



WETICE 2009

18th IEEE International Workshops on
Enabling Technologies: Infrastructures
for Collaborative Enterprises

June 29 - July 1, 2009, Groningen (The Netherlands)

Summary of the 1st IEEE International Workshop on Collaboration and Cloud Computing

The first IEEE International Workshop on Collaboration & Cloud Computing sponsored by WETICE 2009 (Workshops on Enabling Technologies: Infrastructures for Collaborative Enterprises) was held in the 395 year old university of Groningen in Netherlands. About 30 participants represented various universities and industry R&D organizations from USA, Europe, Asia and African continents. The purpose of the workshop was to:

1. Discuss a long term research agenda that analyzes current trends in Cloud Computing and proposes new research themes,
2. Collaborate in future research efforts and
3. Create a long term research direction that is not constrained by short term profit driven motives¹

Current drive to migrate from server centric computing architecture to a totally network centric computing architecture with logical computing resources that can be assembled from a group of distributed resources on demand, offers a fresh opportunity to rethink the architecture and optimize end-to-end business services creation, delivery and assurance.

The conference started with an overview of the state-of-the-art and a proposal for cloud services engineering discipline in the keynote speech from Prof. Stefan Tai. "We argue that the tremendous potential of Clouds lies in making effective use of Clouds as a distributed computing model in a business

¹ In recent years, both Venture Capital funded projects and University research efforts have gravitated towards short term returns. While in the past institutions like AT&T Bell Labs, IBM Watson Research etc carried out long term research that invented the transistor and the Laser, during the past two decades such institutions were dismantled by the market forces. Fortunately, the IEEE forums still provide a venue for longer horizon ideas.

context, and that therefore the development of Cloud services must incorporate valuation in terms of business criteria. Further, a rich ecosystem of Cloud services (and corresponding providers and consumers) exists, which forms a highly dynamic environment to develop, test, deploy and operate Cloud services. Compositions and configurations of select Cloud services for business purposes constitute a service-oriented business value network (SVN)”.

The CCC session started with opening remarks from the Chair observing that the computing cloud evolution depends on research efforts from the infrastructure providers creating next generation hardware that is service friendly, service infrastructure developers that embed business service intelligence in the network to create distributed business workflow execution services and service providers who assure service delivery on a massive scale with global interoperability. Current architecture and evolution of the cloud is increasing complexity by piling up layers of management over layers.

Nine papers discussed various aspects of present and future cloud computing directions and Jim Baty from SUN presented a talk on cloud service creation and role of patterns.

A lively discussion followed on the evolution of clouds:

1. Is the cloud just an XaaS stack or is there more to it?²
2. Is unified computing just throwing servers, network and storage in blades?³
3. Are lessons from the past from telecommunications and the Internet relevant to clouds to provide massive scalability and global interoperability?⁴
4. How can infrastructure hardware vendors accelerate the cloud deployment by including service enabling features⁵
5. Is the current trend in throwing multiple OSs inside the server and include another networking abstraction layer bridging these OSs the right model or should we look for a new network

² Current cloud reference models discuss infrastructure as a service, software platform as a service, and software as a service as a stack that various providers make available to consumers of these services on demand and pay per use. However, these services are often not integrated and not interoperable leading to vendor lock-in. Discussion centered on the need for better solution that provides service provider independence, global interoperability and telecom grade “trust” with respect to availability, performance and security.

³ Question was raised whether the current silo based server, network and storage management cost structure will be improved with bringing server, network and storage blades closer in a unified computing architecture. Major cost of ownership today is in addressing end-to-end application to spindle Quality of Service and current individual server, network and storage silo optimization does not address end-to-end optimization

⁴ There is a perception that telecommunication network management and service architectures are quite different from IP network and service architecture. However some old-timers point that the FCAPS management concepts are relevant in implementing both business services and cloud infrastructure services management. It was also pointed out that current generation of VCs, technologists and academicians have no knowledge of the telecommunications history and the lessons that are relevant to computing clouds.

