

# HUPYY TEMPORAL - SMT-LIB VERIFICATION REPORT

Generated: 2025-11-04 11:24:21

Query ID: query\_1762284261

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:

- Policy Rule: Employees with Senior clearance have WRITE access to Production Database at any time
  - Policy Rule: Employees in On-Call Rotation have EMERGENCY OVERRIDE access 24/7
  - Policy Exception: Any employee under active investigation has ALL SYSTEM ACCESS SUSPENDED, overriding all other rules
- 
- Marcus Webb (E-4782) clearance level: Senior [x]
  - Marcus Webb on-call status: YES (March 10-16, 2025) [x]
  - Access attempt date: March 14, 2025, 11:47 PM EST [x]
  - P1 Production Outage: Active [x]
- 
- Investigation INV-2025-089: Active (started March 12, 2025)
  - Security restriction: ALL SYSTEM ACCESS SUSPENDED [ ]
- 
- Verification: access\_suspended = true -> can\_write = false
  - Result: WRITE access DENIED
- 
- CONCLUSION: Despite having Senior clearance and being on-call during a P1 outage, Marcus Webb cannot perform WRITE operations because his access is suspended due to active security investigation INV-2025-089

## 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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