DESIGN THE TOSCA OF CLOUD RESOURCES

¹SNEHAL V. RAUT, ²H. R. DESHMUKH

¹M E. Scholar, Department of Computer Science, Dr. Rajendra Gode Institute of Technology and Research, Amravati, India ²Professor & HOD, Department of Computer Science, Dr. Rajendra Gode Institute of Technology and Research, Amravati,

India

E-mail: ¹snehalraut5002@Yahoo.Com,

Abstract - With the advent of Cloud Computing, organizations are increasingly migrating their information and communication technology (ICT) resources to the cloud. Cloud computing is driving formidable change in the technology industry and transforming how to do business in around the world. [4] Using TOSCA, the cloud providers are able to define the interoperable description of services and their relationships, and to enable the portability and automated management across cloud platforms and infrastructures. However the verification of the cloud orchestration design with TOSCA is still crucial to ensure and alert when the safety properties of the cloud design are violated. In this paper, to proposed the formal verification of cloud resources design and also to describe the all the cloud resources.

I. INTRODUCTION

Topology and Orchestration Specification for Cloud Applications (TOSCA) [1] is a standard for cloud based web services design and the processes to manage them. TOSCA is developed and approved by the Organization for the Advancement of Structured Information Standard (OASIS). It helps construct agility and reduce restriction with responsibility in resource management. Using the TOSCA standard, the cloud service providers are capable of describing their cloud computing infrastructure and architecture and manage the implementation of the cloud resources. There are several cloud orchestration tools providing the automation of the deployment of implementation.



Figure 1: Structural elements of a service template and their relations [11]

II. LITERATURE REVIEW

Karn Yongsiriwit et. al. [1] proposed a semantic framework tackling this heterogeneity issue. We develop a set of ontologies to semantically represent cloud resources by looking at three cloud resource description standards: Topology and Orchestration Specification for Cloud Applications (TOSCA), Open Cloud Computing Interface (OCCI), and Cloud Infrastructure Management Interface (CIMI). Hence, our framework promotes the creation of a common semantic knowledge base of cloud resources described using these different standards. This knowledge base allows a seamless translation of cloud providers' resource descriptions. We developed an application to validate our approach as a proof of concept. We also evaluated the feasibility and completeness of our semantic framework on use cases obtained from standard specifications.

Warun Chareonsuk et. al. [2] proposed an alternative mean to do the formal verification of the cloud orchestration design by superimposing the relevant BPEL of web services over the existing TOSCA description of a cloud orchestration. The resulting formal model of the superimposition between BPEL and TOSCA defines not only the orchestration of the web services but also their service interfaces and the corresponding high level behaviors of the services. In this paper, the safety properties of the cloud orchestration are focused only and defined using the linear temporal logic formula. Our formal model is correctly written in Promela and formally verified using model checker SPIN.

Rawaa Qasha et. al. [3] shows how TOSCA, a new standard for cloud service management, can be used to systematically specify the components and life cycle management of scientific workflows by mapping the basic elements of a real workflow onto entities specified by TOSCA. Ultimately, this will enable workflow definitions that are portable across clouds, resulting in the greater reusability and reproducibility of workflows.

Beniamino Di Martino et. al. [4] this paper we propose an overview of two solutions for cloud services description and orchestration, TOSCA (Topology and Orchestration Specification for Cloud Applications) and HOT (Heat Orchestration Template), a comparison among these two solution and examples of how these two solutions correlate with cloud patterns.

Bisera Ivanovska et. al. [5] uses the P-TOSCA model for other issues that are also very important in virtualized datacenters and cloud computing, that is,

III. PROPOSED ALGORITHM

Algorithm

Step 1: Register user on cloud

Step 2: Fetch MAC address of user device and store against user details

- Step 3: Detect user choice to access the resources from cloud
- Step 4: Select resource uploaded to cloud by user

Step 5: Fetch attributes of resource

Step 6: Classify resource according to the attributed fetched by system

Step 7: Upload resource to cloud and record store in DB

Step 8: Configure TOSCA control panel by specifying resource selection criteria

Step 9: Fetch list of resources from cloud according to user choice and TOSCA control panel configuration.

