

AUTOMATED WEB SERVICE CHANGE MANAGEMENT (AWSCM - A TOOL)

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This is a presentation of publication on IEEE CloudCom 2014

<http://doi.ieeecomputersociety.org/10.1109/CloudCom.2014.144>

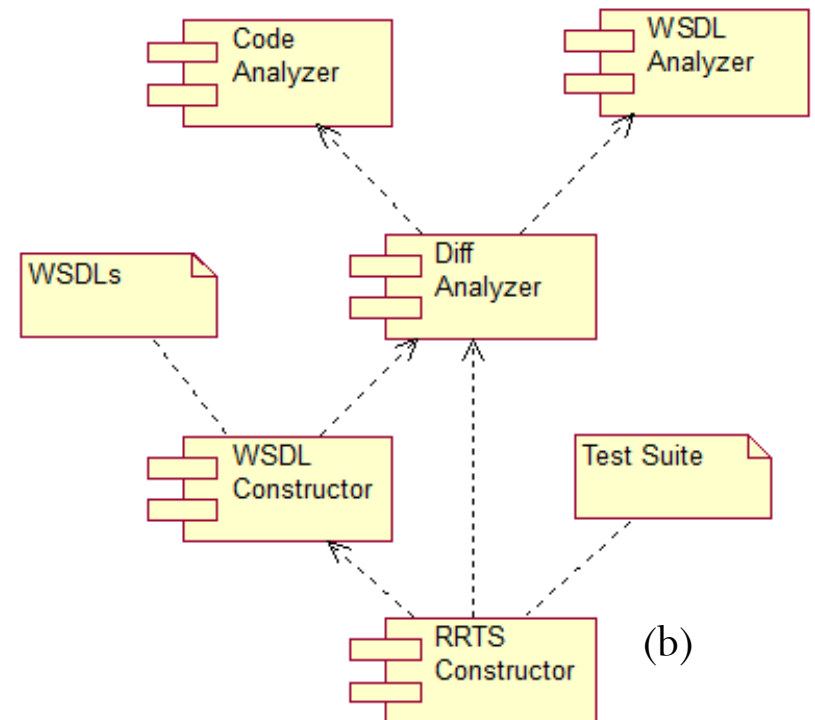
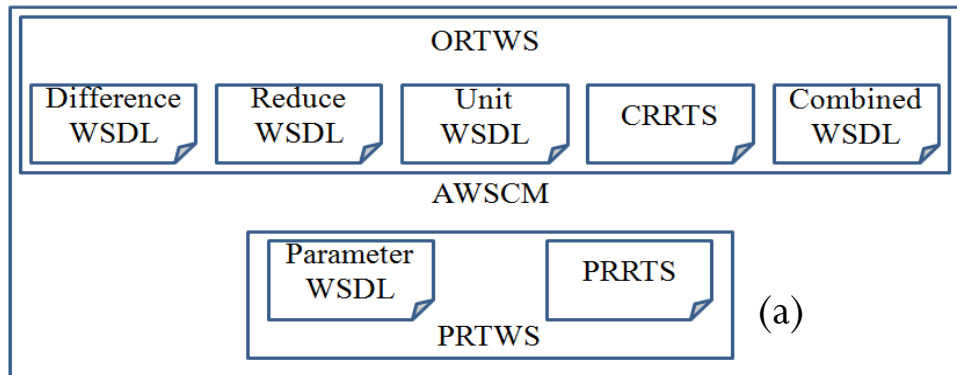
AWSCM <https://sites.google.com/site/animeshchaturvedi07/research/awscm>

Automated Web Service Change Management (AWSCM - A Tool)

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Introduction

- *Automated Web Service Change Management (AWSCM)* constructs *Subset WSDL* based on change impact analysis of WSDL and WS code.
- AWSCM visualize and capture changes in the form of intermediate artifacts during impact analysis, figure 1 (a) (b).

