Cloud computing over Singapore

By

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Status

- Dec 2008 - Submission of whitepaper
- Feb 2009 – Shortlisted for full submission
- 30 March 2009 – Submission of Full proposal

Members of CRP proposal

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- Bharadwaj Veeravalli (Lead Co-PI), Associate Professor, National University of Singapore
- Soh Yeng Chai (Co-PI), Professor, Nanyang Technological University
- Kuo Jer-lai (Co-PI), Assistant Professor, Nanyang Technological University
- Lim Hock Beng (Co-PI)Program Director, Intelligent System Center, Nanyang Technological University
- Tan Kian Lee (Co-PI),Professor, National University of Singapore
- Teo Yong Meng (Co-PI),Associate Professor, National University of Singapore
- Yap Hock Chuan Roland (Co-PI), Associate Professor, National University of Singapore
- Ma Dan (Co-PI), Assistant Professor, Singapore Management University

The promise of Cloud Computing

- "*Cloud computing is the next wave of computing and the internet*." by S. Ballmer, CEO of Microsoft.
- "*The technology industry is in the early stages of a big shift — one that will transform how we access information, share content, and communicate. This next wave will be driven by a new model of computing: Instead of installing packaged software applications on their computers, people and businesses will use their web browsers to access a wide range of "cloud services" available on-demand over the Internet*." By S. Robison, Executive VP, Chief Strategy and Technology Officer, HP.

Merrill Lynch analyst estimated that it is US$100 billion business ("The Cloud Wars: $100+ billion at stake" on 7 May 2008).