Step 10: Maintain usage for resource for every user

Step 11: Report the usage and choice made by user

IV. RESULT ANALYSIS

• C • • • • • • • • • • • • • •	Using TOSCA	x +	d Features from USA.gov	
Cloid Using TOSCA	→ C' û	localhost:4450/tosca/login.aspx	••• 🛡 🏠 🔍 Search	III\ 🗊
LOSIN to Access Cloud Resources ↓ Username Password Password Cloud Using TOSCA Tegister to Access Cloud Resources Wername Register to Access Cloud Resources Register to Access Cloud Resources	Cloud Using T	DSCA		
LOGIN to Access Cloud Resources				
 ✓ Username Password □ogin New Registration Eigure 2: Home Page Using TOSCA × + •	L	OGIN to Access Cloud Resources	4	
Password	< Username			>
Eggin New Registration Figure 2: Home Page Leng 105CA	Password			
Figure 2: Home Page	Login New	Registration		
teing TOSCA x + → C û û locahost:4450/tosca/register.aspx … V û Q. Search Cloud Using TOSCA Cloud Using TOSCA Register to Access Cloud Resources K Username Password Confirm Password File Choice Smallupto 50MB) • MAC Address DE-AF-78-D0-2D-080CCAF-78		Figure 2	: Home Page	
Cloud Using TOSCA Cloud Using TOSCA Register to Access Cloud Resources Register to Access Cloud Re	I Using TOSCA	x +.		06
Cloud Using TOSCA	→ C' @	Iocalhost:4450/tosca/register.aspx	💟 🏠 🔍 Search	III\ E
Username Password Confirm Password File Choice Small(upto 50MB) MAC Address DE-AF-78-D0-2D-D9CC-AF-78	Regist	er to Access Cloud Resources		
Password Confirm Password File Choice Smailupto 50MB) • MAC Address DE-AF-78-D0-2D-D9CC-AF-71	< Username			>
Confirm Password File Choice Smallupto 50MB) • MAC Address DE-AF-78-D0-2D-D9CC-AF-71	Password			
File Choice Smail/upto 50MB) MAC Address DE-AF-78-00-20-09CC-AF-78	Confirm Password			
MAC Address DE-AF-78-D0-2D-D9CC-4F-71	File Choice	Small(upto 50MB)		
	MAC Address	DE-AF-78-D0-2D-D9CC-AF-78		
Register Login		Register Login		

Proceedings of 72nd IRF International Conference, Pune, India, 29th April, 2018

to enlarge/extend the energy efficient management system. A prototype application that dynamically creates a target virtual machine on utilized physical compute node, ports the application(s) from a virtual machine hosted on an underutilized physical server to the target virtual machine in Eucalyptus cloud is presented, which is specified with P-TOSCA. After migration, the prototype application will shut down the underutilized empty physical node.

									(D)(D)
€) → ଫ ŵ	(i) localhos	t:4450/tosca/resources.aspx			🖾	Q, Search			III 🖸
Cloud Using TOSC	6)			Home	Add Service	View Services	Delete Service	Logout	
Size MAC		Select Smatl(upto 50MB)	t Plan to View Resources						
	Clo	ud Resou Curr	rces Avail rent User	able f	or				

