Enhanced insight in the use of in-house libraries using static code analysis

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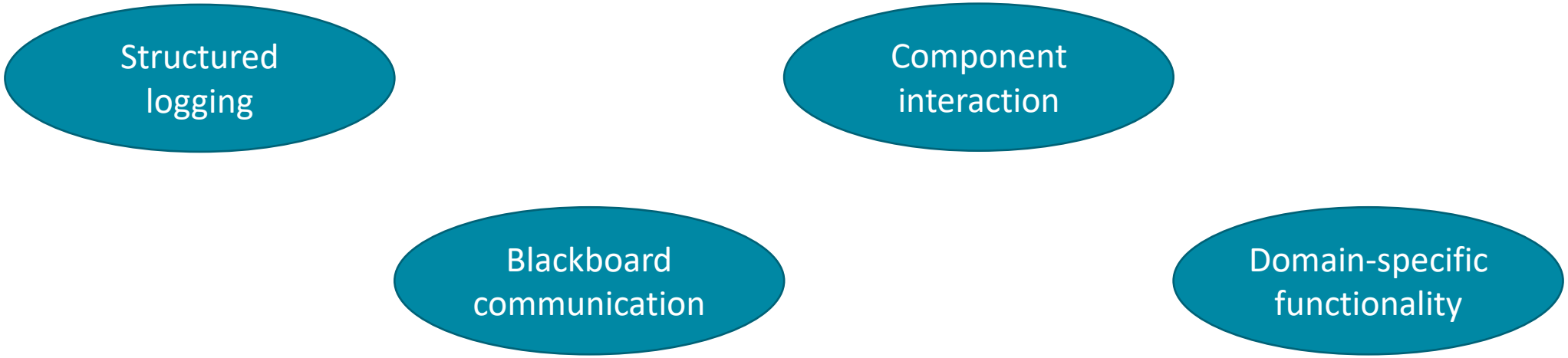
An initiative of industry, academia and TNO

ESI

In-house libraries are used at many places for many purposes

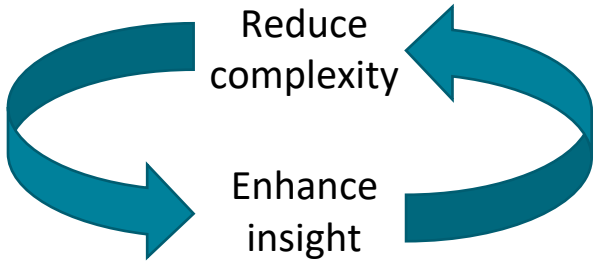


Demand for methods that enable the high-tech industry to

- Replace in-house libraries by other (off-the-shelf) technologies
- Enhance insight in the use of in-house libraries

