The State Transition Engine

Development of PL/SQL Applications with a Business Rules Approach

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Agenda

- Problem & Solution
- Business Rules Architecture
- STE Concepts
- STE Development
- Demo – Timesheet App

The Problem

- Tax agency
  - Hundreds of documents
  - Each document has a different process
  - Processes were highly changeable (major changes each year)
- No way to do this in a traditional environment

How we solved the problem

- New Idea – Articulate business process flows and let users write the code.
- Natural way to think about business events
- State Transition Engine (STE)
- Using this approach -
  - Users write the code.
  - STE provides better code management.
  - Generator creates better code.
- The STE supports application development.

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Advantages of Business Rule Environment

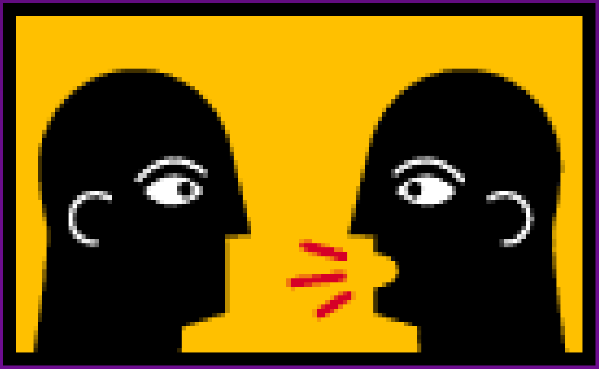
- Users participate in design.
- UML model (80% of structural rules)
  - Still hard to read (20% participation)
  - Users can’t build them (except to add, modify attributes)
- Process Flows (95% of process rules)
  - 95% participation
  - Users can build them!!!

Why use a state transition engine ?

- It is a way of looking at an object (business event).
- It replaces 90% of application logic.
- Things that the STE replaces:
  - Default values
  - Object access
  - Field-level edit privileges
  - Process flow steps
  - Program logic
  - Item ordering in applications
- With an STE, applications become object viewers.
- It is virtually a complete programming language.