Figure 4: Resource available for User

-)→ ଫ 🍙	() localh	ost:4450/tosca/resource	es.aspx		🛛	✿ Q Search		
Cloud Using TOSCA	Α.				Home Add Service	View Services	Delete Service	Logou
			Select Plan to View	Resources				
Size		Small(upto 50/	(B)					
MAC								
merc		DE-AF-78-D0-2D-D	9CC-AF-78-D0-2D-D9					
mnu		DE-AF-78-D0-20-0	900-AF-78-D0-2D-D9	rces				
mine		DE-Ar-78-00-20-0	View Resour	rces				
mere.		DE-AF-78-00-20-0	View Resour	rces				
mac		DE-AF-78-00-20-0	View Resou	res				
nn.			View Resour	res Auroilad				
mu	Clo	oud Res	View Resour	Availat	ole for			
nn.	Clo	oud Res	View Resources	Availat	ole for			
	Clo	oud Res	Sources urrent	Availat User	ole for			
Re	C[(OUD Resource	Sources View Resou	Availat User	ole for			
Res	C [(OUD Resource	SOURCES View Resou	Availat User	DLE FOR			
Res 1 2	C [(OUD Resource aaa add.png	SOURCES View Resou SOURCES URCENT	Availat Jser	Type Small(upto 50MB) Small(upto 50MB)			
Res 1 2 3	C [(DEAF-78-D0-20-0 OUD Resource aaa add.png add.png	SOURCES View Resou SOURCES URCENT	Availat Jser 40.2255859375 40.2255859375	Type Small(upto 50MB) Small(upto 50MB) Small(upto 50MB)			
Res 1 2 3 6	C [(DEAF-78-D0-2D-D OUD Res Name of Resource aaa add.png pvc.pdf	SOURCES View Resou SOURCES URRENT Resource Owner 1 aaa aaa 0	Availat Jser 40.2255859375 40.2255859375 44.9921875	Type Small(upto 50MB) Small(upto 50MB) Small(upto 50MB) Small(upto 50MB) Small(upto 50MB)			
Rec 1 2 3 6 7	C [(Name of Resource aaa add.png pvc.pdf pvc.pidf	SOURCES View Resou View Resou Urrent Resource Owner 1 aaa aaa 0 0	Availat Jser 23 40.2255859375 40.2255859375 44.9921875 40.3115234375	Type Small(upto 50MB) Small(upto 50MB) Small(upto 50MB) Small(upto 50MB) Small(upto 50MB) Small(upto 50MB)			

Figure 5: To Show all Resources available for users

Design the Tosca of Cloud Resources

)→ ሮ @	③ localhost-4450/tosca/add_resource.asps		🛛	🗘 Q, Search		
Cloud Using TO	ISCA	Home	Add Service	View Services	Delete Service	Logout

Cloud Computing

Add Cloud R	esources For Current User
Select Resource	Browse No file selected.
Name of Resource	AlbumArtSmall.jpg
Owner of Resource	nn
Туре	Small
Size of Resource(in KB)	8.73828125
	Add Resource Clear

Figure 6: User can add resources to cloud

Cloud Using TOSCA)	< +										101	
← → œ @		() lo	calhost:4450/	tosca/repo	irt.aspx				🖸 🏠	Q, Search		III/	
	С	louc	l Res	Sour	rces U	tili	ization	n Report					
	C	louc	l Res	OUI Or (rces U Currer	tili nt l	izatior User	n Report					
	User 10	Resource 10	Res Usage Date	OUI Or (Usage Time	rces U Currer Resource Name	tili It l	ization User	1 Report					
	User 10 7	Resource 10	Usage Date	Usage Time 2:00 AM	rces U Currer Resource Name dot.pdf	tili It l Type Large	ization User size 271.9580078125	User MAC DE-AF-78-D0-2D- D9-CC-AF-78-D0-2D-D0	-				
	User ID 7	Resource 10 10	Usage Date 01/04/2018 01/04/2018	Usage Time 2:00 AM 2:15 AM	Resource Name dst.pdf pvcpipe[1].pdf	tili It l Type Large Small	zatior User 271.9580078125 40.3115234375	User MAC DE-AF-78-D0-2D- D9CC-AF-78-00-2D-00 D9CC-AF-78-00-2D-00 D9CC-AF-78-00-2D-00					
	User ID 7 7	Resource 10 10 7	Usage Date 01/04/2018 01/04/2018 01/04/2018	Usage Time 2:00 AM 2:15 AM 4:57 PM	Resource Name dst.pdf pvcpipe[1].pdf	tili Type Large Small	Zation User 271.9580078125 40.3115234375 40.3115234375	User MAC DE-AF-78-D0-2D- D9CC-AF-78-D0-2D- D9CC-AF-78-D0-2D- D9CC-AF-78-D0-2D- D9CC-AF-78-D0-2D- D9CC-AF-78-D0-2D-D0- D9CC-AF-78-D0-2D-D0-2D- D9CC-AF-78-D0-2D-D0-2D-					

