

Project Name: Technical Review of Using Cloud for Research
 Version: 0.b
 Contact: Gary Will (gbw@ecs.soton.ac.uk)
 Date:20/12/2009



Project Plan

Project Information			
Project Name	Technical Review of Using Cloud for Research		
Start Date	16 November 2009	End Date	15 May 2010
B udget	£59,928		
Lead Institution	University of Southampton		
Project Director	Dr Gary Wills		
Project Manager & contact details	Dr Gary Wills Learning Societies Lab School of Electronics and computer Science University of Southampton SO17 IBJ		
Partner Institutions	As consultants: University of Warwick, Eucalyptus Ltd. and SAP CEC		
Project Web URL			
Programme Name	Research Infrastructure		
Programme Manager	James Farnhill		
Document Name			
Document Filename	<i>Using Cloud for Research (Technical Review)</i>		
Author(s) & project role			
Date	19/11/2009	Filename	Short Project Plan.doc
URL	<i>if document is posted on project web site</i>		
Access	<input checked="" type="checkbox"/> Project and JISC internal		<input type="checkbox"/> General dissemination
Document History			
Version	Date	Comments	
0.a	19/11/2009	Initial draft	
0.b	20/12/2009	Minor changes after feedback from JISC	

Overview of Project

1. Background

There is a rapidly increasing range of research activities which involve the outsourcing of computing and storage resources to public cloud providers, who provide managed and scalable resources virtualised as a single service. Amazon Elastic Computing Cloud (EC2) and Simple Storage Service (S3) are two widely adopted open cloud solutions, which aim at providing pooled computing and storage services and which charge users according to their weighted resource usage. Early cloud initiators focused on resource provision at infrastructure level, also known as Infrastructure as a Service (IaaS) cloud, and did not allow implementation of advanced features until the emergence of the platform cloud, which offered full software stacks and enabled multiple applications to share a single development and hosting environment. Platform cloud providers such as Google Application Engine and Microsoft Azure service normally provide a dedicated Software Development Kit (SDK) and hosting environment, making it hard to migrate applications developed on one cloud platform to the other, although attempts have been undertaken to extend generic programming models utilising cloud capabilities. Rather than using third-party cloud services, researchers in the UK have shown great interest in developing custom cloud solutions from existing IT infrastructure. One of the first UK private clouds was set up by the St. Andrews Cloud Computing Initiative (StACC) in summer 2009, based upon 'Elastic Utility Computing Architecture Linking Your Programs To Useful Systems' (EUCALYPTUS), an open source software that enables the creation of private computing clouds on premise and hybrid clouds allowing these on-premise clouds to interact with public clouds through Amazon Web Service (AWS) interfaces. In order to ensure the interoperability of development tools and applications across cloud infrastructures, the Open Cloud Computing Interface (OCCI) working group was founded in April 2009 by Open Grid Forum (OGF) to deliver standard APIs for management of cloud computing infrastructure.

2. Aims and Objectives

The objectives of this project include:

- capturing the current landscape of computing and storage cloud usage as an infrastructure service within UK research communities;
- assessing requirements and state-of-the-art technical solutions;
- providing guidance on the use, adoption and migration to cloud computing for research;
- and recommending further development and standardisation efforts to JISC.

3. Overall Approach

The project proposed to combine expert consultancy and desk research approaches. The project starts in a close collaboration with "using cloud for research" group for project management, stakeholder analysis and use case gathering from HE institutions and research departments while paying more attentions on technical requirements and issues. Our project team is also intended to attend incoming research conferences and, or organise where necessary, workshops to enrich our understanding of technical requirements, challenges, available solutions and ongoing technical research activities. Continuous desk research will be going on for information consolidation, reviewing available and emerging standards, and technical prototyping. Paid expert consultancy will take place to hunt professional solutions to identified technical requirements and issues. Finally we will provide guidance and best practices for adoption of existing cloud technologies for future HE researchers, as well as recommendations to JISC for open technical issues and standard tasks where applicable.

4. Project Outputs

During the execution of this review projects, there are a list of deliverables:

- D1 – A details project plan
- D2 – An interim report
- D3 – A Guide to Using Cloud for Research Application Development
- D4 – A Technical Guide to Producing Cloud Facilities for Research
- D5 – Final report

5. Project Outcomes

The project targets at producing following outcomes:

- understanding technical requirements and how solutions can be used in research for infrastructure cloud;
- guidance on use, adoption, and migration to cloud computing by applying existing cloud technologies for researches in UK HE.
- recommendations to JISC for future technical work on the use of cloud computing in UK HE.

