Reverse Engineering SDL Models
A Pattern-Based Approach

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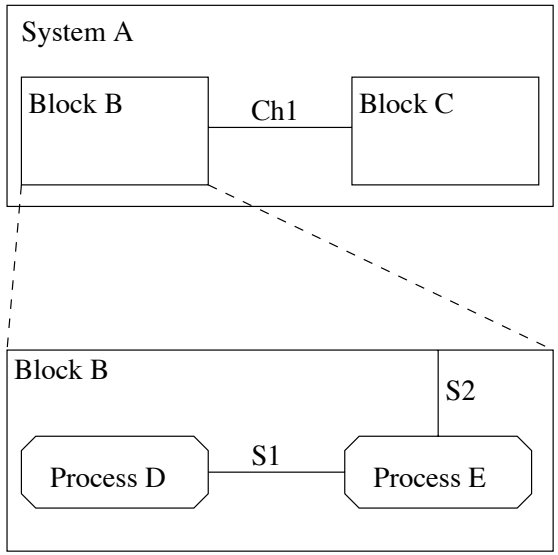
Overview

- Why Reverse Engineering?
- SDL to OMT
- UML improves translation
- Patterns and Reverse Engineering
- Example
- Conclusions and Future Work

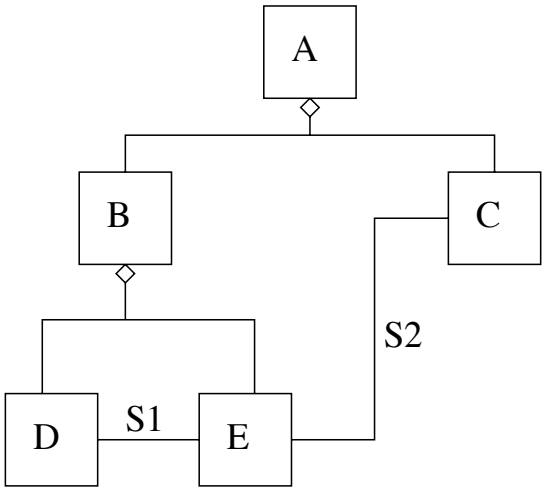
Why Reverse Engineering ?

- Document, maintain and re-engineer SDL code
- Use a OO design methodology (e.g. INSYDE)