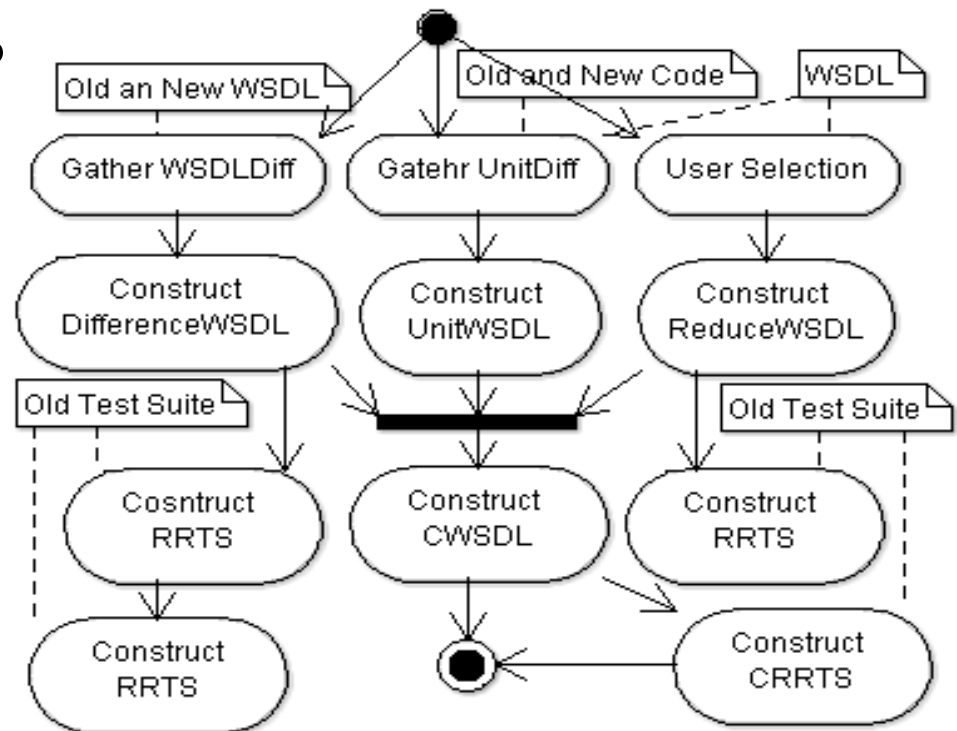


Introduction

- We have proposed two WS regression testing approaches, namely, *Operationalized Regression Testing of Web Service (ORTWS)* and *Parameterized Regression Testing of Web Service (PRTWS)* and prototyped them using AWSCM.
- AWSCM contains two modules for regression testing, namely, ORTWS and PRTWS.

