Reverse Engineering Tool Requirements For Real Time Embedded Systems
The right tool for the right systems
Tools

- **System**
  - Real time
  - Embedded
  - Developed in procedural paradigm
Tools

The right **tool** for the right **purpose**
Tools

• **Purpose**
  
  • *Modify software architecture*
  
  • *Ensure co-evolution*
  
  • *Update documentation*
SAR LifeTime flow and defined RE features

Stéphane Ducasse and Damien Pollet
Software architecture reconstruction: A process-oriented taxonomy
SAR LifeTime flow

Goals

Processes

Inputs  Techniques  Outputs
SAR and defined RE features

- **Goals**
  - Redocumentation
  - Reuse
  - Conformance
  - Co-Evolution
  - Analysis
  - Evolution
- **Related Artifacts**

- **Processes**
  - Bottom-Up
  - Top-Down
  - Hybrid

- **Inputs**
  - Non-Architectural
  - Architectural
- **Styles**
- **Viewpoints**

- **Techniques**
  - Quasi-Manual
  - Semi-Automatic
  - Quasi-Automatic
- **Construction**
- **Abstraction**
- **Investigation**
- **Concepts**
- **Clustering**
- **Dominance**
- **Matrix**

- **Outputs**
  - Visual
  - Architecture
  - Conformance
  - Analysis
- **Horizontal**
- **Vertical**

- **Source Code**
- **Textual Information**
- **Dynamic Information**
- **Physical Organization**
- **Human Organization**
- **Historical Information**
- **Human Expertise**
- **Source Code**
- **Textual Information**
- **Dynamic Information**
- **Physical Organization**
- **Human Organization**
- **Historical Information**
- **Human Expertise**
- **Relational Queries**
- **Logic Queries**
- **Programs**
- **Lexical Queries**
- **Recognizers**
- **Graph Patterns**
- **State Engine**
- **Maps**
SAR LifeTime cycle and defined RE features

Processes

- Bottom-Up
- Hybrid
- Top-Down
SAR LifeTime cycle and defined RE features

Processes

- Bottom-Up
- Hybrid

Process choice (Hybrid)

: SAR points  : features
SAR LifeTime cycle and defined RE features

Inputs

- Source Code
- Textual Information
- Dynamic Information
- Physical Organization
- Human Organization
- Historical Information
- Human Expertise

- Styles
- Viewpoints

Architectural

Non-Architectural
SAR LifeTime cycle and defined RE features

Inputs

- Source Code
- Physical Organization
- Human expertise

Non-Architectural

Dependency Analysis
- Concrete data structure
- Concrete code structure
- Abstract data structure
- Abstract code structure

Data/Beh relationships provider
SAR LifeTime cycle and defined RE features

Inputs

Non-Architectural

- Source Code
- Physical Organization
- Human expertise

Concrete data structure
Concrete code structure
Abstract data structure
Abstract code structure

Dependency Analysis
Data/Beh relationships provider
SAR LifeTime cycle and defined RE features

**Inputs**

- **Non-Architectural**
  - Concrete data structure
  - Abstract data structure
  - Concrete code structure
  - Abstract code structure
  - Human expertise

- **Architectural**
  - Source Code
  - Physical Organization
  - Data/Beh relationships provider

**Dependency Analysis**
SAR LifeTime cycle and defined RE features

Inputs

Non-Architectural

Concrete data structure
Concrete code structure
Abstract data structure
Abstract code structure
Dependency Analysis
Data/Beh relationships provider

- Source Code
- Physical Organization
- Human expertise
SAR LifeTime cycle and defined RE features

Inputs

- Source Code
- Physical Organization
- Human expertise
- Concrete data structure
- Concrete code structure
- Abstract data structure
- Abstract code structure
- Data/Beh relationships provider
- Dependency Analysis
SAR LifeTime cycle and defined RE features

Inputs

Non-Architectural

- Source Code
- Physical Organization
- Data/Beh relationships provider
- Concrete data structure
- Concrete code structure
- Abstract data structure
- Abstract code structure
- Human expertise

Dependency Analysis
SAR LifeTime cycle and defined RE features

Techniques

- Quasi-Manual
- Semi-Automatic
- Quasi-Automatic
SAR LifeTime cycle and defined RE features

Techniques

Semi-Automatic

- Abstraction
- Relational Queries
- Logical Queries
- Lexical Queries

Search
SAR LifeTime cycle and defined RE features

Outputs

- Visual
- Architecture
- Analysis
- Conformance
SAR LifeTime cycle and defined RE features

Outputs

- Visual
- Conformance
- Source Code Visualisation
- Graphical Visualisation
- Rule creator and checker
SAR LifeTime cycle and defined RE features

Outputs

Visual

Conformance

Source Code Visualisation

Graphical Visualisation

Rule creator and checker
SAR LifeTime cycle and defined RE features

Outputs
- Visual
- Conformance

Source Code Visualisation
Graphical Visualisation
Rule creator and checker
SAR LifeTime cycle and defined RE features

Goals

- Re documentation
- Reuse
- Conformance
- Co-Evolution
- Analysis
- Evolution
- Related Artifacts
SAR LifeTime cycle and defined RE features

Goals

Co-Evolution

Abstract structure implementation
RE Tools and defined features

Understand

- Process choice
- Source Code Visu.
- Graphical Visu.
- Concrete Code Struct.
- Concrete Data Struct.
- Abstract Code Struct.
- Abstract Data Struct.
- Dependency Analysis
- Data/Beh. Relat. Prov.
- Search
- Rule Creator/Checker
- Abstract Struct. Impl.
- Open to user extension

Moose
RE Tools and defined features

- Obeo Agility
- Code Case
- Understand
- Moose
- Rigi

: defined Feature
Questions