Speed-up maintenance and development on legacy code bases

Mutually reinforcing demands

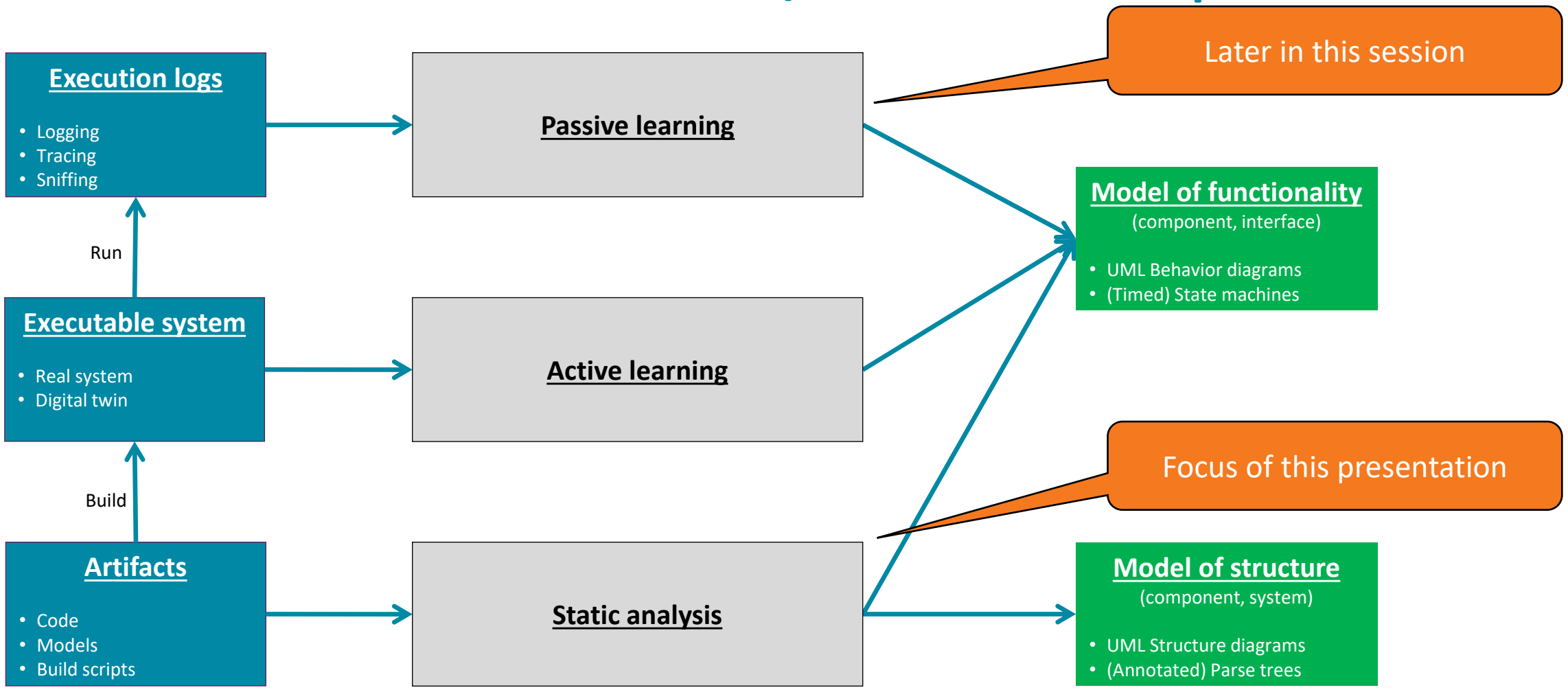


"Even experienced developers spend a lot of time on analysis"

Enhance insight

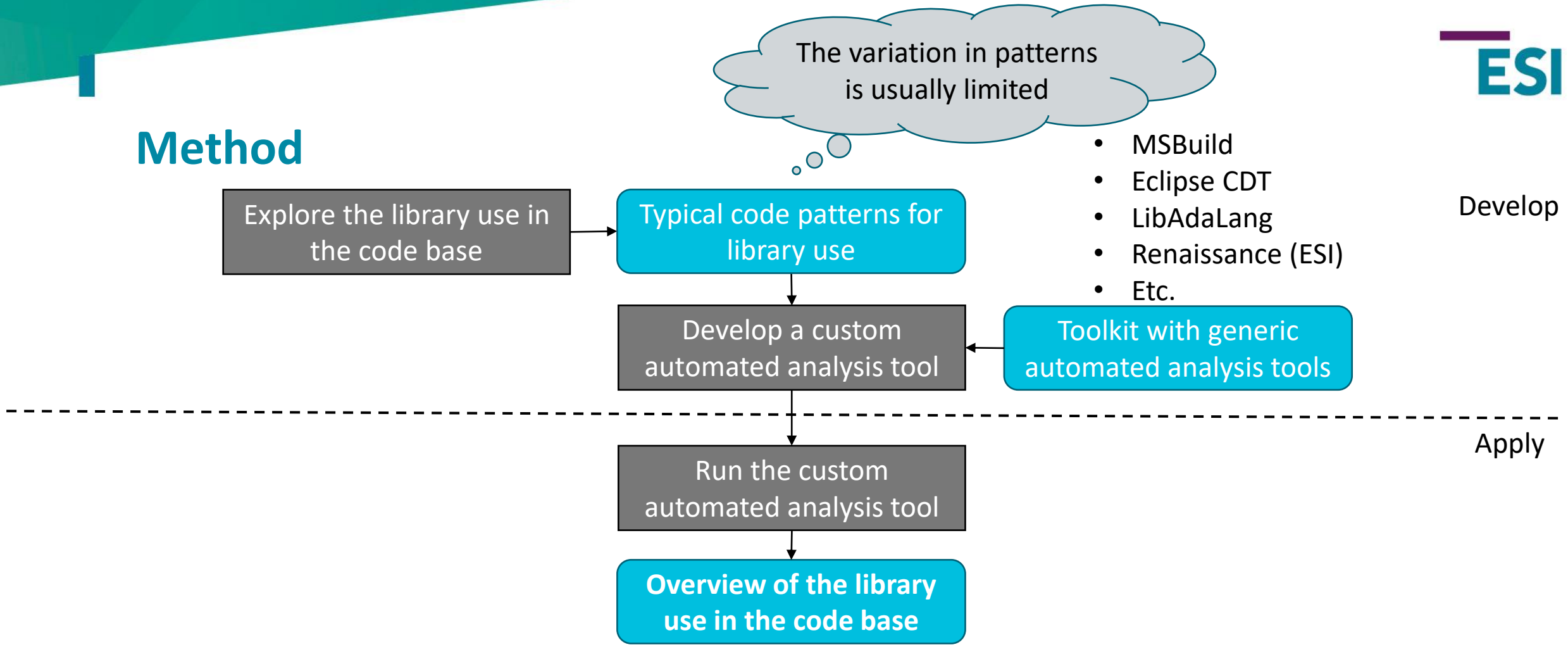
- Dominant activity in many areas of software engineering
  - Supports not only maintenance, but also regular development
- Global overview models instead of local code fragments
  - Beyond textual search and cross-reference databases
  - E.g., data flow analysis for domain-specific code fragments in their context

