Transactuations: Where Transactions Meet the Physical World

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Inconsistent Behavior

General SmartThings Discussion¹

“... More importantly, we were robbed when we were out on vacation. I had it set to armed away. The logs show the motion of the robbers, but it never sounded the alarm ... I no longer trust it to do what it is supposed to do when it is supposed to do ...”

[1] SmartThings Community: https://community.smartthings.com
When Smart Home Is Not Smart

**Inconsistent Behavior**

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"... this system imo is a hobby for Samsung and has never been consistent since day one. There is no way I would trust this system to do anything beyond monitoring under sink leaks."

[1] SmartThings Community: https://community.smartthings.com
Failures in IoT

- Device failures
  - Battery drainage
  - Subsystem failures
  - Etc.

- Network failures
  - RF interference
  - Copper slap flooring
  - Etc.

- Concurrent execution
  - Data race bugs
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Analyzed 182 apps and found possible 309 problems
Solution

Transaction
Solution
Solution

Transaction

Transactuation
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• High-level abstraction for building reliable IoT applications

• Providing strong semantics for systems interacting with the physical world
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Track II: Session Runtimes