**ThingsMigrate: Platform-Independent Migration of Stateful JavaScript Applications**

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**Motivation**
Modern IoT network
- IoT devices are now general-purpose
- IoT devices are resource-constrained
- IoT systems are heterogeneous

How to migrate a running process without considering platform-specific details?

**Low-level Migration**
- Program counter
- Registers
- Memory Pages

**High-level Migration**
- Stack
- Variables
- Functions

**Implementation**

**Scope**
We inject a `Scope` object at the beginning of each function. A `Scope` object stores the current local state of the function.

```
var root = new Scope()
function PiggyBank()
    var balance = 0
    scope_0.vars.balance = balance
    var deposit = function(amount){
        balance += amount
        return deposit
    }
    scope_0.addFunction(deposit)
    root.addFunction(PiggyBank)
    var bank = PiggyBank()
    things.setInterval()
    root.addFunction(function putMoney(){
        var scope_1 = new Scope(root)
        bank(100)
        }, 1000)
```

**Augment Timers**
We replace native timer calls with our own timers to track timer state.

**Updating Scope**
After each statement that updates a variable, we copy the new value into the `Scope` objects.

**Case Study: Motion Detector**

**Results**

**Execution Time**

**Memory Usage**

**Approach**

1. **Instrumentation**
   - Expose the hidden program state via code instrumentation to avoid modifying the JavaScript engine (e.g., Node.js).

2. **Serialization**
   - Given the entire program state, serialize it into a transportable "snapshot" such as a JSON string.

3. **Restoration**
   - From the snapshot, reconstruct the program state by generating new code on-the-fly.

**Summary**

ThingsMigrate provides support for migration of JavaScript programs
- Stateful applications
- Platform-independent
- No VM modification

Find out more [GitHub](https://github.com/karthiksp-ubc/ThingsJS)