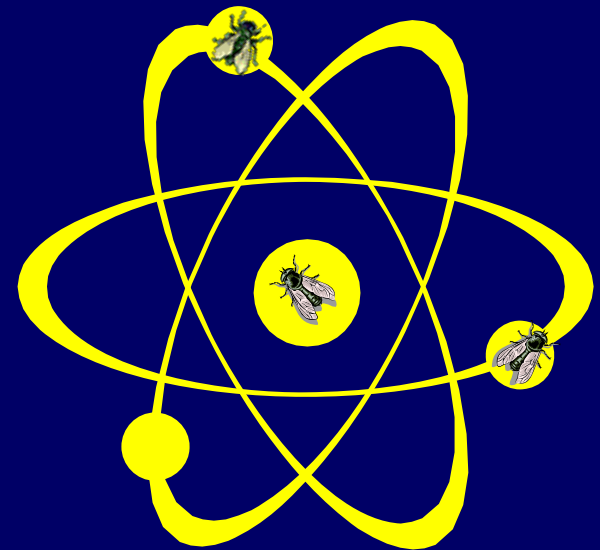


# Making Debuggers Transaction-Ready

Yossi Lev

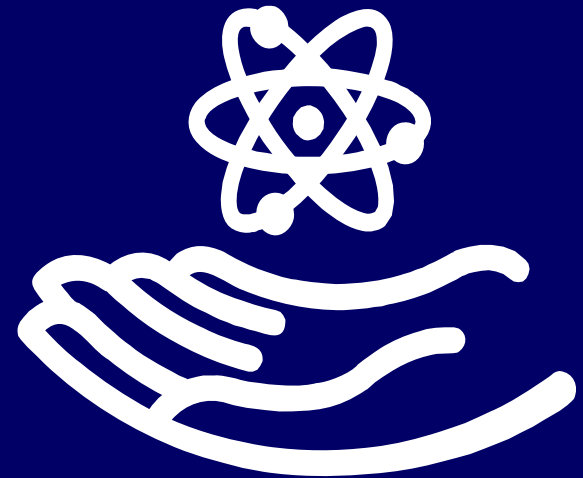
*Brown University &  
Sun Microsystems Laboratories*



# Transact 06:

## Debuggers have to change [Lev, Moir]

- What you see is *not* what you get
- Different control flow, contention management
- Transaction-related info



# Goal: Develop Debugging Framework

- **Abstraction**  
External library helps debuggers deal with transactional programs.
- **Generality**  
Not targeted to a specific debugger
- **Extendibility**  
Support many runtime TM systems

# Functionality [What?]

- Stopping and Stepping
  - Validation
  - Special conflict management
  - Abnormal control flow
  - Conditional stop on whether inside a transaction

# Functionality [What?]

- System-wide Transaction Info
  - List latest Tx of all threads
    - Identify Tx's with TxIds
      - Match together retries of same execution
  - Transaction Status
    - Running, Committable, Conflicted
  - Tx  $\leftrightarrow$  atomic block

# Functionality [What?]

- Addresses, Values, and Conflicts

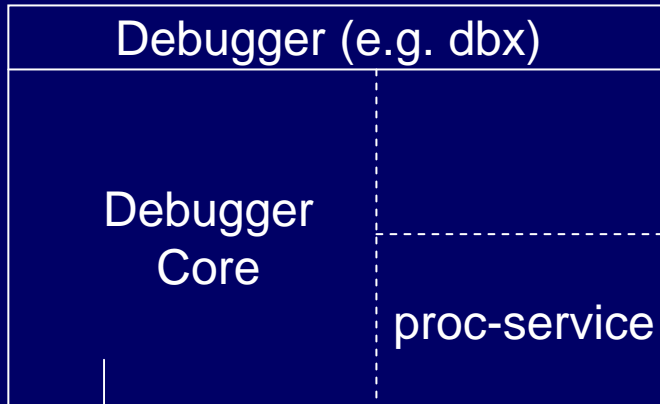
Given a variable/address:

- Which transactions “own” it?
  - For Read, Write, or Both
- Which transactions actually accessed it?
  - False conflicts detection
- Value accessed

# Functionality [What?]

- Transactional Events
  - Stop/Trace Tx-related events
    - Tx Begin/Commit/Abort
    - Tx Lose/Win/Wait-on a conflict
  - Provide event info
    - Who am I conflicting with, etc.