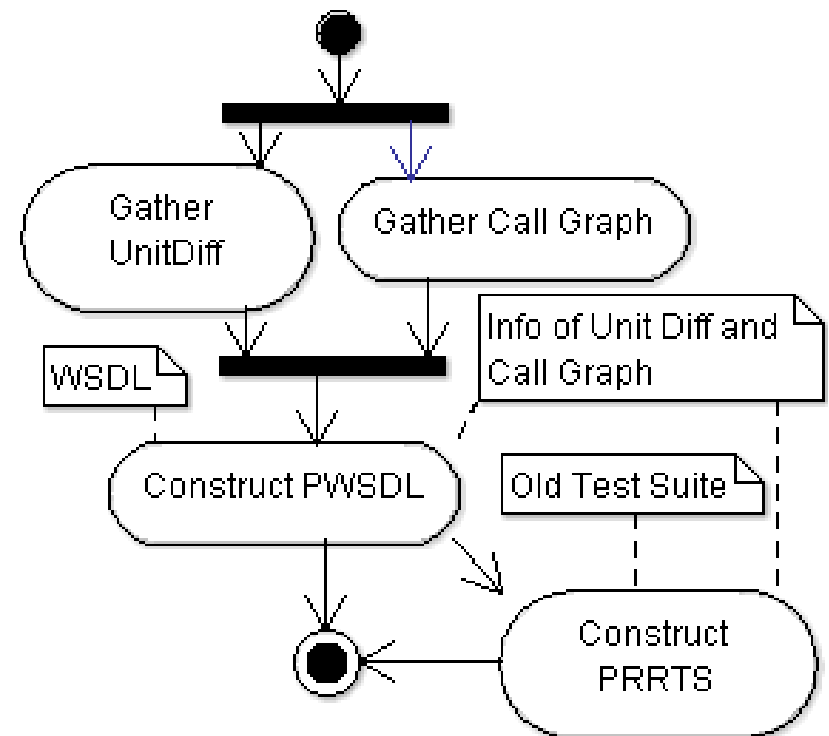
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- ORTWS module has three intermediate artifacts.
- Changes at WSDL are captured in Difference WSDL (DWSDL) and changes at code are captured in Unit WSDL (UWSDL).
- Additionally, selective re-testing using Reduced WSDL (RWSDL).
- These WSDLs combined to form Combined WSDL (CWSDL), which is used for the construction of Combined RRTS (CRRTS) as shown in the figure.



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- PRTWS module has the Parameter WSDL (PWSDL) as an intermediate artifact.
- Parameter WSDL is an extension of Unit WSDL for WS compositions and internal call interaction as shown in the figure.



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Algorithm inside ‘WSDL Constructor’

- (*D/U/R/P*)WSDLs are together termed as **Subset WSDL (SWSDL)**. The *SWSDL* further helps in accessing the **Subset Service**. Subset Service can be accessed in three ways **Difference Service, Reduce or Selective Service and Combined Service**.
- The *PWSDL* are constructed with the operations that are indirectly affected from changes such that their called methods or operations have undergone changes. Called operations can also be part of other WS i.e. this is also applicable in WS composition. Two inputs are required: ‘*newWSDL*’ and ‘*affectedOperations*’
- The *DWSDL* algorithm takes two inputs: new and old WSDL. The algorithm gathers operations that have undergone WSDL changes to construct *DWSDL*.

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Algorithm inside ‘WSDL Constructor’

- The *RWSDL* algorithm takes any WSDL as input to gather its operations and then ask the user to select operations. *RWSDL* gives us access to the *Reduce or Selective Service* i.e. selective operations of a Service.
- The *UWSDL* algorithm takes three inputs: new, old code of operations and new WSDL. *UWSDL* is constructed with the operations that have gone through changes at code. *PWSDL*, *DWSDL* and *UWSDL* gives access to the *Difference Service* i.e. difference or changes between the two Services.
- The *CWSDL* is constructed with the operations in one or more *Subset WSDLs* such that it contains only unique and non-redundant operations. *CWSDL* give access to the *Combined Service* i.e. combination of unique operations of Services.

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Algorithm inside ‘RRTS Constructor’ Component

- Reduce Regression Test Suite (RRTS) can be constructed from the old test suite only for the operations in a SWSDLs. RRTS is returned as output with test cases for only those operations of (D/U/R/C/P) WSDLs.
- Suppose, $WS = WS \text{ version } 1$, $WS^* = \text{Modified } WS \text{ version } 2$, $T\text{-old} = \text{Test Cases for the code of } WS$, $T\text{-new} = \text{Test Cases for the code of } WS^*$, $T^* = \text{Reduced test Cases}$, and $requiredOperations = \text{operations undergone changes}$.

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Algorithm inside 'RRTS Constructor' Component

→ *The procedure to construct RRTS is as follows*

1. $T^* = T\text{-old}$: Reduced test case initially has old test cases.
2. The declaration of operation is inserted, deleted, modified, and unmodified with their test cases.
3. If operation is deleted then delete its corresponding test cases (td).
4. If operation is inserted then add test cases (ti) template.
5. If operation is modified then add test cases (tm) with selective test sequences/steps according to changes.
6. $T^* = T^* - tu$ delete all remaining unused test cases (tu) which are already executed in the testing of previous version of WS.
7. Return the T^* (reduced test case) evaluated to be $T^* = ti + tm - td - tu$.