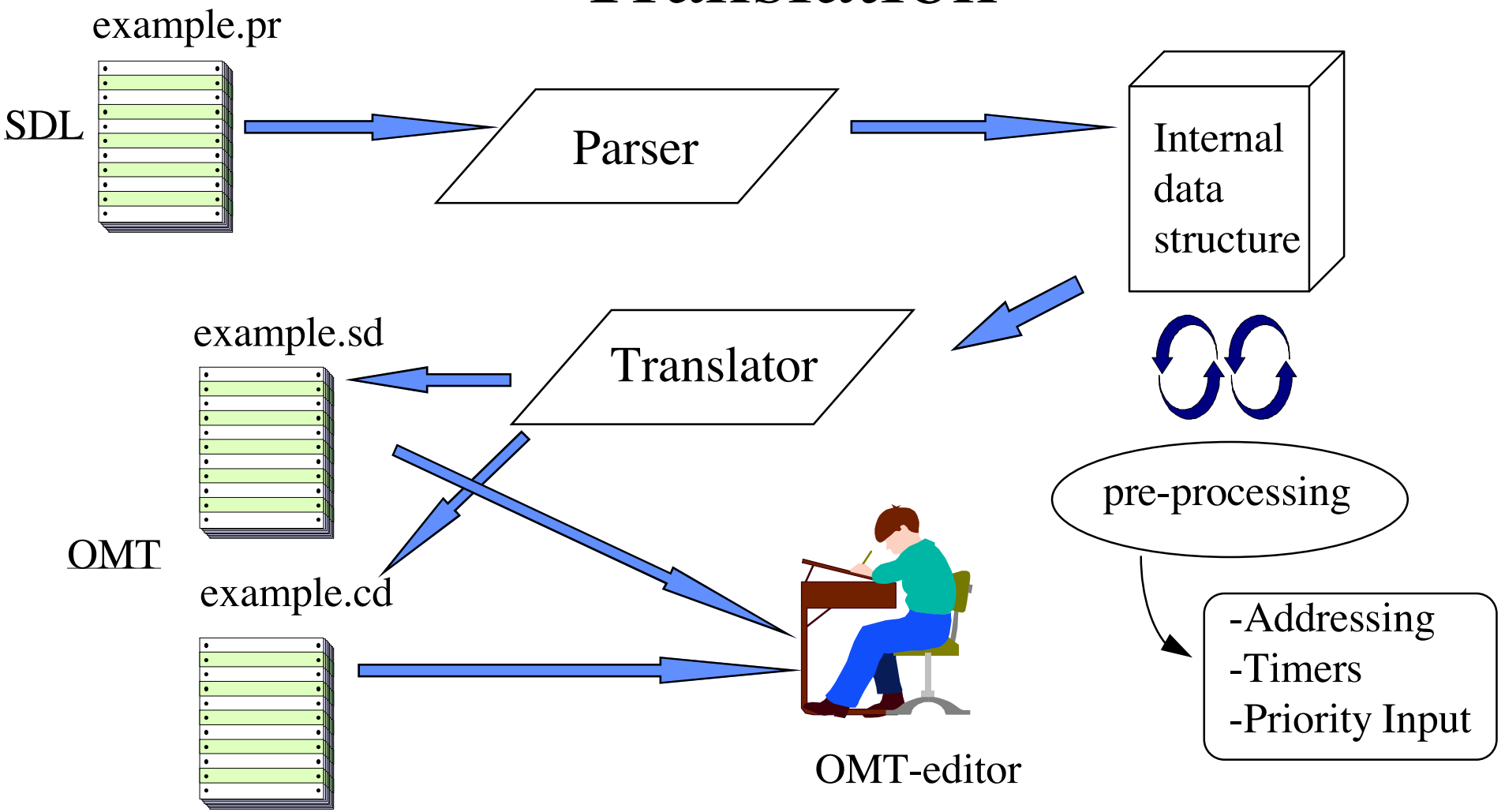
SDL



OMT/UML

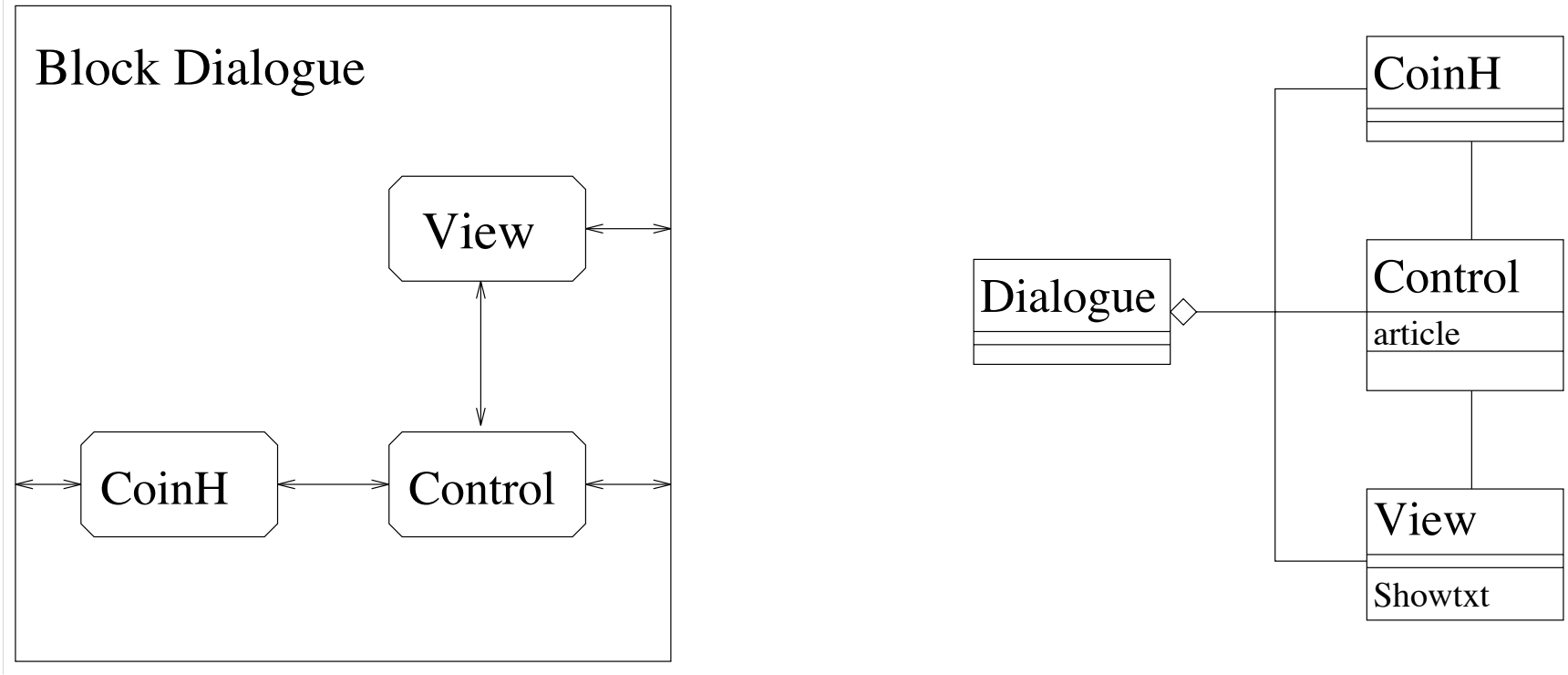


Translation



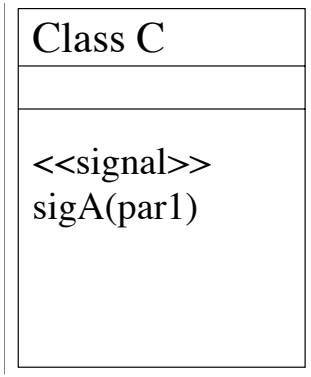
Translation rule example

Translation of a block and its processes



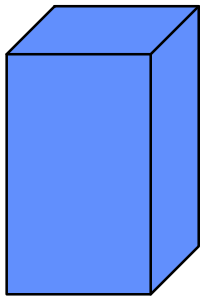
UML

- Richer syntax of UML helps to improve the translation rules
  - Signals
  - Packages
  - Collaboration diagrams
  - Patterns !
  - ...

