

Model Transformation

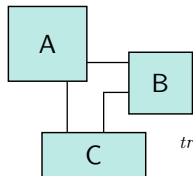
Miro Spönemann



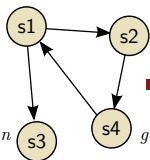
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Model Transformation



model transformation



code generation

```
switch (_state_1) {
  case 0:
    goto M18;
  case 1:
    if (_s_R) {
      _state_1 = 1;
      _state_4 = 1;
      _state_12 = 1;
      /* Vacuous terminate */;
      goto M20;
    } else {
      _state_1 = 1;
      _state_8 = 1;
      /* Vacuous terminate */;
      goto M20;
    }
  if (_state_12) {
    if (_s_R) {
      goto M35;
    } else {
      _state_12 = 1;
      _term_40 &= ~(1 << 1);
    }
  }
}
```

compile

```
movzbl _s(%rip), %eax
andl $4, %eax
testb %al, %al
je .L13
movb $1, _state_1(%rip)
movb $1, _state_4(%rip)
movb $1, _state_12(%rip)
movb $1, _state_8(%rip)
jmp .L8
.L13:
movb $1, _state_1(%rip)
movzbl _state_4(%rip), %eax
testb %al, %al
je .L14
movb $1, _state_4(%rip)
movzbl _state_12(%rip), %eax
testb %al, %al
je .L15
movzbl _s(%rip), %eax
andl $2, %eax
testb %al, %al
jne .L27
```

Domain-specific model

Behavioral model

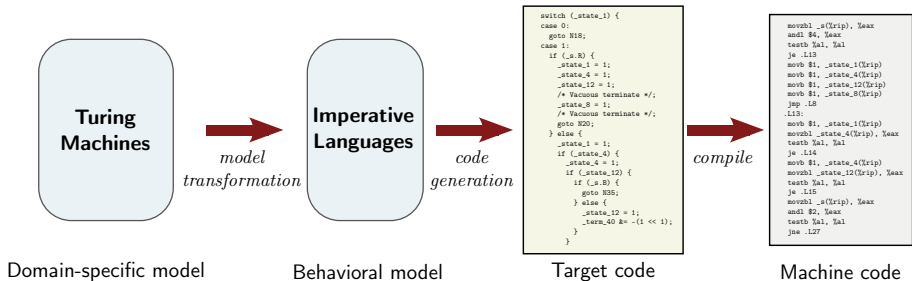
Target code

Machine code

Model Transformation Languages

- Atlas Transformation Language (ATL)
 - <http://www.eclipse.org/at1/>
- Query/View/Transformation (QVT)
 - <http://www.omg.org/spec/QVT/>
- Xtend
 - Formerly part of the OAW Xpand project
 - Now a generic Java extension language

Model Transformation Tutorial



Imperative Language Example

```
int program test
input bool b
int x
char array a
```

```
begin
```

```
  x = (5 * 4)
```

```
  a = "hallo"
```

```
  a[2] = 'm'
```

```
  while b
```

```
  begin
```

```
    b = (x <= 5)
```

```
  end
```

```
  if (x == 2)
```

```
  then nothing
```

```
  else begin
```

```
    x = (2 * x)
```

```
  end
```

```
  return ((x / 2) - 7)
```

```
end
```

Metamodel for Imperative Languages