Semi-automated model extraction/inference techniques

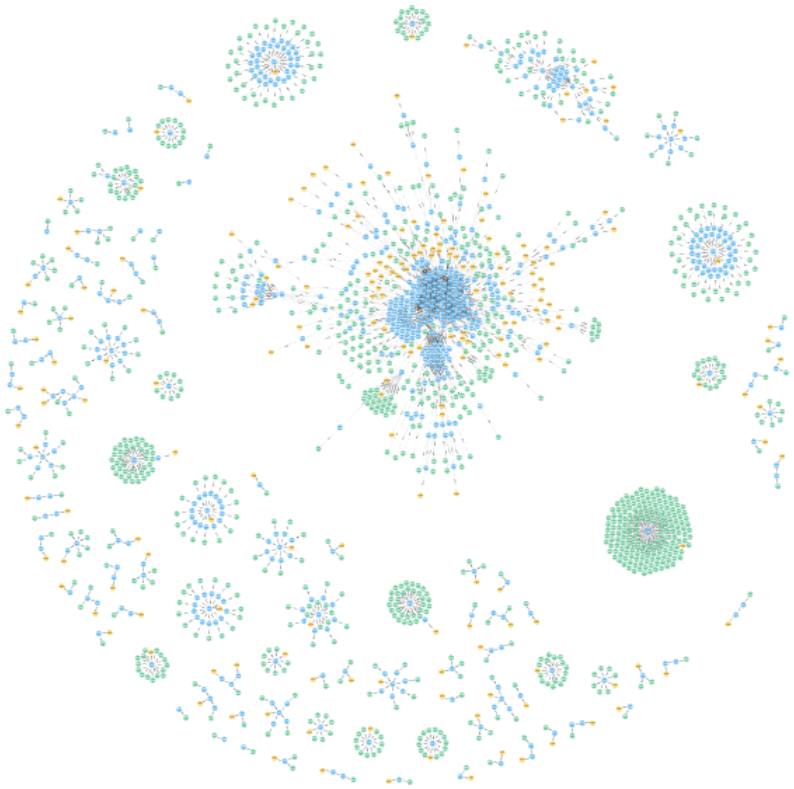


Method for analyzing in-house libraries

Method

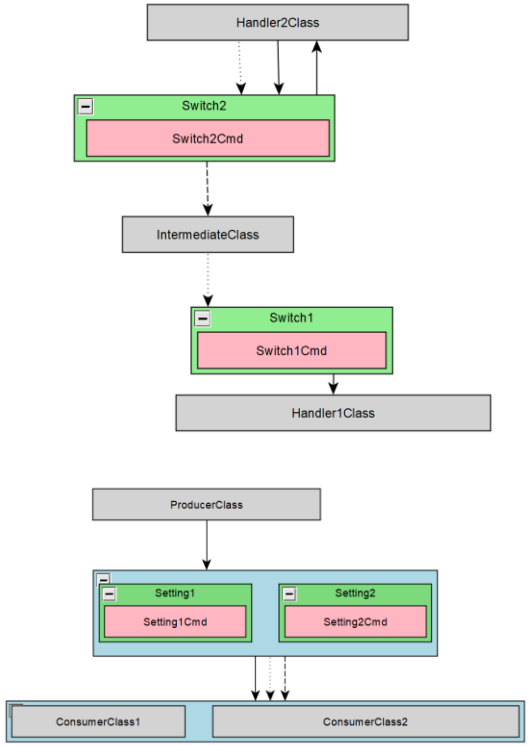


Enhanced insight in the use of in-house libraries



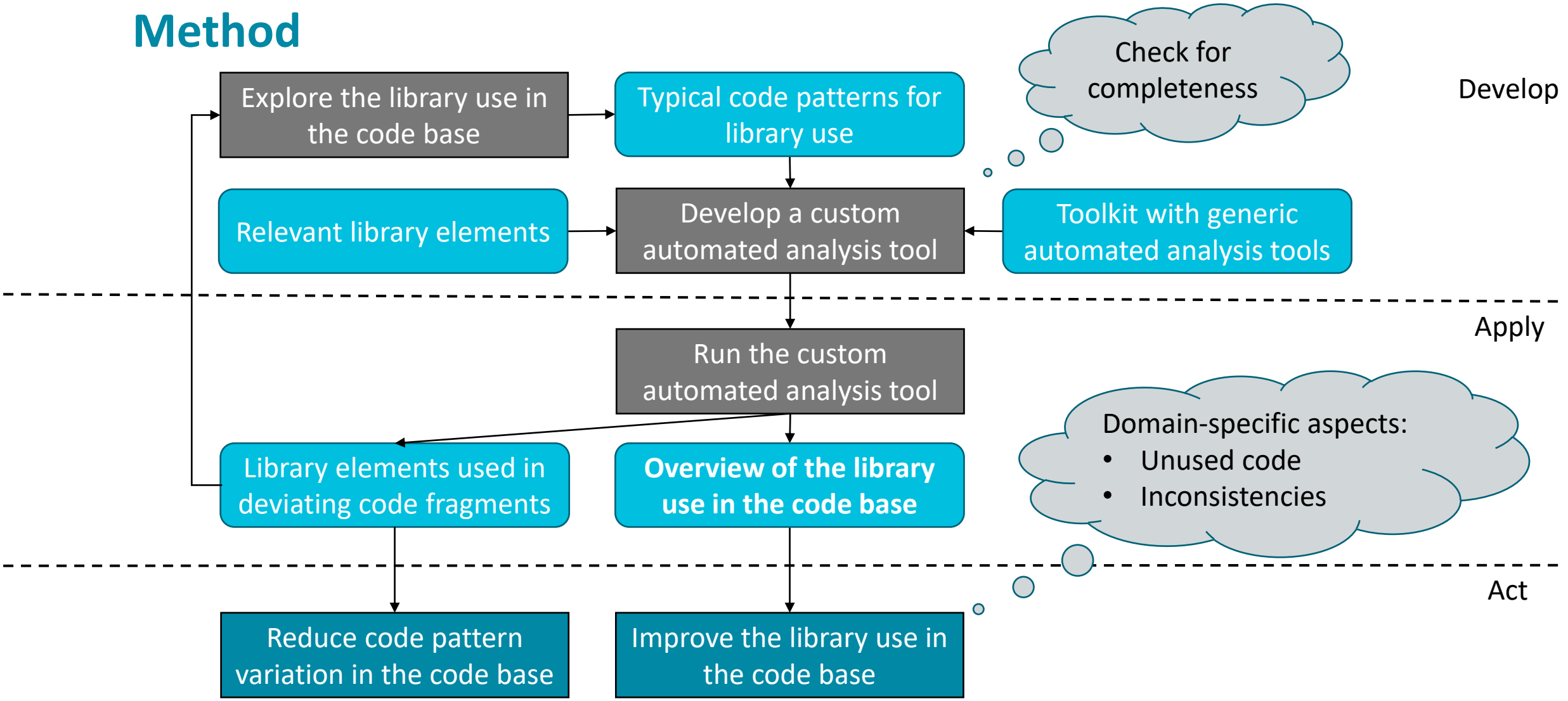
```
AcqFuncSwitchRoomLight (8B42A980-4290-11D4-B1BC-00C04F90D031):
* Associated command: AcqSwitchRoomLightCmd
* Constructor calls:
--- \UnitBase\Services\IGC\Misc\AcqMiscRoomHandler\Src\AcqMiscRoomHandler.cpp
* Updates meta:
--- CAcqMiscRoomHandler::SelectApplication(CAcqGenEPXValidationFailures) : SetFunctionEnabledState [\UnitBase\Ser
* Event handlers:
--- CAcqMiscSwitchRoomLightMethodCaller::ExecuteMethod() [\UnitBase\Services\IGC\Misc\Inc\AcqMiscSwitchRoomLightM

AcqParAcquisitionInputFocus (1EFB48FC-CA91-43E5-944D-8DE4800CD37A):
* Associated command: AcqSelectAcquisitionInputFocusCmd
* Constructor calls:
--- \UnitBase\Services\IGC\Appl\AcqApplAppl\Src\AcqApplCompoundStateHandler.cpp
--- \UnitBase\Services\IGC\Appl\AcqApplExp\Src\AcqApplExposureHandler.cpp
* Updates core:
--- CAcqApplCompoundStateHandler::CAcqApplCompoundStateHandler(CAcqCIControlItemManager) : SetRequestedValue [\Un