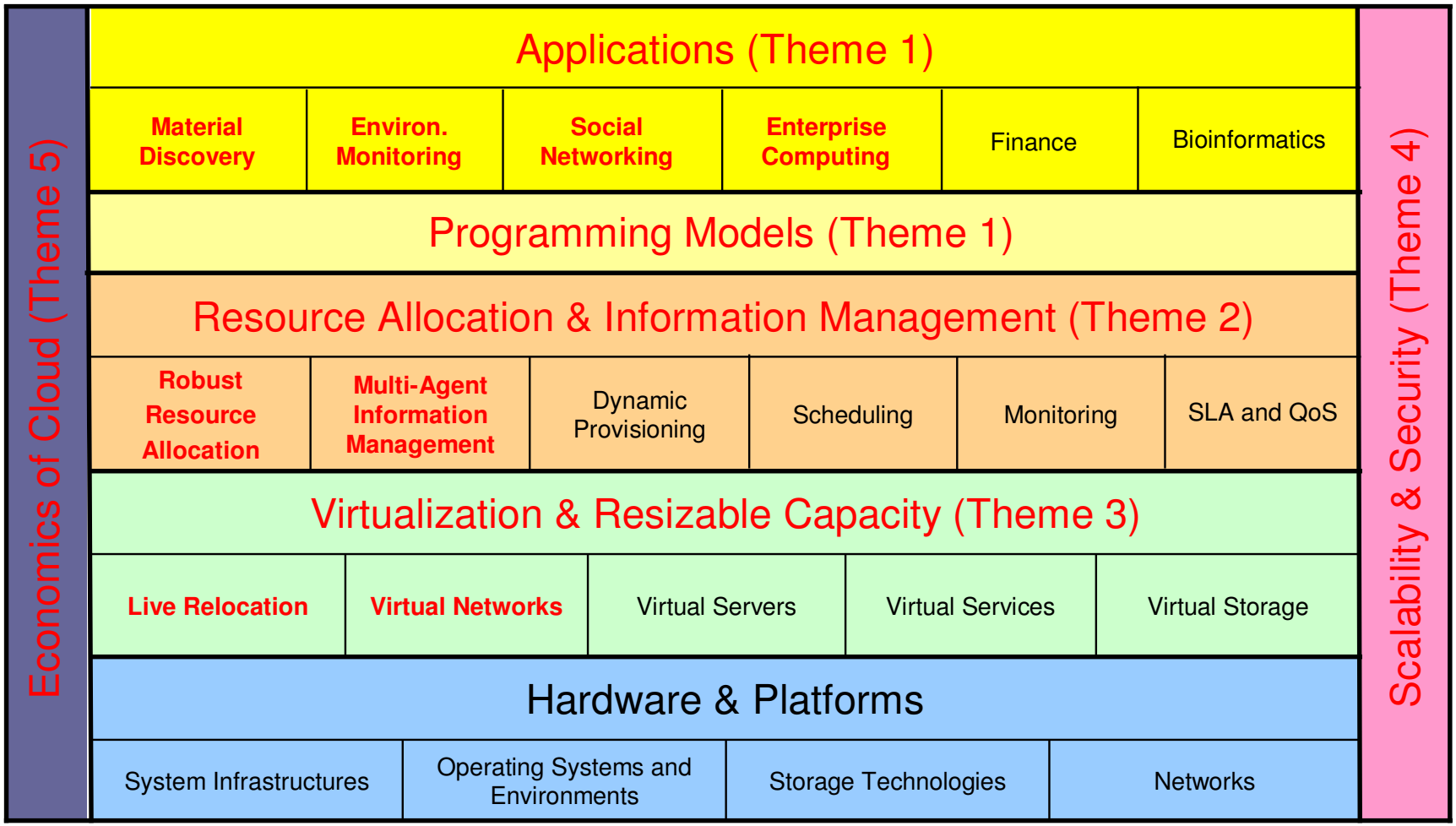
Mission

- The ***mission*** of this proposed program is to ***render a Compute-Anywhere Cloud infrastructure*** for advancing the business, social computing and scientific needs in Singapore.

Objectives

- To design a Cloud Computing reference architecture and solutions to issues at several layers of the architecture;
- To design and develop scalable, flexible, and dependable frameworks for delivering Cloud Services;
- To design novel programming models and allied software tools adhering to service oriented nature of CCI;
- To design novel algorithms, models, and methodologies that accommodate business, social and scientific applications as services;
- To understand the implications and to conduct empirical and analytical economic value analysis on the proposed CCI;
- To train adequate manpower in Cloud Computing and Services in Singapore

Framework


Economics of Cloud (Theme 5)
Applications (Theme 1)
Material Discovery
Environ. Monitoring
Social Networking
Enterprise Computing
Finance
Bioinformatics
Programming Models (Theme 1)
Resource Allocation & Information Management (Theme 2)
Robust Resource Allocation
Multi-Agent Information Management
Dynamic Provisioning
Scheduling
Monitoring
SLA and QoS
Virtualization & Resizable Capacity (Theme 3)
Live Relocation
Virtual Networks
Virtual Servers
Virtual Services
Virtual Storage
Hardware & Platforms
System Infrastructures
Operating Systems and Environments
Storage Technologies
Networks
Scalability & Security (Theme 4)

Theme 1: Programming models and applications (Lim Hock Beng, Kuo Jer Lai)

This theme focus on the design and development of new programming models and several important cloud computing applications.

- Semantic-based programming model
- Applications: Scientific, social networking and enterprise computing domains

Theme 2: Resource Allocation and Information Management

(Bharadwaj Veeravalli , Soh Yeng Chai)

This theme aim to provide resources in a transparent manner via designing robust allocation strategies and evaluate their performances.

- Robust Resource Allocation
- Multi-Agent Information Management

Theme 3: Virtualization & Resizable Capacity
(Teo Yong Meng , Bu-Sung Lee)

- This theme leverages on virtualization to address the important issue of resizable capacity by exploiting both server and network capacities to achieve greater scalability.
  - **Live Relocation**
  - **Virtual Networks**

Theme 4: Scalability and Security
(Tan Kian Lee, Roland Yap)

- This theme will focus on the selected applications (some are discussed in Theme 1) and address scalability from three different aspects, namely the number of nodes, the size of the data and the number of concurrent tasks from a higher level perspective.

Theme 5: Economics of Cloud
(Ma Dan)

- This theme aims to conduct empirical and analytical economic value analysis on the proposed CCI. As important as all technique solutions, right economic incentive serves to "convince" both supply and demand sides of the advantages of the cloud service business model, and hence eventually makes it a feasible IT option in practice.

Related Cloud projects

- RESERVIOR : Build a Cloud computing infrastructure focus on Business services.
- CLuE : Develop application on top of IBM Cloud infrastructure.
- Cirrus Cloud test-bed : Yahoo, Intel, HP, Karlshure, UIUC,IDA to create a Cloud test-bed.*

Strength of CRP

- A balanced of scientific application with system development.
- Involvement of economic factors
- Close working with IDA to build up the Cloud community, especially with the SME

Q & A