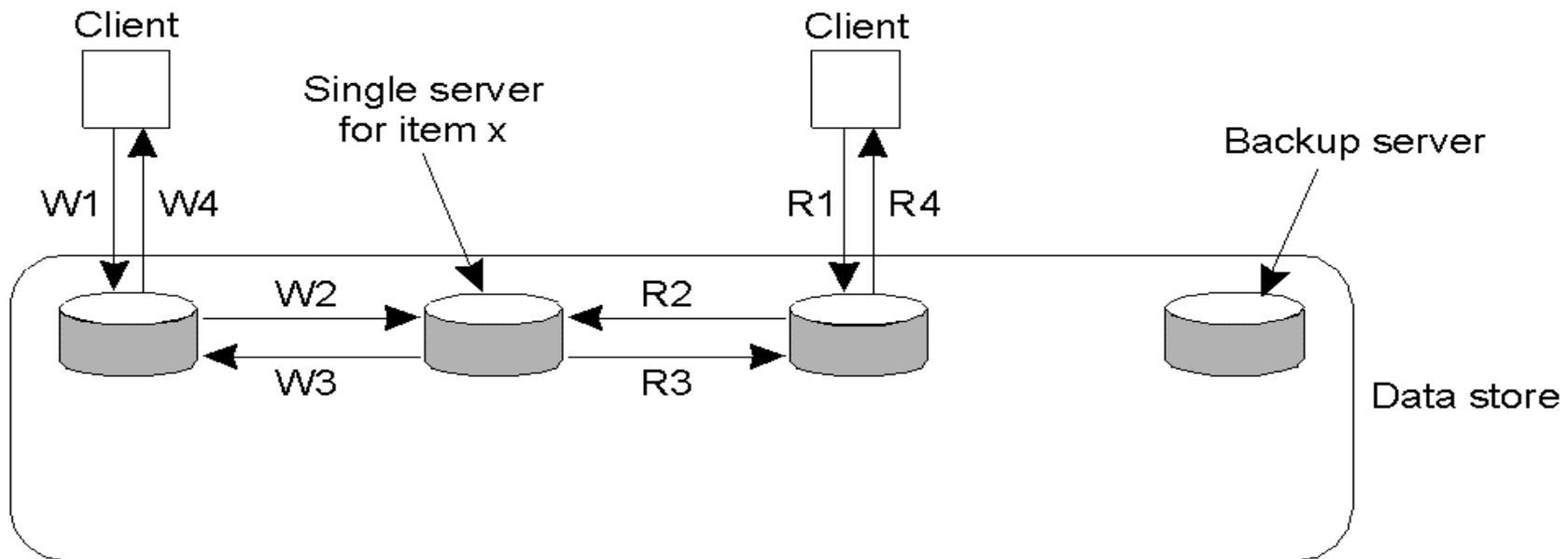
- Protocolos Pull versus Push

Característica	Push-based	Pull-based
Estado do Servidor	Lista de réplicas clientes	Nada
Mensagens enviadas	Update	Consulta e update
Tempo de Resposta	Imediato (ou tempo de busca-update)	Tempo de busca-update

# Protocolos de Consistência



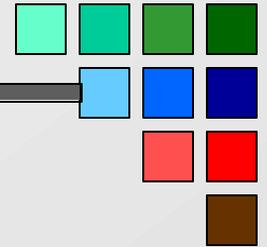
- Protocolos de Escrita Remota (1)
  - Protocolo de escrita remota com um servidor fixo através do qual operações de leitura e escrita são enviadas