6. Stakeholder Analysis

Stakeholder	Interest / stake	Importance
JISC	Funder/recipient of recommendations for future work	Medium
CETIS	Guidance can influence advice provided by CETIS	High
Janet UK	Guidance can influence Janet UK investigation into providing a UK HE cloud	High
Researchers	Guidance could help researchers to carry out high performance and cost-effective research by using clouds.	High
HE Information System/ research computing services	Guidance could facilitate them in providing cloud facilities for researchers.	High
Commercial cloud vendors	Guidance could help them effectively target the HE market	Medium

7. Risk Analysis

Risk	Probability (1-5)	Severity (1-5)	Score (P x S)	Action to Prevent/Manage Risk
Schedule Slippage	3	2	6	Careful management on tasks, milestones, and deadlines, and communication with the JISC programme management team on options and adjustments for change as might be desired.
Lack of institutional involvement	1	4	4	The institutions which are expected to participate in the case studies and surveys are represented on the Project Team and on the panel of expert consultants, and it is expected that this will lead to their full cooperation and involvement.
Loss of key personnel	1	3	3	The School of ECS and the University of Southampton to this project, as evidenced by accompanying letter of support, guarantees that in this event alternative personnel will be engaged at the earliest opportunity.
Loss of expert consultants	1	1	1	Agreements have been received from the expert consultants who are only eligible to be paid after completion of consultancy.

8. Standards

The project will review emerging cloud-related specification from both research and industry standard organisations as listed in the table below.

Name of standard or specification	Version	Notes
DMTF Open Virtual Format specification	1.0.0	an open standard for packaging and distributing virtual appliances or more generally software to be run in virtual machines
DMTF Common Information Schema	2.23.0	CIM provides a common definition of management information for systems, networks, applications and services, and allows for vendor extensions. CIM's common definitions enable vendors to exchange semantically rich management information between systems throughout the network.
OASIS XML Access Control Markup Language	2.0	The specification defines a standard XML schema for representing authorisation and entitlement policies.
OASIS Security Assertion Markup Language	2.0	This specification defines the syntax and semantics for XML-encoded assertions about authentication, attributes, and authorization, and for the protocols that convey this information.
OASIS Web Services Distributed Management	1.0	This specification defines a Web service architecture for distributed resource management.
OGF Web service agreement specification	1.0	The SLA specification is potentially used for QoS driven resource allocation and planning
OGF Open Cloud Computing Interface Specification	1.0	It describes a slim and extensible Interface for Infrastructre as a Service (IaaS) model based Clouds.

9. Technical Development

This project will involve limited technical development on architectural prototyping to demonstrate some aspects of the report.

10. Intellectual Property Rights

The University of Southampton will retain the IPR associated with the project. All project or service outputs will be made available free of charge and in perpetuity within the further and higher education sector and in accordance with JISC's Open Access Policy. Permission is granted to HEFCE to freely exploit the outputs under a Creative Commons Attribution Non Commercial No Derivative Licence 2.0 UK: England and Wales. The University of Southampton will ensure that they have permission to use all third party copyright and other IPR prior to digitisation or incorporation into any outputs and take all necessary measures to try and trace rights holders which will include documentation of their efforts.

Project Resources

11. Project Partners

The project is collaborating with a number of professional and commercial cloud providers, in particular University of Warwick, Eucalyptus Ltd. and SAP CEC. They will be acting as consultants on the project.

12. Project Management

The project will be run in line with the advice and guidance in the JISC Project Management handbook. Key members of the team are:

- Dr. Gary Wills – project manager;
- Mr. Lester Gilbert – will conduct and synthesise research as required;
- Dr. Xiaoyu Chen – primary technical investigator;
- Dr. David Bacigalupo – consultant technical

13. Programme Support

Timely completion of this review is subject to the following dependencies on JISC: timely award of contract (assumed before 16 November); timely provision of any documentation that is required in order to support this work; support for proposed activities, in particular venues for workshops; and, timely review of the final outputs by relevant stakeholders (two weeks scheduled).

14. Budget

Directly Incurred Staff	November 09 – May 10	TOTAL £
Total Directly Incurred Staff (A)	£15,198	£15,198
Non-Staff	August 08– July 09	TOTAL £
Travel and expenses	£6,760	£6,760
Commissioned Work	£13,172	£13,172
Hardware/software	£	£
Dissemination	£1,000	£1,000
Evaluation	£	£
Other	£	£
Total Directly Incurred Non-Staff (B)	£20,932	£20,932
Directly Incurred Total (A+B=C) (C)	£36,130	£36,130
Directly Allocated	August 08– July 09	TOTAL £
Staff	£9,260	£9,260
Estates	£8,108	£8,108
Other	£	£
Directly Allocated Total (D)	£17,368	£17,368