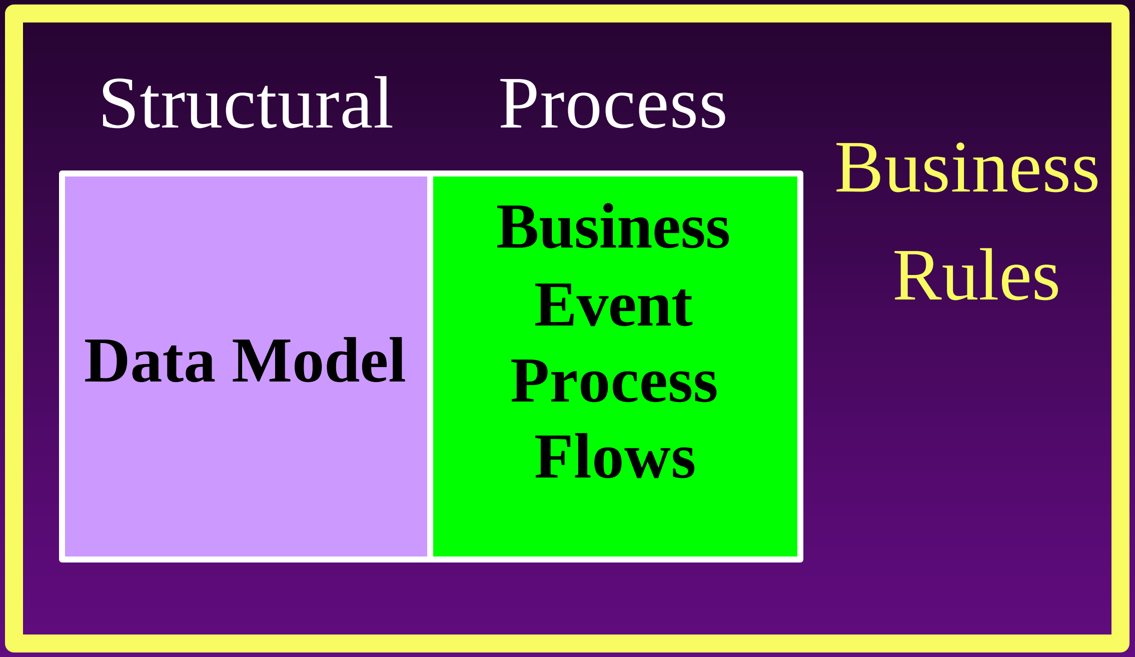
State Transition Language

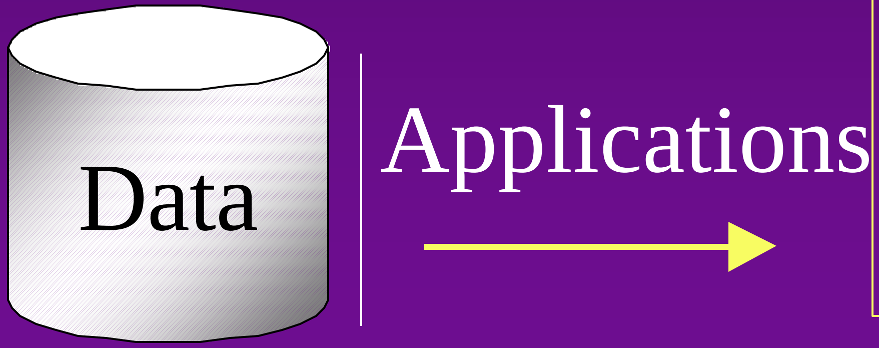
- Process Flow = State Transition Language
- Business Process Flow Diagram = analysis
- Communicate business events to users
- Flow diagrams are graphical
- In STE, process flows are the source code.
- Process flows loaded into STE repository