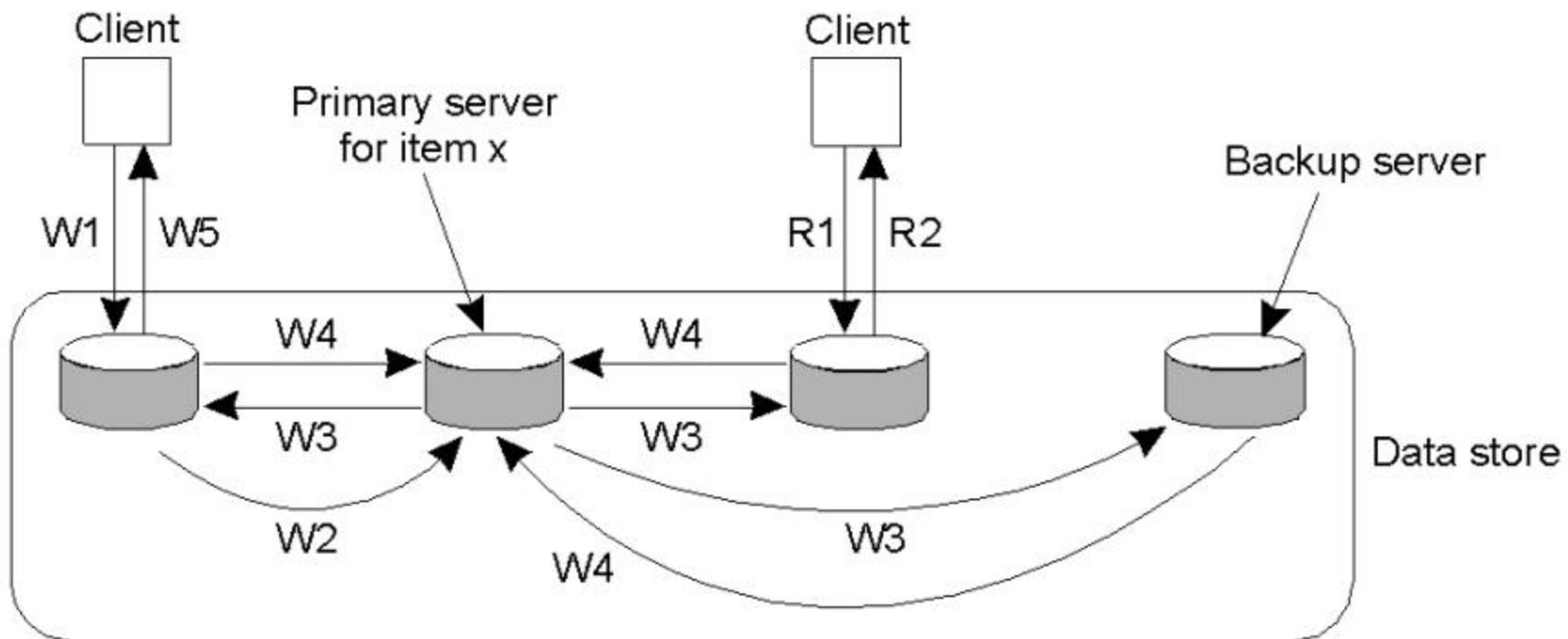
W1. Write request  
W2. Forward request to server for x  
W3. Acknowledge write completed  
W4. Acknowledge write completed

R1. Read request  
R2. Forward request to server for x  
R3. Return response  
R4. Return response

# Protocolos de Consistência



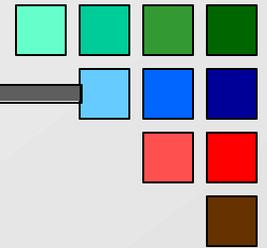
- Protocolos de Escrita Remota (2)



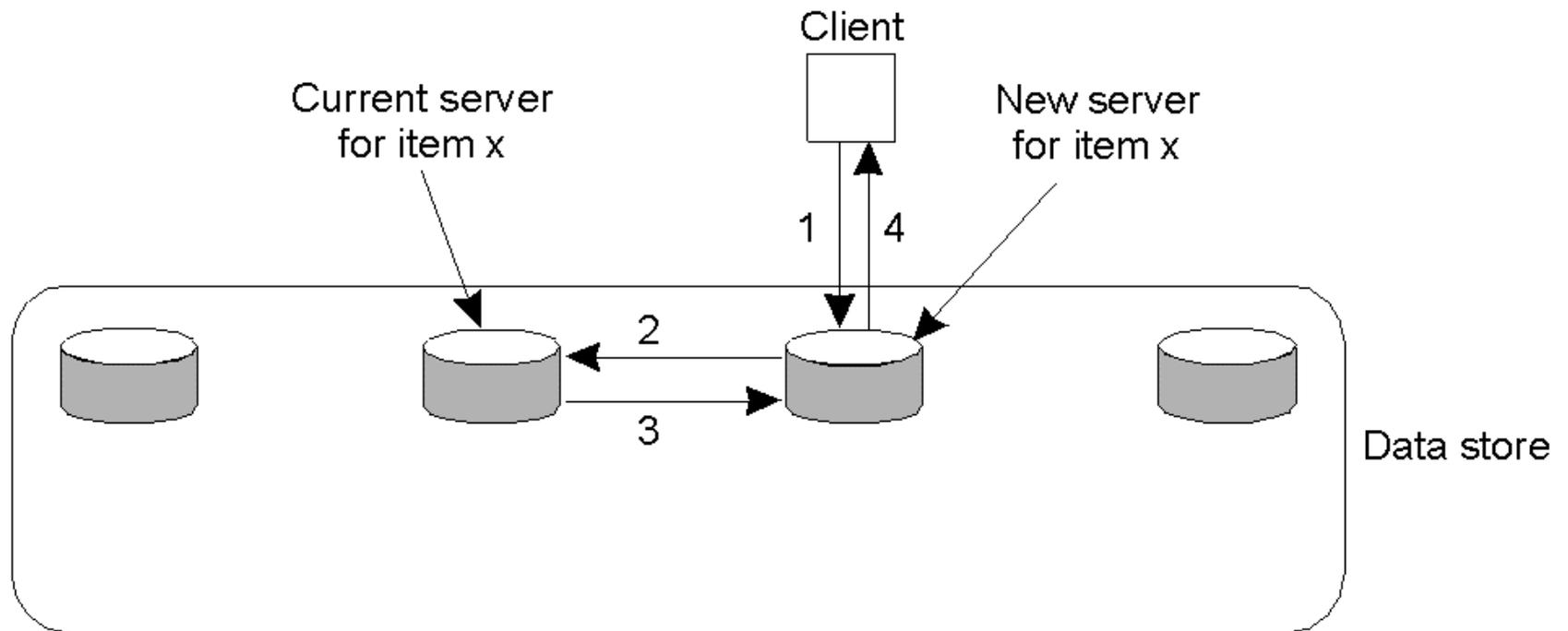
W1. Write request  
W2. Forward request to primary  
W3. Tell backups to update  
W4. Acknowledge update  
W5. Acknowledge write completed