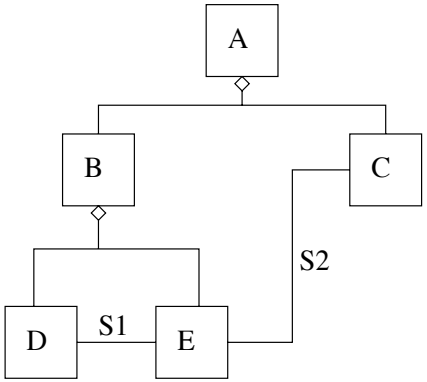


Reverse Engineering and Patterns

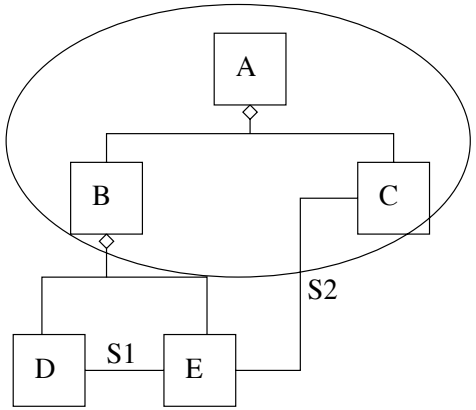
SDL Model



Step1: Translating



Step2: Layering with pattern information



Reverse engineering

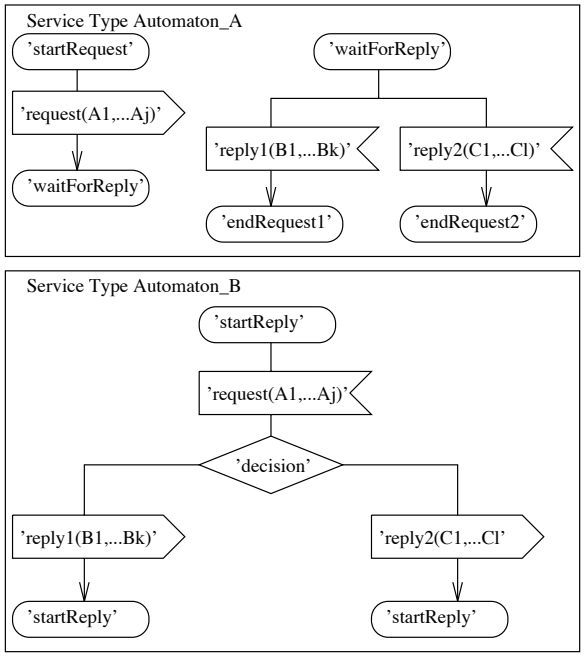
Users still have access to all the details

Detection

"A pattern is detectable if its template solution is *distinctive* and *unambiguous*"

Automatic detection
vs.
Interactive detection

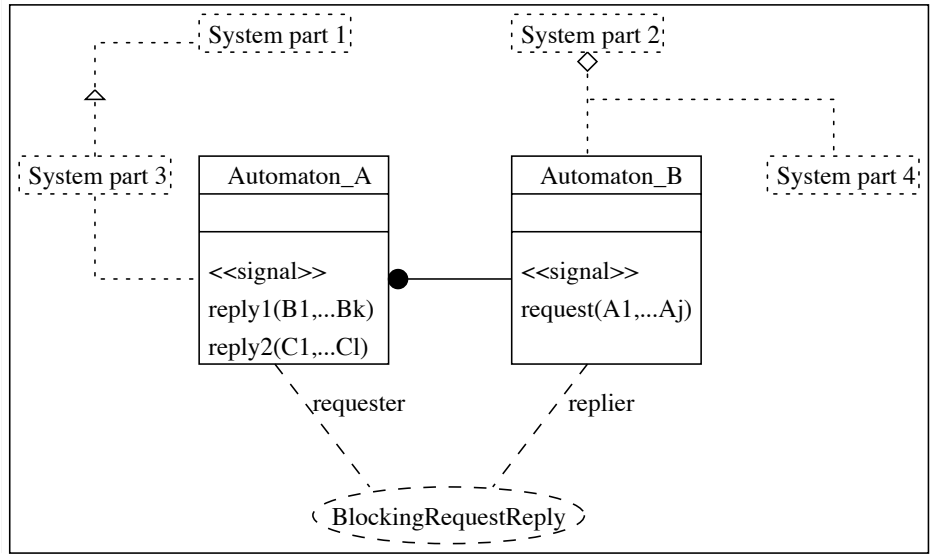
BlockingRequestReply	+
TimerControlledRepeat	+
DynamicEntitySet	0
Codex	-
DuplicateIgnore	-
DuplicateHandle	-