Architecture

- Business Rules Repository



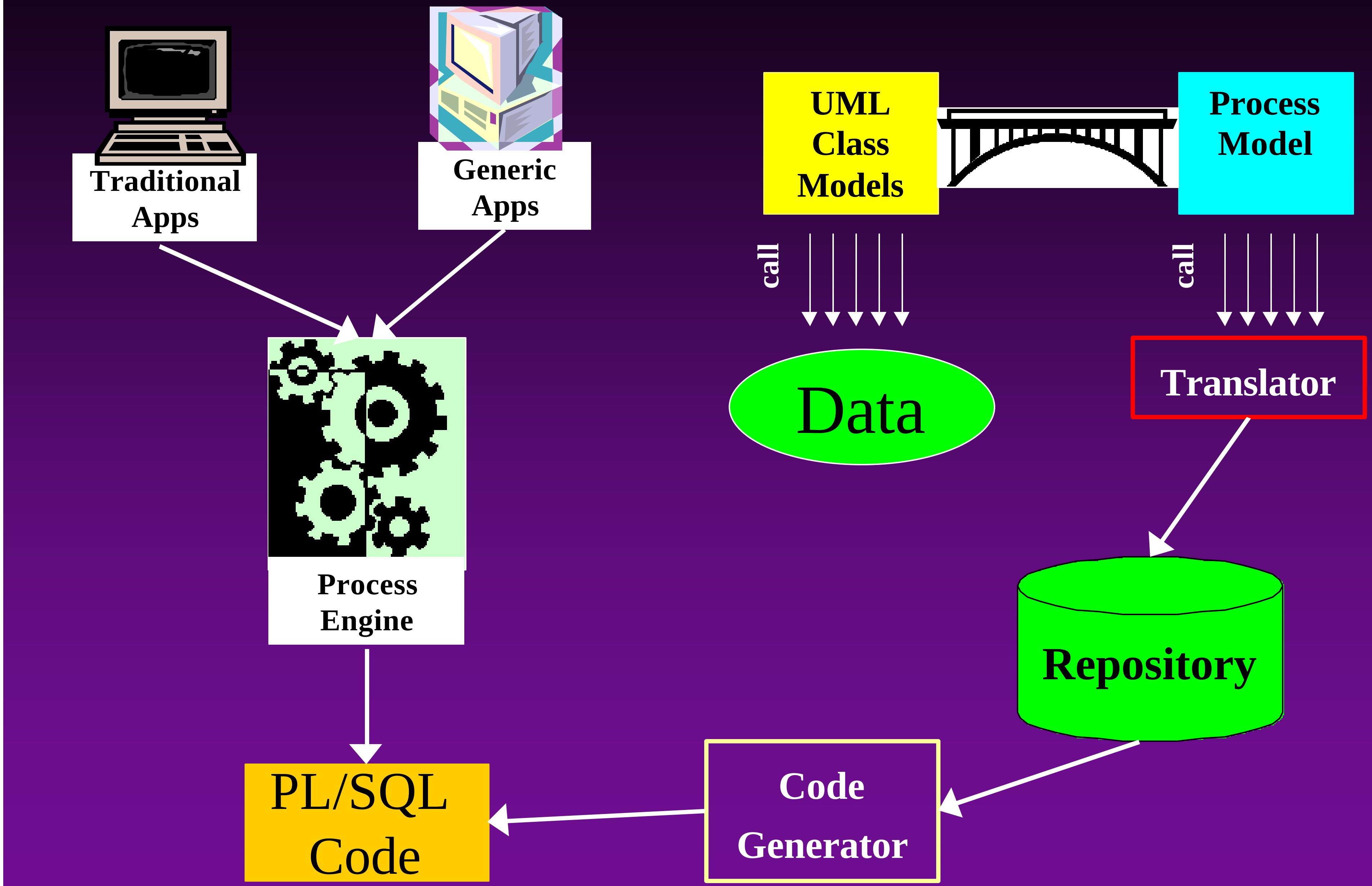


- Domain Builder
- Object Builder
- User-friendly applications

STE - Description

- Use State Transition Engine (STE) idea to support application development.
- Place all process-related business rules (code) in STE repository.
- Generate code (PL/SQL).
- Run entire system with <u>ONE</u> application.

Process Rules Architecture



The REAL Advantage!!!!

- “The only reason you are able to build so cheaply is that you foist the programming off onto your users.”

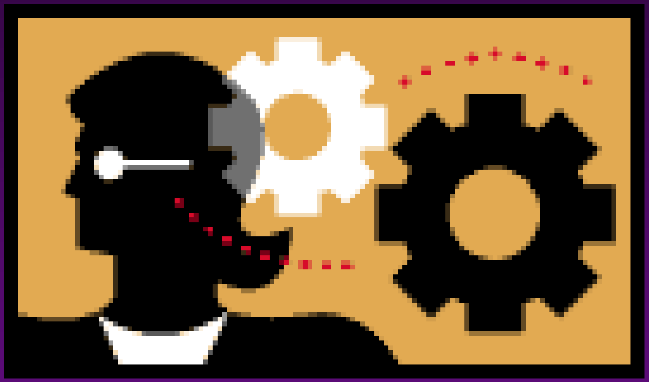
  Ulka Rodgers

Process Flow Details

- Generates simple PL/SQL procedures
- User maintainable
- ProcessBusinessEvent(event_oid, result_id)
- All generated code, no overhead

STE Concepts

- State – An activity at a point in a process flow
- State Events – Predefined trigger points
- Transitions – A business event changes state
- Task – A line of code



States

- State:
  - A point in time in a process flow where an activity may occur
- Manual
  - When an object is in a manual state, it stays there until some event moves it to a different state
- Automatic
  - When an object is in an automatic state, it executes some behavior (code) and automatically transitions to another state

State Types

- Manual States
  - Begin
  - End
  - Inbox
  - Wizard
  - Suspend
  - Error

- Automatic States
  - Automatic
  - Auto Begin

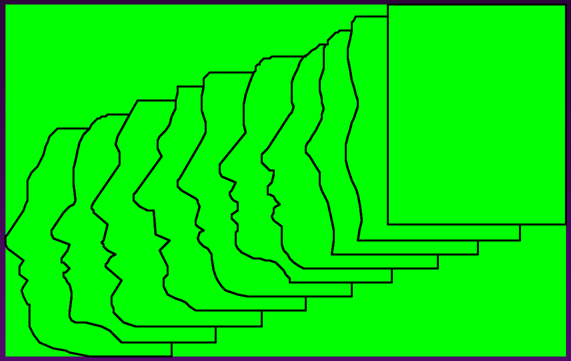
State Events

Listed in the order in which they may occur:

- On_Set
- Expiration
- Before_Open
- Manual_Processing
- Auto_Bail
- Bail
- Manual_Decision
- Automatic_Decision
- Listener

Transitions

- Manual
  - Manual Decision
- Automatic
  - All other events
- Rules for transitions
  - Automatic – like a case statement
  - Manual – validation rule