R1. Read request  
R2. Response to read

# Protocolos de Consistência

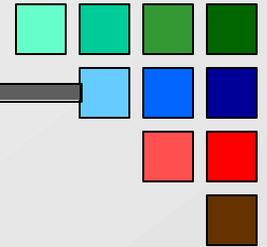


- Protocolos de Escrita Locais(1)

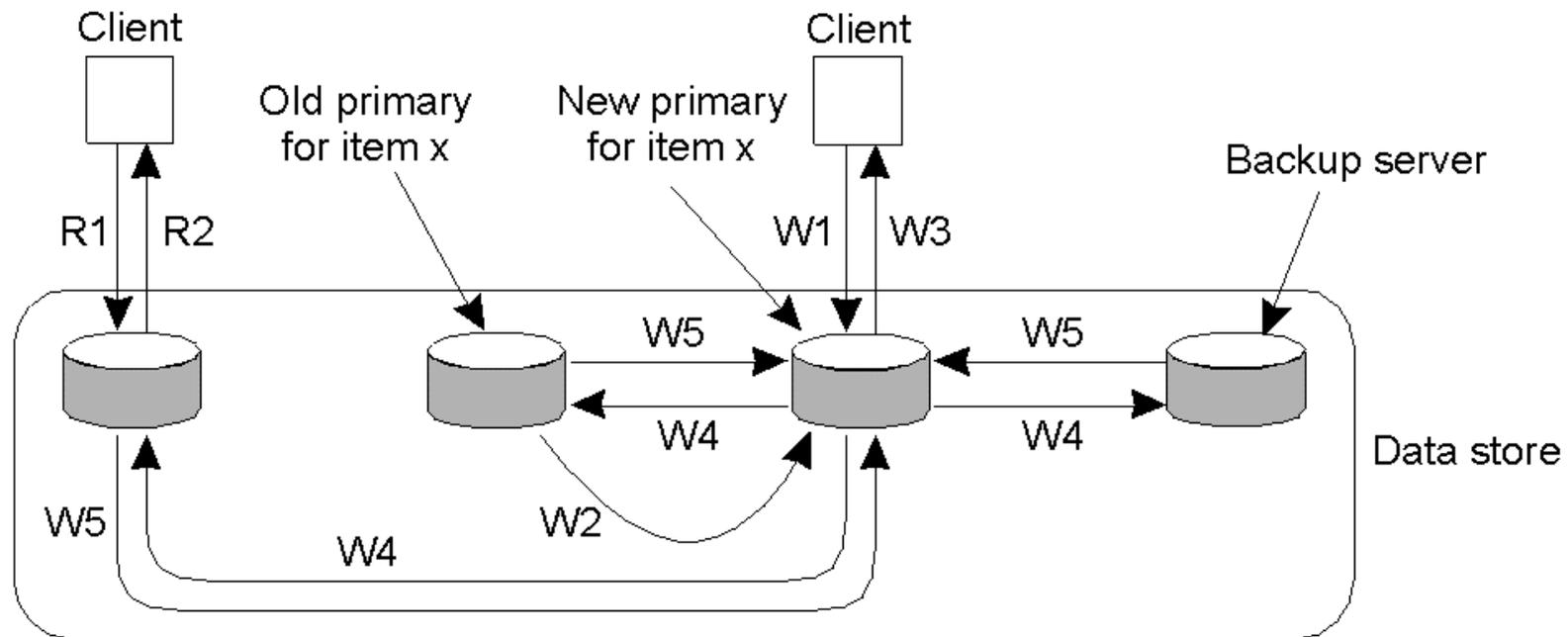


1. Read or write request
2. Forward request to current server for x
3. Move item x to client's server
4. Return result of operation on client's server