# Under the hood [How?]

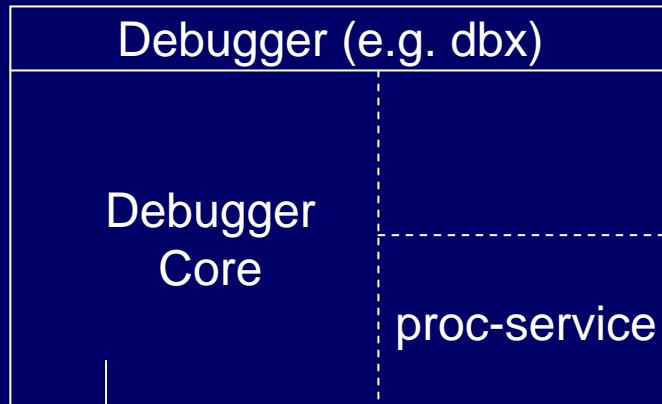


*Debugger's Process Space*

*Target's Process Space*

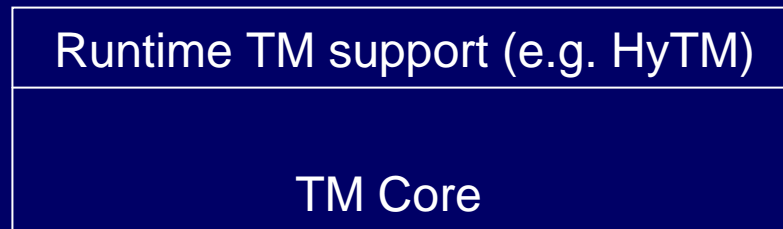


# Under the hood [How?]

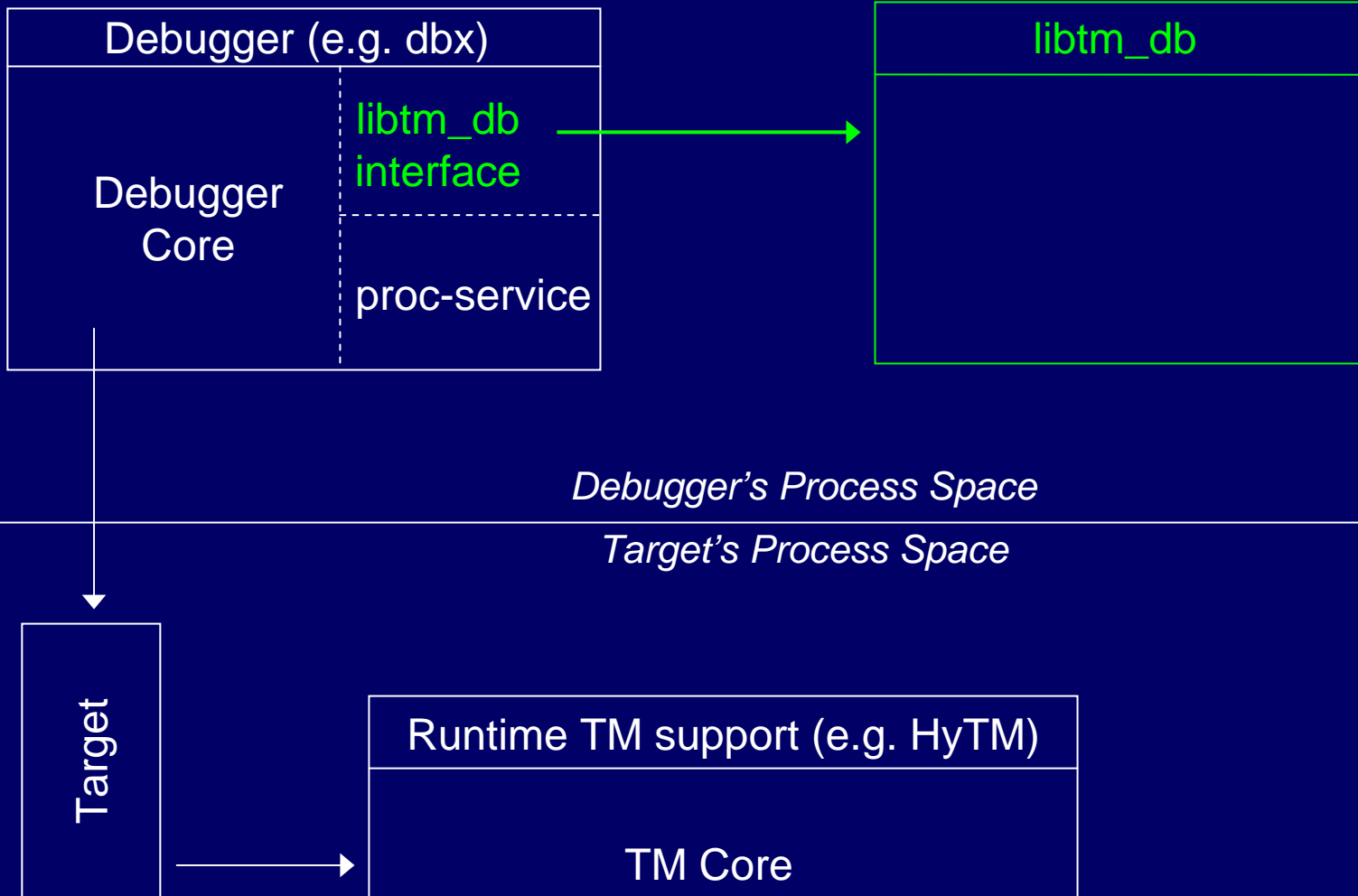


*Debugger's Process Space*

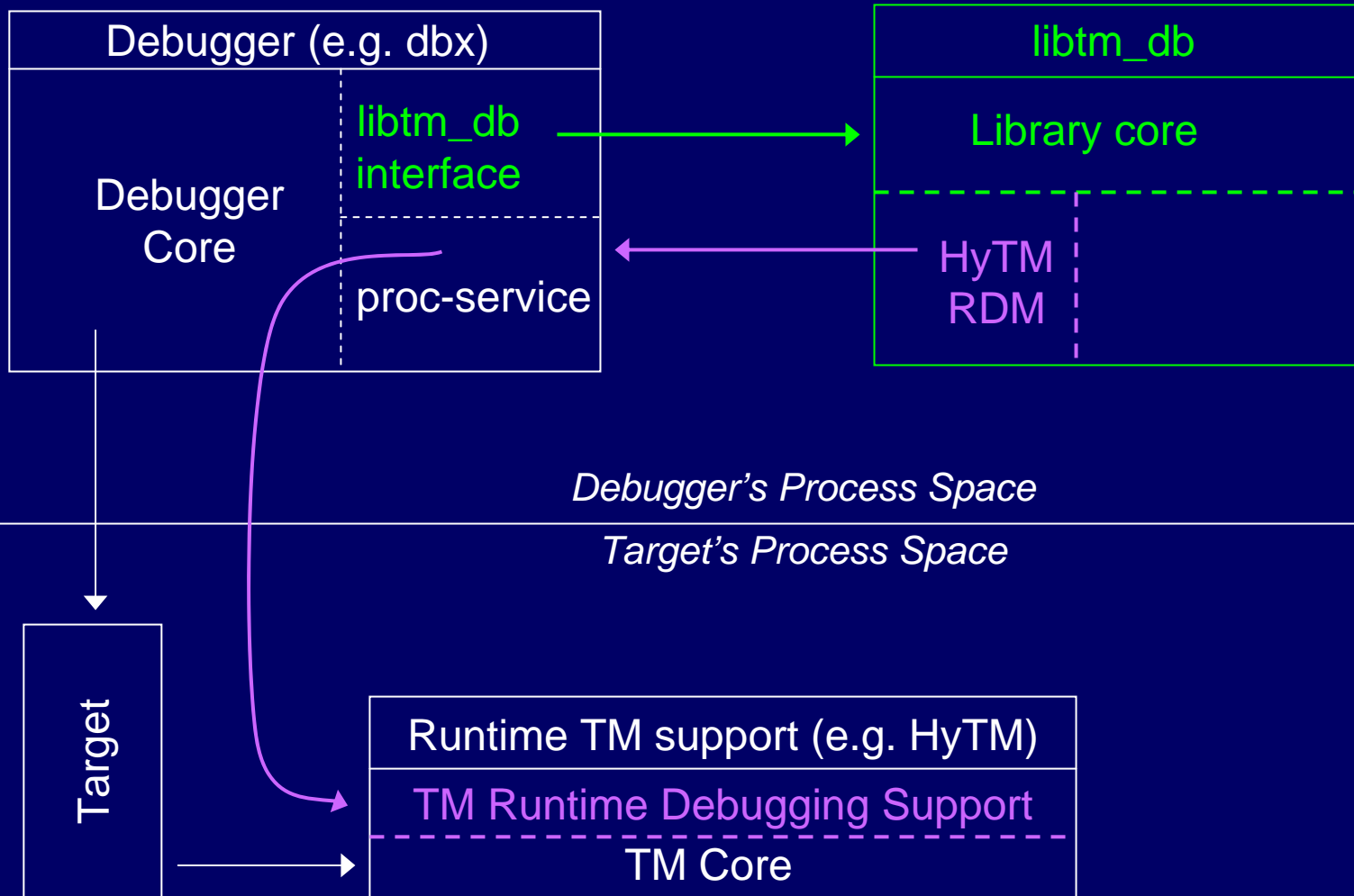
*Target's Process Space*



# The libtm\_db library [How?]



# The libtm\_db library [How?]



# Plan [When?]

- Fall 08: Open source a prototype of
  - `libtm_db`, supporting various variants of HyTM runtime TM
  - The `HyTM runtime TM` library (with runtime debugging support)
  - Scriptology for transactional debugging using `libtm_db` with `unmodified dbx`.

# Summary

- External library for transactional debugging
  - Provides *debuggers* with **general transactional debugging** support
  - Work with any debugger that provides the proc-service interface.
  - Provides *TM library developers* with **well-defined interface** for transactional debugging support

# Thanks\*



*\* No bugs were harmed in preparation of this presentation*