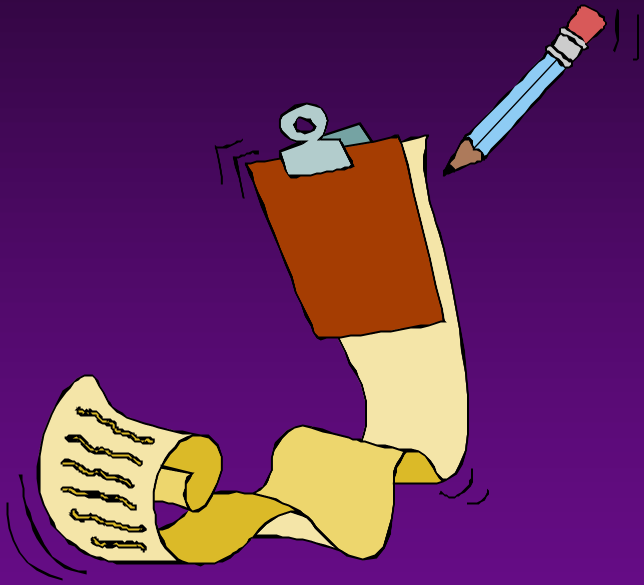


Tasks (1)

- Line of executable code
- Types used in STE
  - Assignments –
    - Salary := 5000
    - Party_Name:=First_Name||’ ‘||Last_Name
  - Function calls –
    - Create_JE_YN := Create_Journal_Entry_YN(OID)
    - Obj_ID:=Create_Bus_Event_ID(‘Add_Employee’)

Tasks (2)

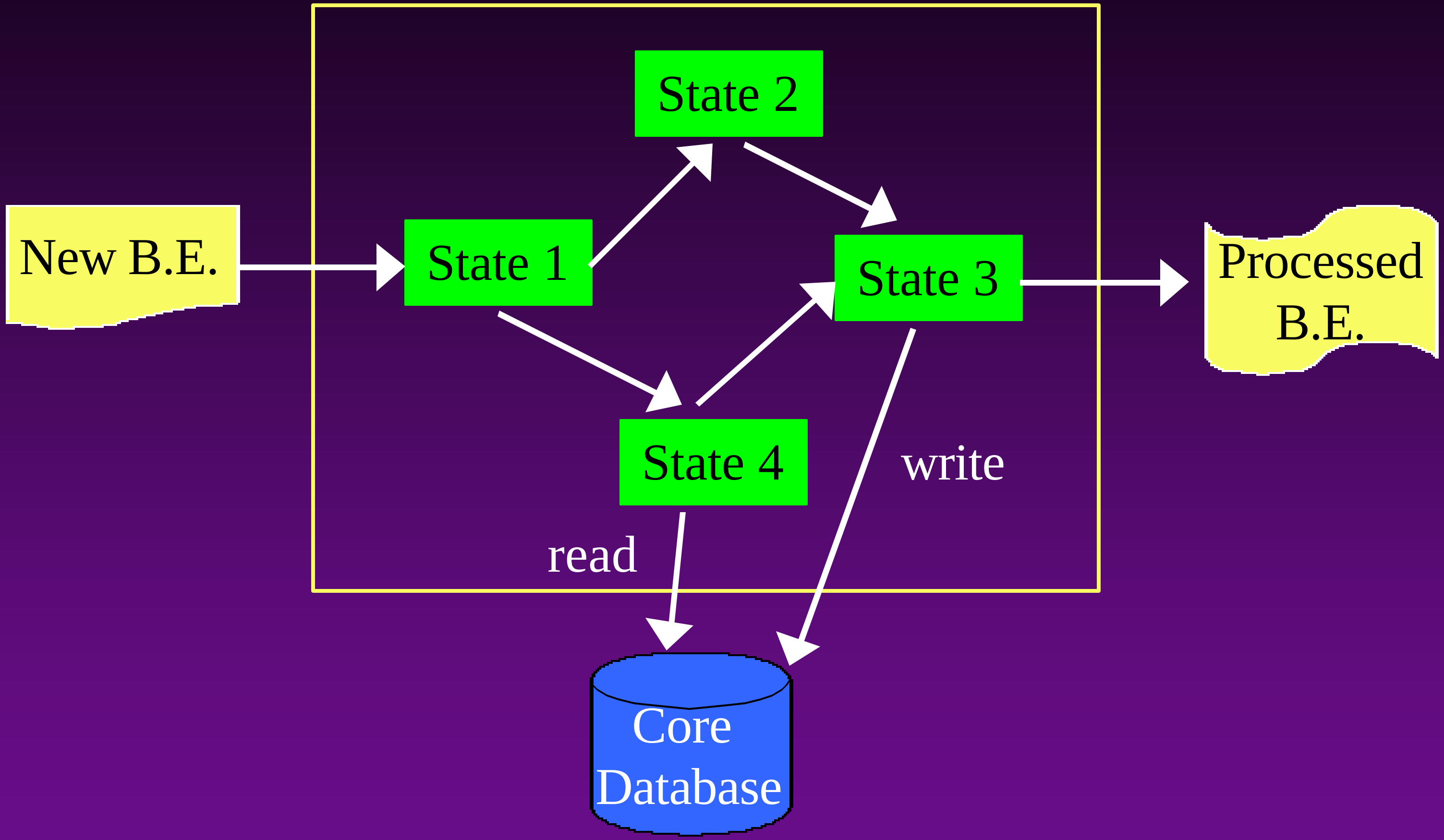
- Attach to events
  - Before_Open
  - On_Set
- Attach to transitions
  - Auto transitions
    - Expire
    - Listener
    - Bail
    - Auto_Decision
  - Manual Decision
    - Rule_Success, Rule_Fail