Application of AWSCM

Table 1. Case studies of ORTWS & PRTWS on Web services

Web service Project	CWSDL for ORTWS			PRTWS	
	DWSDL testing	RWSDL testing	UWSDL testing	Dynamic Black Box Testing	Static White Box Testing
Eucalyptus	Y*	Y*	Y*	X	Y*
SaaS	Y	Y	Y	Y	Y
BookService	Y	Y	Y	Y	Y
Amazon WS	Different versions of WSDL is not available	Y*	Code is not available	Y*	Code is not available
Bible WS		Y		Y	
Currency Conversion WS		Y		Y	
Weather WS		Y		Y	

Threat to validity because case studies is performed without the proper test data for Eucalyptus and AWS.

Application of AWSCM

→ AWSCM is just a prototype , an actual realization can be done when ORTWS and PRTWS is added as feature in the standard WS testing tools.

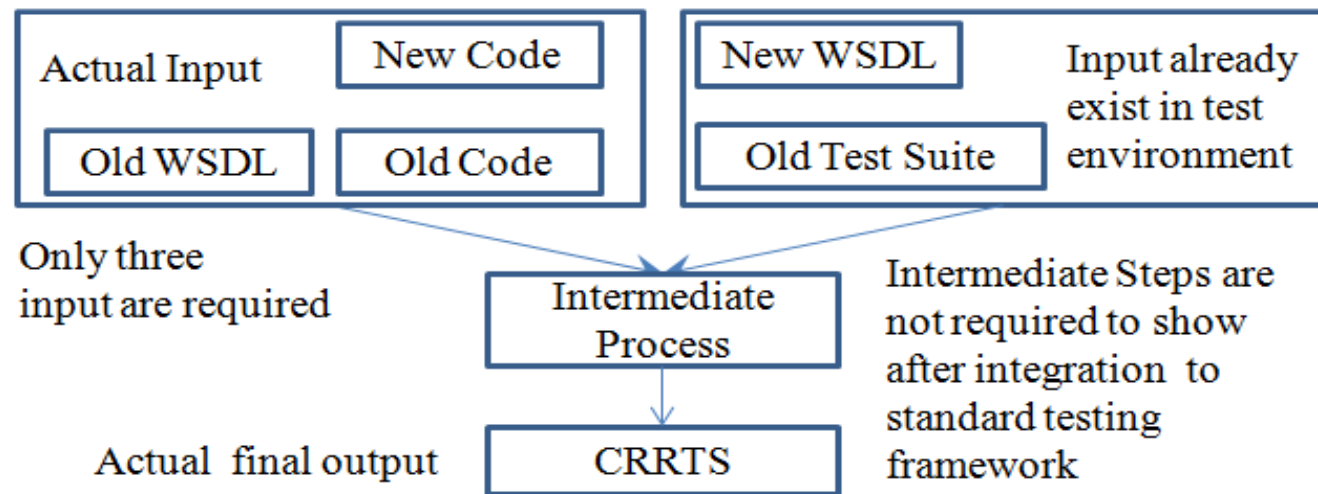


Fig. 4. AWSCM integration with SoapUI and JMeter.

Conclusion on AWSCM

- The paper gives insight on computation of change impact as well as mapping them to their test cases.
- Discussion on details of algorithm for the construction of reduce regression test suite.
- AWSCM can also be useful for top down development of web services using the subset operations in WSDL.

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Other Published Articles on AWSCM

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Hebrew

Gracias

Спасибо

Russian

Spanish

Thank You

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Arabic

Obrigado

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Merci

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ありがとうございました

Japanese

감사합니다

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