Figure 6: To show the utilization report of cloud resource of current users

V. CLOUD APPLICATION DEPLOYMENT WITH TOSCA

A cloud application in TOSCA consists of a number of connected nodes called a service template. The nodes can represent horizontally distributed functions, vertical stacks of software/middleware dependencies or both. Nodes are the building blocks of a TOSCA cloud model, shaping the way an application is designed and the way in which imperative scripts are linked to applications and resources. You can visualize TOSCA templates as a series of connected stacks of nodes, each representing an application element.

CONCLUSION

In this paper, formal verification of cloud orchestration design is described and also presents the different services of TOSCA. Cloud Computing environment, ways to define machine readable standards for the description of Cloud services and their orchestration are highly desired features. The capability of application packaging which enables the reusability and portability of applications or part of them is an important prerequisite to obtain full benefits from Cloud Computing. With the cloud, resource pools can use virtualization to abstract away the heterogeneousness and regional distribution of manufacturing resources.

Efficient Cloud", IEEE, MIPRO,Opatija, Croatia, 25-29 May 2015.

- [6] Florian Haupt, Frank Leymann, Alexander Nowak, Sebastian Wagner, "Lego4TOSCA: Composable Building Blocks for Cloud Applications", IEEE, International Conference on Cloud Computing, 2014.
 - [7] Christos Tsigkanos, Timo Kehrer, "On Formalizing and Identifying Patterns in Cloud Workload Specifications", 13th Working IEEE/IFIP Conference on Software Architecture, 2016.
 - [8] Soheil Qanbari, Fei Li, and Schahram Dustda, "Toward Portable Cloud Manufacturing Services", IEEE Computer Society, November/DECEMBER 2014.
 - [9] Abdul Razaq, Huaglory Tianfield, Peter Barrie, Hong Yue, "Service Broker Based on Cloud Service Description Language", IEEE, 15th International Symposium on Parallel and Distributed Computing, 2016.
 - [10] Alexandru-Florian Antonescu, Philip Robinson, Torsten Braun, "Dynamic Topology Orchestration for Distributed Cloud-Based Applications", IEEE, Second Symposium on Network Cloud Computing and Applications, 2012
 - [11] Shin Nakajima, Lightweight formal analysis of Web service flows. In Progress in Informatics Journal, 2005.

REFERENCES

- Karn Yongsiriwit, Mohamed Sellami, Walid Gaaloul, "A Semantic Framework Supporting Cloud Resource Descriptions Interoperability", IEEE 9th International Conference on Cloud Computing, 2016.
- [2] Warun Chareonsuk, Wiwat Vatanawood, "Formal Verification of Cloud Orchestration Designwith TOSCA and BPEL", IEEE, 978-1-4673-9749-0/16/\$31.00, 2016.
- [3] Rawaa Qasha, Jacek Cała, Paul Watson, "Towards Automated Workflow Deployment in the Cloud using TOSCA", IEEE, 8th International Conference on Cloud Computing, 2015.
- [4] Beniamino Di Martino, Giuseppina Cretella, Antonio Esposito, "Defining Cloud Services Workflow: a Comparison between TOSCA and OpenStack Hot", IEEE, Ninth International Conference on Complex, Intelligent, and Software Intensive Systems, 2015.
- [5] Bisera Ivanovska, Sasko Ristov, Magdalena Kostoska, Marjan Gusev, "Using the P-TOSCA Model for Energy

 $\star\star\star$