FIGURE 5

BYZANTINE FAULT TOLERANT CONSENSUS FOR DISTRIBUTED SESSION MANAGEMENT

110

CONFIGURATION: n = 3f + 1
(Tolerates f Byzantine Failures)

R1 R2 R3

R4 R5 R6

CLIENT
AI AGENT

REQUEST → **PRIMARY** P

CONSENSUS
2f+1 = 5 nodes
for agreement

F1
(Byzantine)

PROTOCOL PHASES

1. REQUEST
Client → Primary

2. PRE-PREPARE
Primary → All

3. PREPARE
All ↔ All

4. COMMIT
After 2f+1

5. REPLY
Replicas → Client

MESSAGE FLOW (f=2, n=7)

t0   t1   t2   t3   t4

SESSION STATE STRUCTURE
• session_id: UUID
• agent_uid: Cryptographic Identifier
• domains: [{domain_id, auth_time, status}]
• behavioral_score: 0.00-1.00
• ephemeral_keys: {enc, sign}
• replay_counter: Integer