--- CAcqApplCompoundStateHandler::HandleEvent(CAcqCIAcqGeoParkPositionEnumChanged) : SetRequestedValue [\UnitBase
--- CAcqApplCompoundStateHandler::HandleEvent(CAcqCIExposureStateIdEnumChanged) : SetRequestedValue [\UnitBase\Se
--- CAcqApplCompoundStateHandler::HandleEvent(CAcqCIFluoStateIdEnumChanged) : SetRequestedValue [\UnitBase\Servic
--- CAcqApplExposureHandler::SelectExamination(IApplARDExaminationData) : SetValue [\UnitBase\Services\IGC\Appl\A
* Updates meta:
--- CAcqApplCompoundStateHandler::CAcqApplCompoundStateHandler(CAcqCIControlItemManager) : AddValueEx [\UnitBase\
--- CAcqApplCompoundStateHandler::CAcqApplCompoundStateHandler(CAcqCIControlItemManager) : CalculateCombinedList
--- CAcqApplCompoundStateHandler::HandleEvent(CAcqCIAcqGeoParkPositionEnumChanged) : SetFunctionEnabledState [\Un
* Subscriptions:
--- CAcqApiAutoTest::GetUIModelItem(CString, CString, BOOL) : GetUIModelItem [\UnitBase\Services\IGC\Api\AcqApiAu
--- CAcqStaticUIModel : RETRIEVE_UIMODELITEM_METHOD [\UnitBase\Services\IGC\Api\AcqApi\Src\AcqStaticUIModel.cpp]
--- CAcqStaticUIModel : RETRIEVE_UIMODELITEM_METHOD [\UnitBase\Services\IGC\Test\AcqServerStub\AcqStaticUIModel.cp
* UI Model Item getters:
--- IAcqStaticUIModel::AcquisitionInputFocus
```



