Discovering Configuration and Architecture Scenarios

SATURN 2010
Agenda

- Define of Architecture and Configuration scenarios
- Discuss model to define Architecture and Configuration scenarios
- Data mining of Configuration scenarios KPI’s
- Conclusions
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A Model

1. Define Business Goals
2. Define Functional and Non-functional Requirements
3. Define Architectural Scenarios
4. Define Software Architecture Options
5. Verify Architecture Scenarios for each Architecture Option
6. Define Final Software Architecture

- Develop Software System
- Install and Configure Software System
- Monitor KPIs of Software
- Analyze Software KPIs Using Data Mining
- Do KPIs Conform with Architectural Scenario Thresholds?
  - Yes: Continue Monitoring KPI's
  - No: Define New Software Configuration Specifications

Store Data to be Used for Re-architecting Software System
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Define Business Goals

- Business goals are defined by system stakeholders.
- Example of business goals include:
  - Ensure the software system has “good” performance
  - The system must be scalable to accommodate customers requirements
  - The systems needs to have high level of usability
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Define Functional and Non-functional Requirements

- Define architectural functional requirements that define the primary functionality of the system are defined
- Define non-functional requirements that associate software qualities with architectural functional requirements
Define Architectural Scenarios

- Combining architectural functional requirements and non-functional requirements to define architectural scenarios used to define the software architecture
- Using the architecture scenarios develop architectural options for the software system
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Verify Architecture Scenarios for each Architecture Option

- For architectural options developed use architecture scenarios to test “best” architecture option
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Define Final Software Architecture

- Develop the final architecture option for the system
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Develop Software System

- Develop software system based on selected architecture
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Install and Configure Software System

- Install and configure software system at customer sites
By using sensors in the system, monitor key process indicators on installations
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Analyze Software KPIs

- Use data mining techniques to analyze and visualize KPIs stored in historian data repositories with respect to known system thresholds identified in architectural scenarios.
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Define if KPIs conform with Architectural Scenarios

- Determine if KPIs stored in historian data repositories are within known system thresholds identified in architectural scenarios
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Continue Monitoring KPIs

- If KPIs stored in historian data repositories are within known system thresholds identified in architectural scenarios continue monitoring software system

- Mine historical data at predetermined time periods
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Define New Configurations

- If KPIs stored in historian data repositories are not within known system thresholds identified in architectural scenarios define re-configuration strategy for the software system.
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Store Data for Future Use

- Store non-compliant KPIs for future use in re-architecture activities
- Continue monitoring system
Conclusions

- Configuration scenarios are a subset of architecture scenarios.
- Instrumenting software to collect KPIs associated with configuration scenarios is important to improve software configuration.
- Data mining techniques are an effective way to analyze configuration scenarios KPI’s.
- Mining configuration scenarios KPI’s can provide new knowledge discovery for the software system that can be employed for future re-architecture purposes.
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