STE Development

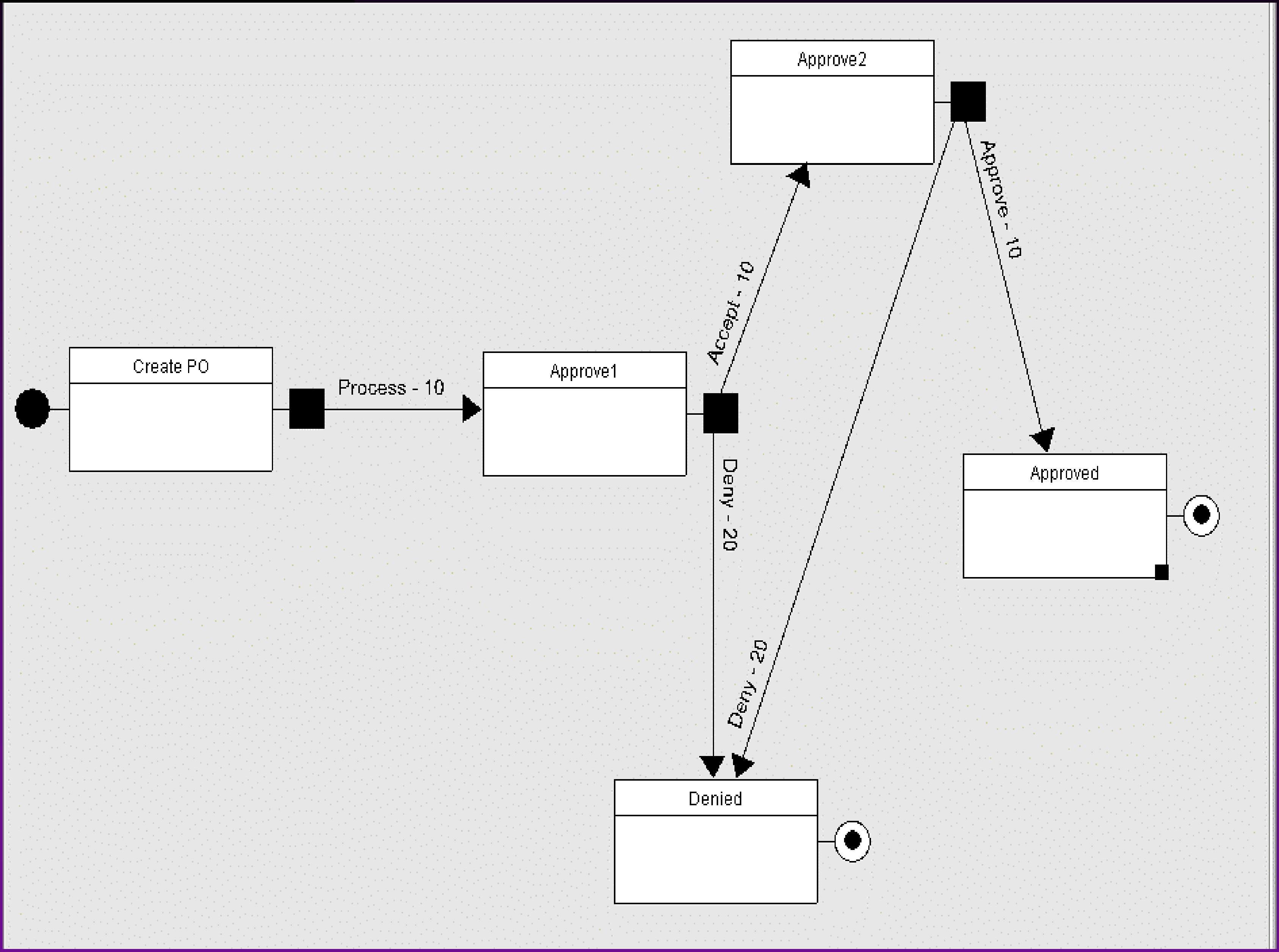
- Traditional
  - Requirements, process flow, code C/C++
- STE
  - Requirements, process flow (the code)
- A new paradigm in development
- Easier to design, code, test, debug and maintain

