

VeriWS: A Tool for Verification of Combined Functional and Non-functional Requirements of Web Service Composition

Manman Chen¹ , Tian Huat Tan² ,
Jun Sun² , Yang Liu³ , Jin Song Dong¹

¹Singapore University of Technology and Design,

²National University of Singapore,

³Nanyang Technological University, Singapore

Service Oriented Architecture (SOA)

- Promotes the use of services as building blocks.
- Making use of open standards, like WSDL and SOAP.
- Interaction of heterogeneous applications.
- Lower cost of ownership for enterprise.



What is Service Composition?

Reuse of other services to achieve a business goal.

Service Composition

- **Composite service** – Made use of other services to achieve a business goal.
- **Component services** – Services made used by the composite service.

Requirements of Service Composition

- **Functional Requirements**

Requirements on its functionality

- **Non-functional Requirements**

Quality of service (QoS)

e.g., response time, availability

Main Features of VeriWS

- It supports verification on different kinds of combined functional and non-functional properties of Web service composition.
i.e., linear temporal logic (LTL) properties, reachability properties, and deadlock-freeness properties
- It supports the simulation of Web service composition models and provides the counterexample in WS-BPEL.

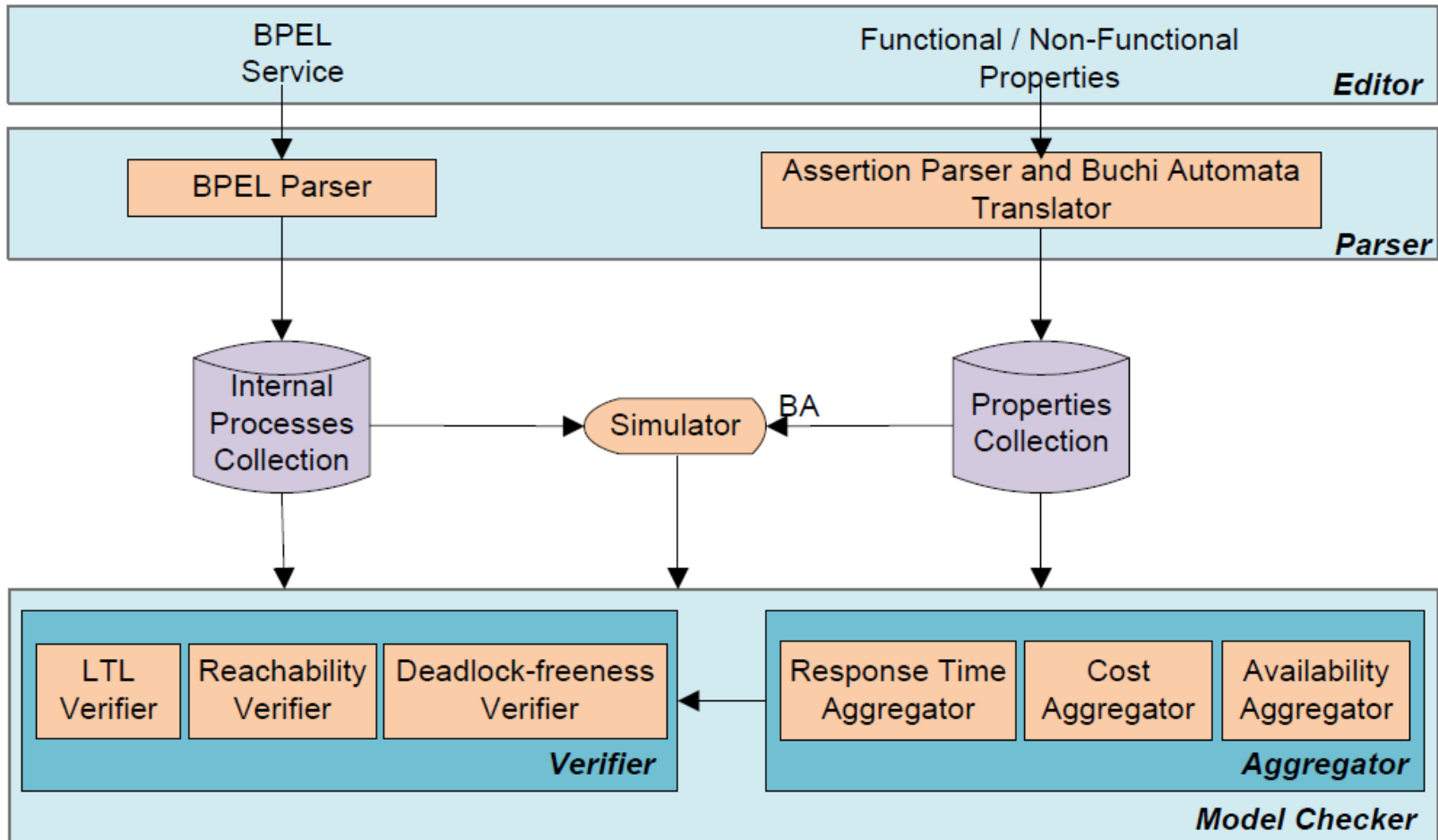
Our Contributions

Given the non-functional attributes of each component service, we provide a tool to verify combined functional and non-functional requirements of the composite service.

Comparison with Existing Tools

Tool	Requirement	Input	Intermediate
WSEngineer	Functional	BPEL	FSP
WSAT	Functional	BPEL	GFSA
VERBUS	Functional	BPEL	Prome la
WOMBAT	Functional	BPEL	Petri nets
AgFlow	Non-Functional	Statecharts	-----
VeriWS	Combined Functional and Non-	BPEL	-----

VeriWS Architecture



VeriWS Architecture

- **Aggregator**

Aggregate different QoS based on their aggregation functions.

- **Verifier**

Check combined functional and non-functional requirements.

- **Simulator**

Visualize the behaviors of a WSBPEL service in the form of a transition system.

Conclusion

We provide a tool **VeriWS**

- Check the satisfiability of combine functional and non-functional requirements of Web Service.
- Based on the semantics of BPEL directly.

Thank you!