# Protocolos de Consistência



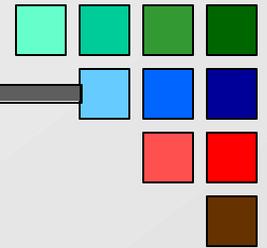
- Protocolos de Escrita Local(2)



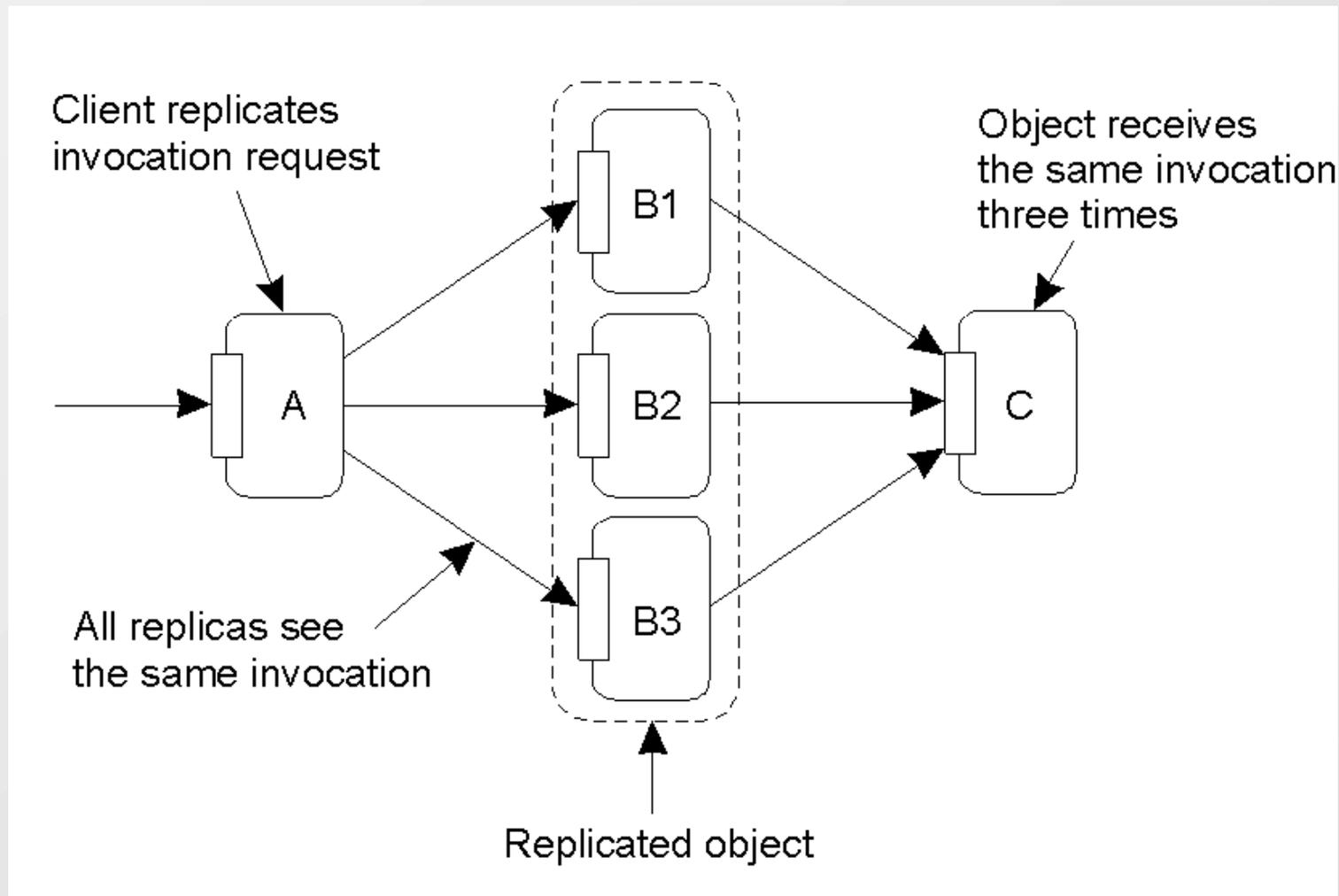
W1. Write request  
W2. Move item x to new primary  
W3. Acknowledge write completed  
W4. Tell backups to update  
W5. Acknowledge update

