# Can Persistence Become a Primary Programming Issue?

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## Vision of Persistent Programming

## Open Challenges

No Persistence-specific artifacts

Language with Seamless Persistence Integration

Runtime System with Efficient Persistence Support

Interoperability with transient programs

Complete cache-aware garbage collection

# Persistent Active Oberon

## Programming Language with Intrinsic Persistence

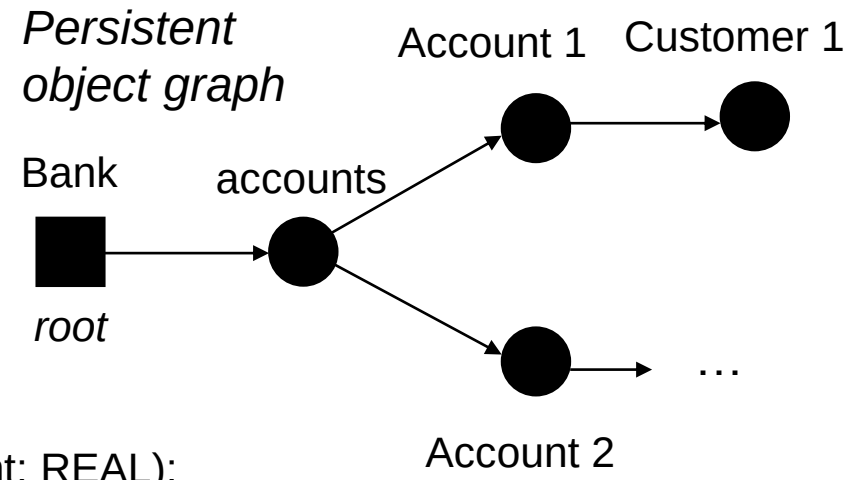
Module as persistence root

```
MODULE Bank;
  Account = OBJECT
    VAR customer: Customer; balance: REAL;
  END Account;

  VAR accounts: AccountList;

  PROCEDURE Transfer(from, to: Account; amount: REAL);
  BEGIN from := from - amount; to := to + amount
  END Transfer;

  AccountManager = OBJECT
  BEGIN {ACTIVE}
    WHILE (* … *) DO
      Transfer(a, b, c)
    END
  END AccountManager;
END Bank.
```

Persistent reference

Procedure as atomic transaction

Activity implements transaction sequence




Persistent program code ≡ transient program

# Persistent Active Oberon

Operating System with Inbuilt Persistence Support

**Memory Safety** with complete incremental garbage collection and simultaneous caching

**Interoperability** between persistent and transient modules (via implicit transient references)

**Performance and scalability** is well competitive to classical implementations (using databases)

Project webpage for system download:
*http://www.bluebottle.ethz.ch/Persistent*