➔ **Experiment with various representations to gain insight in large code bases**

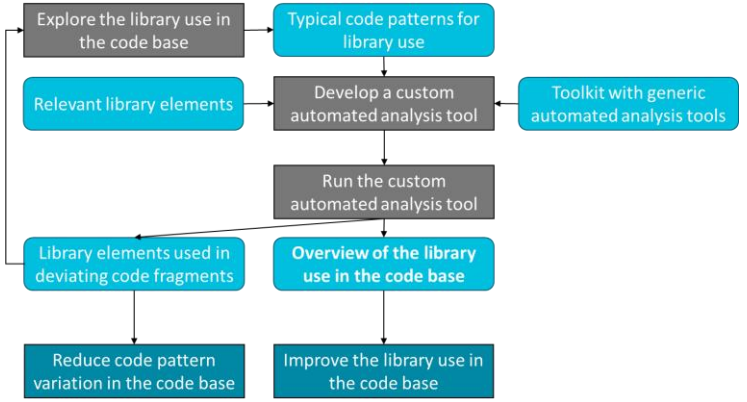
Method



Method for enhanced insight in the use of in-house libraries

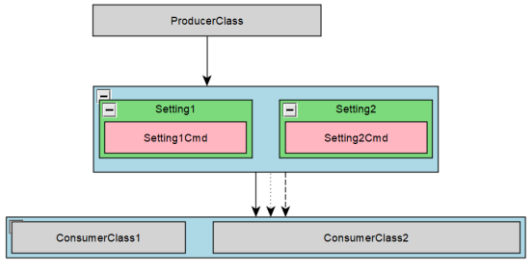
Model-based method based on static code analysis

- Semi-automated approach
  - Machine: Perform repetitive tasks in a structured way
  - Human: Steer and customize the process in a creative way
- Incremental, iterative approach
  - Common code patterns in a small subset of the code base
  - More exceptional code patterns, and larger subsets of the code base



Benefits of the extracted custom models

- Enhanced insight using global overviews that are difficult to see in the code base
- Typically reveal immediate improvement opportunities



Acknowledgements

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