Define Flow on Business Event



- Business events impact core data structures
  - Party

PO Approval process



Implementation

- Generate procedures
- Procedures call each other
- All variables reside in PL/SQL table

Code for Future Check

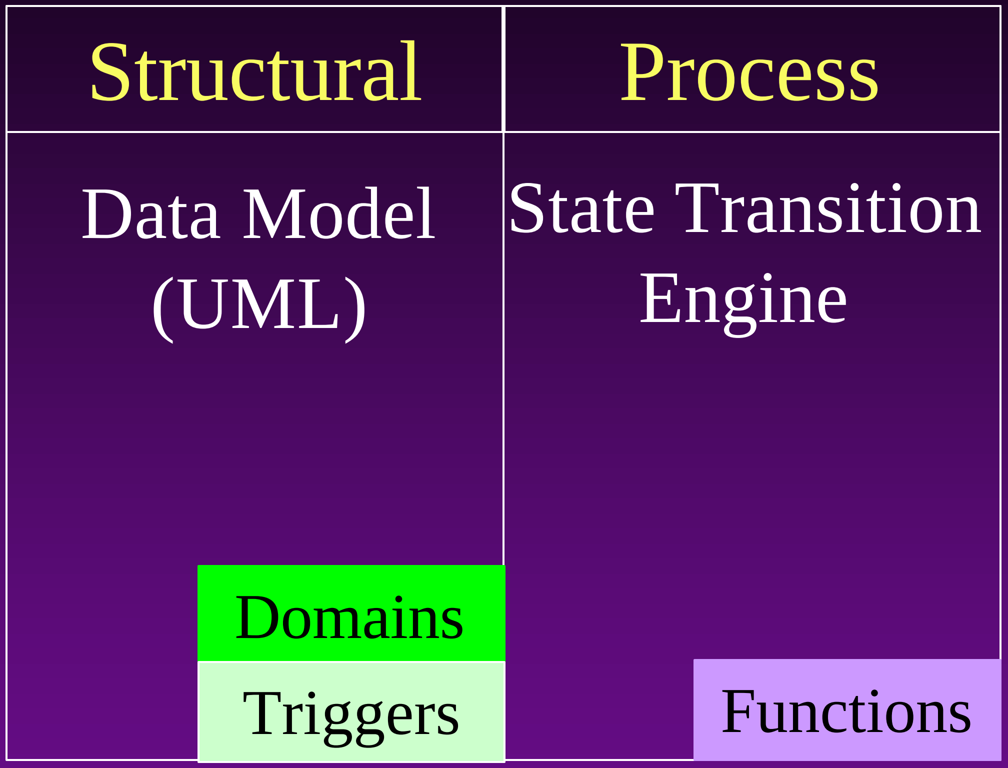
```
procedure p_auto_565(SelfOID in Number) is
Begin

   ste.doc(8890).ValueDT:=glste.f_mature_dt(SelfOID,ste
   .doc(8868).ValueTX);
  /*MatureDate :=
   glste.f_mature_dt(SelfOID,ErrorMessage) */
  if (ste.doc(8890).ValueDT>stepl.f_sysdate) then
  /*(MatureDate > stepl.f_sysdate)*/
    ste.SetEventState(SelfOID,573);
  elsif 1=1 then
  /*No Rule*/
    ste.SetEventState(SelfOID,570);
  else
    raise uml.e_ste_rule_failure;
  end if;
End;
```

Advantages of using the STE

- All code specifications are stored in the repository.
- Actual code is generated.
  - We can change the generation algorithm at will.
  - Improved performance – standardized structure
  - Supports multi-tasking
  - Enforces record locking for entire business event
- Excellent performance – PL/SQL tables
- No logic in the application
  - We can write specific applications, if desired

Part of Larger Picture



- Almost no business logic outside of the repository
- 90% of entire system is generated
- Analysis = Production

DEMO

- Timesheet Application
  - Process Flow Development

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