⁵ Current server virtualization is attempting to arbitrate the access to the underlying hardware, so that guest OSes can share the same machine. Some question whether this is the optimal way to utilize the next generation multi-cpu and multi-core servers. Should we look at a different OS strategy that allocates CPU, I/O and bandwidth dynamically to specific tasks in a workflow based on latency constraints imposed on the task from business workflow and priority considerations.

centric operating system that allows dynamic composition of distributed physical computing resources based on latency tolerance of services consuming the logical resources?

6. Can we accelerate the gathering of Computing Clouds by nucleating fresh ideas to create the virtual infrastructure fabric, the management services fabric and the business services fabric?⁶
7. Will the current vendors with vested interest in selling more and more sticky software and services to customers for generating recurring revenue participate in reducing complexity and eliminating current silo management product suites⁷

The papers and the discussion have evolved into a suggestion for future research in the following Areas:

1. Hardware assistance to dynamically compose computing, network and storage resources to create logical resource pools that meet service requirements of the resource consumers such as latency tolerance, response time, throughput, bandwidth etc.
2. An operating system that allows the composition of logical resources dynamically by matching the hardware infrastructure capabilities and the resource consumer profiles
3. A service creation infrastructure that allows composition and assembly of logical resources to create business workflows and
4. A service management fabric that also is an assembly of logical resources to assure service delivery

These themes will be carried into the future for further analysis and research. The 2nd International IEEE Workshop sponsored by WETICE2010 will convene at the Technological Education Institute of Larissa, Greece to examine the progress. The theme for the 2nd Workshop will be amended to:

“Collaboration in Computing Clouds⁸” and will address:

⁶ A new reference model that discusses a virtual computing fabric, a management services fabric and a business services fabric was introduced in a paper presented at the conference. This emphasizes the dynamism that virtualization presents in dialing up-and dialing-down of CPU, memory, bandwidth, throughput, I/O etc based on response time and latency constraints of services utilizing the resources.

⁷ Current server, network and storage vendors are motivated in generating recurring revenues with their software and service solutions and it was pointed out that it was not in their best interest to develop simplifying solutions that eliminate current management intensive products such as SAN. This was compared to the Cobol programming environment in the late 80s when there was a huge resistance to move to newer approaches with object technology. Vendors and consultants always invoked the number of lines of Cobol code that exists as a point to why a transition will be very difficult. However today, the number of new lines of Cobol code is almost zero. It was also pointed out that the complexity of databases today is leading the new cloud providers such as Google and Amazon to embrace simpler database implementations. Is it possible that a similar transition will occur from SANs and current server centric Operating Systems to a simpler network centric OS and simpler service management strategies?

⁸ The key attribute of a computing cloud is the elasticity of the computing, network and storage resources through dynamic provisioning. The granularity with which these resources can be dialed up and dialed down will determine the nature of the computing cloud and the value it adds to the agility and manageability of the services that can be composed and delivered using the cloud. A computing cloud allows physical resources to be composed into logical resources that fulfill the requirements that the service demands such as response time, latency tolerance, level of persistence, availability, security etc.

1. Service enabling hardware infrastructure for Computing Clouds focusing on next generation storage, server and networking hardware whose resources can be dynamically FCAPS managed
2. Network centric computing and associated operating systems that allow logical resource composition from physical resources on-the-fly
3. Service management fabric in and among the Computing Clouds which will assure on-demand service assurance to both service developers and users
4. Business Services Fabric – How to implement distributed business services and workflows with telecom grade availability, performance and security and
5. Services metering

The presentations from the 2009 workshop are posted at www.workshop.kawaobjects.com

2nd International IEEE Workshop on

Collaboration in Computing Clouds

Details

Venue : Larissa, Greece

Host : Technological Education Institute of Larissa

Conference Dates : June 2010

Organizer : The Institute of Electrical and Electronics Engineers
(IEEE)

Language : English