

HUPYY TEMPORAL - SMT-LIB VERIFICATION REPORT

Generated: 2025-11-04 11:25:10

Query ID: query_1762284310

Status: SAT

Execution Time: 57 ms

1. PROBLEM STATEMENT

Based on the company policy document, can Marcus Webb (E-4782) perform WRITE operations on the Production Database at 11:47 PM EST on March 14, 2025 during the P1 production outage?

The additional necessary data is in
/Users/alexanderfedin/Projects/hapyy/cofounder/hupyy-temporal/data/free-form/adhoc/testfile.txt

2. GENERATED SMT-LIB CODE

Logic: QF_UF

```
(set-logic QF_UF)
(set-option :produce-models true)
(set-option :produce-unsat-cores true)

;; Ground truth from data
(declare-const has_senior_clearance Bool)
(assert (= has_senior_clearance true))

(declare-const is_on_call Bool)
(assert (= is_on_call true))

(declare-const is_under_investigation Bool)
(assert (= is_under_investigation true))

(declare-const access_suspended Bool)
(assert (= access_suspended true))

(declare-const date_is_march14_2025 Bool)
(assert (= date_is_march14_2025 true))

(declare-const time_is_2347 Bool)
(assert (= time_is_2347 true))

(declare-const is_p1_outage Bool)
(assert (= is_p1_outage true))

;; Derived logic
(declare-const can_write Bool)

(declare-const write_from_clearance Bool)
(assert (= write_from_clearance (and has_senior_clearance (not access_suspended)))))

(declare-const write_from_oncall Bool)
(assert (= write_from_oncall (and is_on_call (not access_suspended)))))

(assert (=> access_suspended (not can_write)))

(assert (= can_write (or write_from_clearance write_from_oncall)))

(check-sat)
(get-model)
```

3. VERIFICATION RESULTS

Status: SAT

Wall Time: 57 ms

Model (Satisfying Assignment):

```
sat
(
(define-fun has_senior_clearance () Bool true)
(define-fun is_on_call () Bool true)
(define-fun is_under_investigation () Bool true)
(define-fun access_suspended () Bool true)
(define-fun date_is_march14_2025 () Bool true)
(define-fun time_is_2347 () Bool true)
(define-fun is_p1_outage () Bool true)
(define-fun can_write () Bool false)
(define-fun write_from_clearance () Bool false)
(define-fun write_from_oncall () Bool false)
)
```

4. HUMAN-READABLE EXPLANATION

Proof:

- Employee: Marcus Webb (E-4782)
- Request: WRITE access to Production Database
- Time: 11:47 PM EST, March 14, 2025
- Context: P1 production outage

- Marcus Webb status:
 - Has senior clearance: [x]
 - Is on-call: [x]
 - Is under investigation: [x]
 - Access suspended: [x]

- Policy Rule: WRITE access requires either:
 - Senior clearance AND no suspension, OR
 - On-call status AND no suspension

- Verification Path 1 (Senior Clearance):
 - Has senior clearance: [x]
 - Access NOT suspended: [] (access is suspended)
 - Result: Cannot write via clearance path

- Verification Path 2 (On-Call):
 - Is on-call: [x]
 - Access NOT suspended: [] (access is suspended)
 - Result: Cannot write via on-call path

- Override Rule: Access suspension blocks ALL write operations
 - Suspension active: [x]
 - Override applied: All write paths blocked

- DENIED: Marcus Webb cannot perform WRITE operations due to active access suspension

5. TECHNICAL DETAILS (APPENDIX)

cvc5 Standard Output:

```
sat
(
(define-fun has_senior_clearance () Bool true)
(define-fun is_on_call () Bool true)
(define-fun is_under_investigation () Bool true)
(define-fun access_suspended () Bool true)
(define-fun date_is_march14_2025 () Bool true)
(define-fun time_is_2347 () Bool true)
(define-fun is_pl_outage () Bool true)
(define-fun can_write () Bool false)
(define-fun write_from_clearance () Bool false)
(define-fun write_from_oncall () Bool false)
)
```

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