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Indirect Costs (E)	£21,412	£21,412
Total Project Cost (C+D+E)	£74,910	£74,910
Amount Requested from JISC	£59,928	£59,928
Institutional Contributions	£14,982	£14,982
Percentage Contributions over the life of the project	JISC 80%	Total 100%

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Detailed Project Planning

15. Workpackages

[NOTE: the Gantt Chart and project planning is moderately modified to accommodate coordination with other two projects in particular during use case reviews]

WORKPACKAGES	November			December				January				February				March					April				May	
	16	23	30	7	14	21	28	4	11	18	25	1	8	15	22	1	8	15	22	29	5	12	19	26	3	10
WP1																										
WP2																										
WP3																										
WP4																										

	Start	Finish		Milestone	Responsibility
WORKPACKAGE 1: Project Planning and Technical Requirement Analysis <u>Objective:</u> Identify technical challenges learned from case study	16/11/09	08/01/10			
1. Project Kickoff meeting	17/11/09				GW
2. Stakeholder analysis	16/11/09	27/11/09			DB
3. Project Plan (D1)	16/11/09	27/11/09		Yes	XC
4. Literature Review	16/11/09	08/01/10			XC,DB
5. Researcher Use Cases & Requirements	30/11/09	08/01/10			XC, DB

6. ISS Use Cases & Requirements	30/11/09	08/01/10			XC, DB
7. Research Computing Service Use Cases & Requirements	30/11/09	08/01/10			XC, DB
WORKPACKAGE 2: Applicable Solutions and Standards <u>Objective:</u> Identify available solutions and standardisation efforts from cloud providers and standards bodies.	08/01/10	12/02/10			
8. Consult academic cloud providers	08/01/10	29/01/10			XC, DB
9. Consult commercial vendors	08/01/10	29/01/10			XC, DB
10. Consult international standard bodies	08/01/10	29/01/10			XC, DB
11. Architectural prototyping	01/02/10	05/02/10			XC, DB
12. Interim Report (D2)	08/01/10	19/02/10	Interim Report	Yes	XC, DB, GW, LG
WORKPACKAGE 3: Assessment and Guidance Development <u>Objective:</u> Deliver guidance for both research providers and researchers based on consolidated assessments on collected solutions.	22/02/10	03/04/10			
13. Technical Assessment (functional aspects)	22/02/10	12/03/10			XC, DB
14. Technical Assessment (non-functional aspects)	22/02/10	12/03/10			XC, DB
15. Guidance development for using Cloud for research application development and debugging (D3)	15/03/10	03/04/10	Guidance for developing Cloud for research application	Yes	XC, DB
16. Guidance for development Cloud facilities for research (D4)	15/03/10	03/04/10	Guidance for using Cloud for research application	Yes	XC, DB

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WORKPACKAGE 4: Recommendation and Final Report					
Objective: Deliver final report with prioritised recommendations.	05/04/10	15/05/10			
17. Recommendation development and prioritisation	05/04/10	10/04/10			XC, DB
18. Review guidance drafts	05/04/10	10/04/10			GW, LG
19. Compose draft final report	12/04/10	23/04/10			XC, DB
20. Review and amend final report	26/04/10	14/05/10			GW, LG
21. Release final report and guidance outputs		15/05/10	Final Report	Yes	XC, DB, GW, LG

16. Evaluation Plan

Timing	Factor to Evaluate	Questions to Address	Method(s)	Measure of Success
Over project	Applicability to target community	Does the guidance and advice meet researchers', Information system, research computing service needs?	Consultation with stakeholder groups and expert consultants.	Positive feedback from groups. Takeup of advices on guidance on completion of project.

17. Quality Plan

Output					
Timing	Quality criteria	QA method(s)	Evidence of compliance	Quality responsibilities	Quality tools (if applicable)
AS produced	Spelling and grammar	MS Word spelling checkers and review by PM	No errors on MS Word	Lester Gilbert	MS Word

18. Dissemination Plan

Timing	Dissemination Activity	Audience	Purpose	Key Message
Through project	Consultation with stakeholders who will use outputs	Researchers, Information system, research computing service	Raise awareness	Help and guidance will be available
Through project	JISC website and comms channels such as news items	Researchers, Information system, research computing service	Raise awareness	Help and guidance will be available
End of project	JISC events	Researchers, Information system, research computing service	Raise awareness	Help and guidance will be available

19. Exit and Sustainability Plans

Project Outputs	Action for Take-up & Embedding	Action for Exit
Final Report	Build community for use through dissemination activities above	Upload final report to JISC's Documents & Multimedia repository

Project Outputs	Why Sustainable	Scenarios for Taking Forward	Issues to Address
D3, D4	Potentially useful as long as kept up to date	Integrate with training materials available via JISC infonet	Document maintenance