R1. Read request  
R2. Response to read

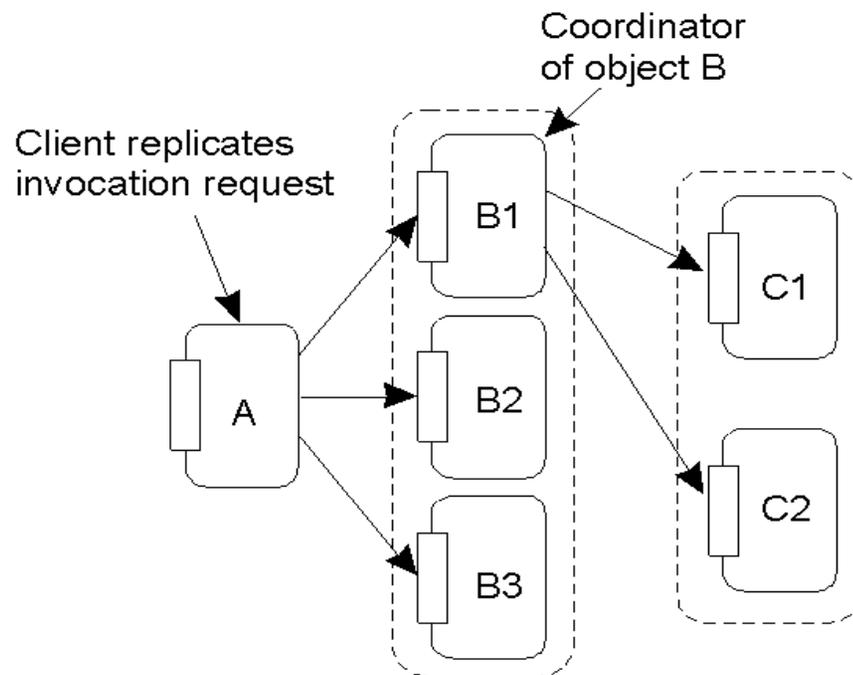
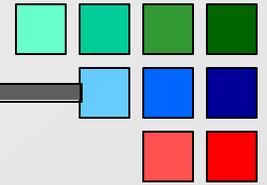
# Protocolos de Consistência



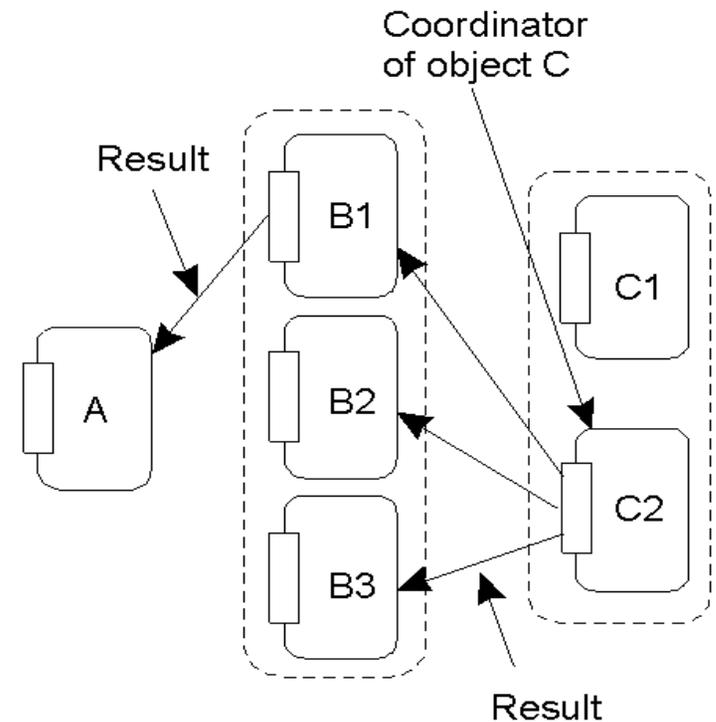
- Protocolo de Replicação Ativa



# Protocolo de Consistência



(a)



(b)

- Envio de uma requisição de invocação de um objeto replicado
- Retornando uma resposta de um objeto replicado<sup>1</sup>