Template Solution
BlockingRequestReply

Notation

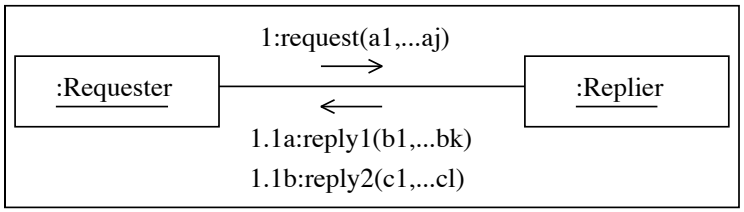
Class diagram



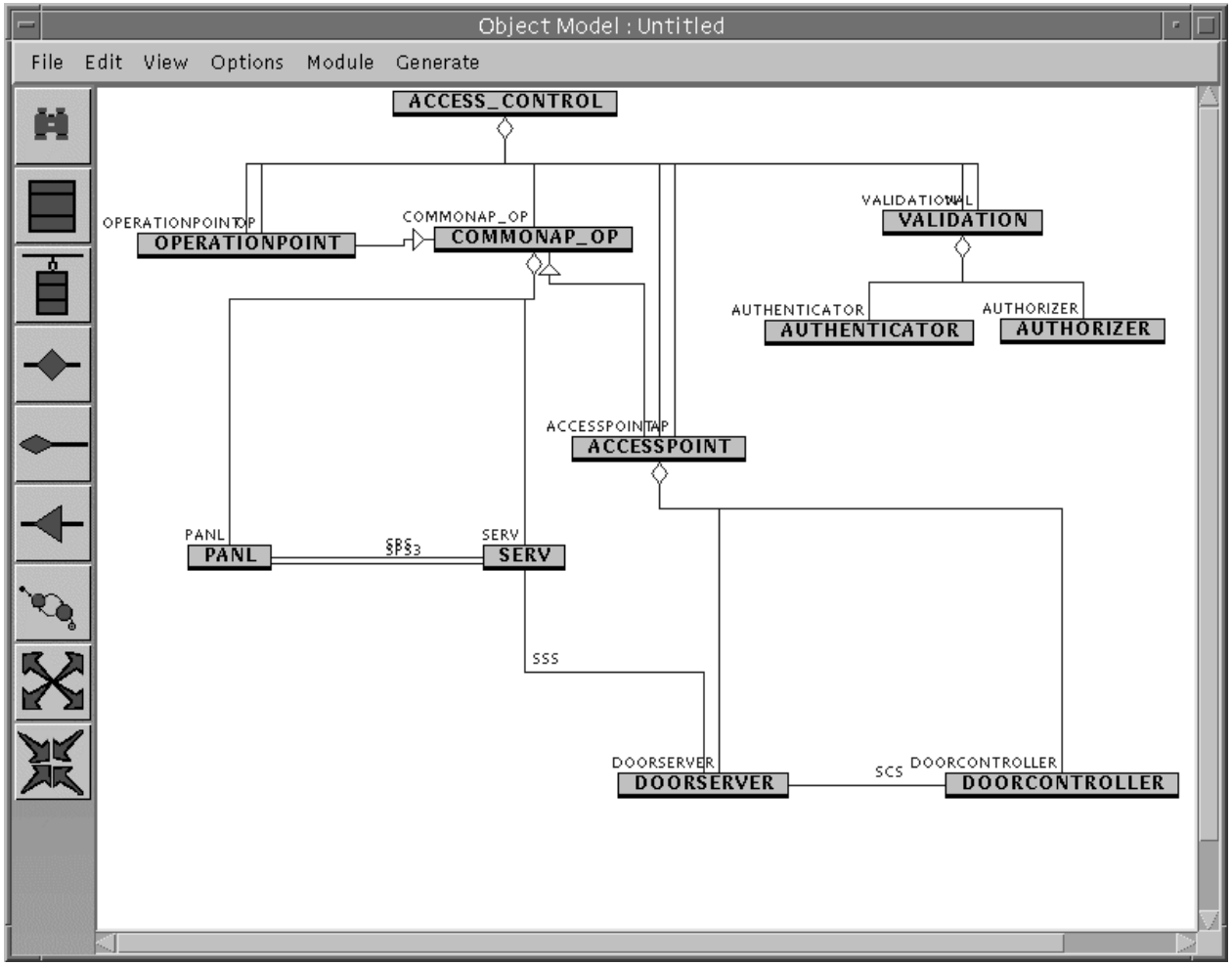
Extensions

- Stereotypes
- Dynamic diagrams

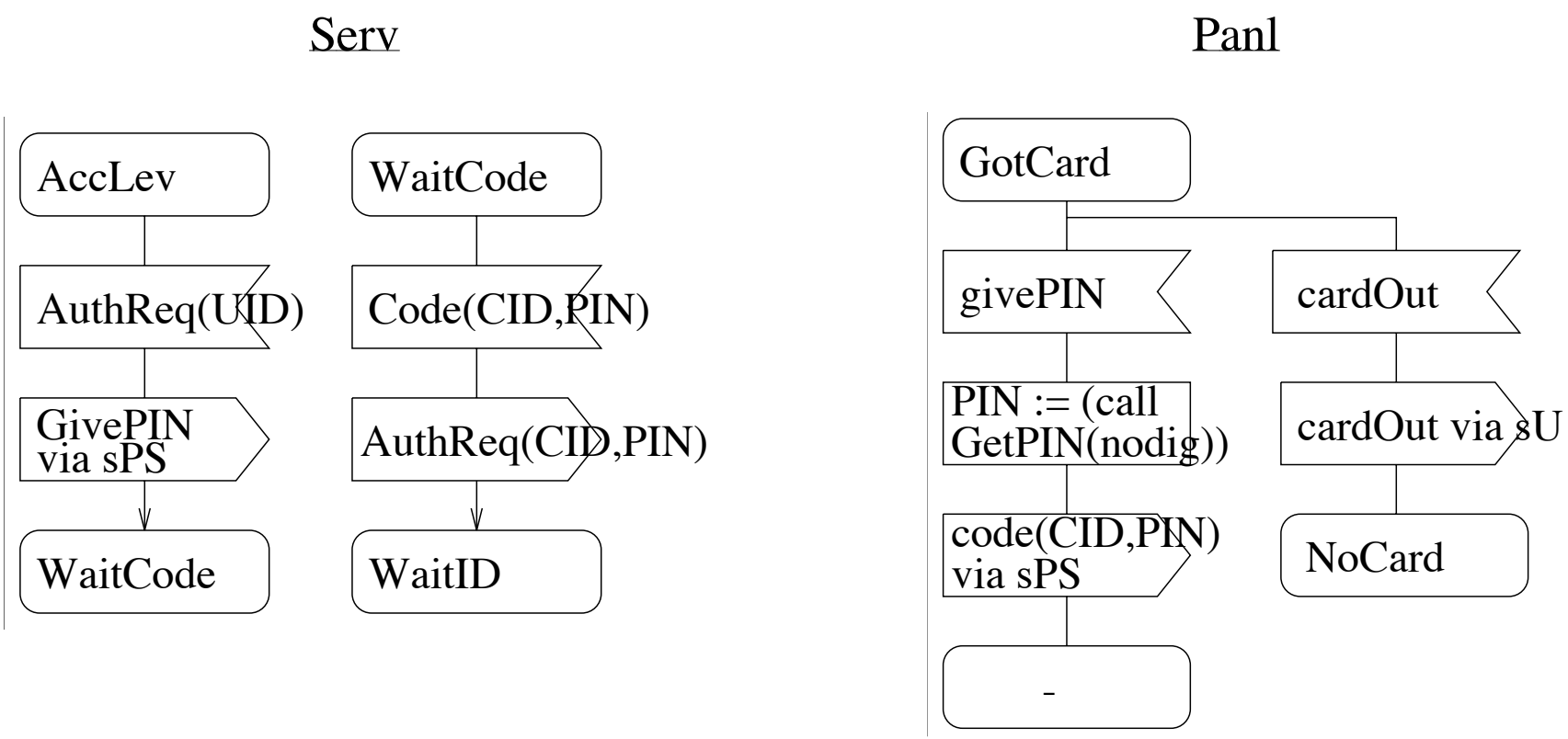
Collaboration diagram



Example (1)


Object Model : Untitled
File Edit View Options Module Generate
ACCESS_CONTROL
OPERATIONPOINTAP
OPERATIONPOINT
COMMONAP_OP
COMMONAP_OP
VALIDATIONVAL
VALIDATION
AUTHENTICATOR
AUTHENTICATOR
AUTHORIZER
AUTHORIZER
ACCESSPOINTAP
ACCESSPOINT
PANL
PANL
SPS3
SERV
SERV
SSS
DOORSERVER
DOORSERVER
SCS
DOORCONTROLLER
DOORCONTROLLER

Example (2)


Serv
Panl
AccLev
AuthReq(UID)
GivePIN
via sPS
WaitCode
WaitCode
Code(CID,PIN)
AuthReq(CID,PIN)
WaitID
GotCard
givePIN
PIN := (call
GetPIN(nodig))
code(CID,PIN)
via sPS
-
cardOut
cardOut via sU
NoCard

Conclusions

- Translator for SDL to OMT translation exists
- SDL to UML (under construction)
- Pattern detection is possible (but not easy)
- UML pattern notation is usefull

Future Work

- Pattern detection (generic mechanism)
- Extend UML pattern notation
- Check scalability