



AUDIT

OF

PUBLIC CLOUD COMPUTING PROJECT

IN

UNDP

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Report on the Audit of UNDP Public Cloud Computing Project

Executive Summary

The UNDP Office of Audit and Investigations (OAI), conducted an audit of UNDP Public Cloud Computing¹ Project (the Project), from 23 November to 4 December 2015. The Project was implemented and managed by the Office of Information Management and Technology, formerly Office of Information Systems and Technology, (the Office). The audit aimed to assess the adequacy and effectiveness of the governance, risk management and control processes relating to the following areas and sub-areas:

- (a) Governance (project initiation, project management, and project implementation);
- (b) Cloud service provider management (selection of the cloud service provider, contract / service level agreement management); and
- (c) Cloud computing security.

The audit covered the activities of the Project from 1 January 2013 to 31 October 2015. This was the first audit of the Project.

The audit was conducted in conformance with the *International Standards for the Professional Practice of Internal Auditing*.

Overall audit rating

OAI assessed the Project as **satisfactory**, which means “Internal controls, governance and risk management processes were adequately established and functioning well. No issues were identified that would significantly affect the achievement of the objectives of the audited entity.”

Key recommendations: Total = 2, high priority = 0

The two recommendations aim to ensure the effectiveness and efficiency of operations.

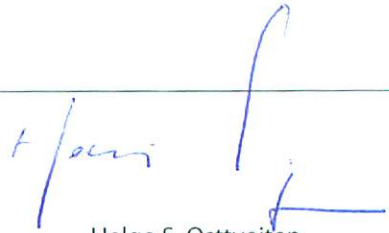
The audit did not result in any high (critical) priority recommendations. There are two medium (important) priority recommendations, which means “Action is required to ensure that UNDP is not exposed to risks that are considered moderate. Failure to take action could contribute to negative consequences for UNDP.” These recommendations include actions to address the following: weaknesses in project management and delayed project risk assessment.

¹ Cloud computing involves the use of computing, information and communications technology resources that are delivered as a service over the Internet from geographically disparate locations.

Management comments and action plan

The Chief Technology Officer and Director accepted both recommendations and is in the process of implementing them. Comments and/or additional information provided had been incorporated in the report, where appropriate.

Issues with less significance (not included in this report) have been discussed directly with management and actions have been initiated to address them.



Helge S. Osttveiten
Director
Office of Audit and Investigations

I. About UNDP Public Cloud Computing Project

The Project consisted of two phases: phase one, migration of UNDP's communications (email services / Microsoft Lync²) to the public cloud, from January to June 2014, and phase two, installation of cloud-based productivity tools (Office 365 / One Drive) for UNDP, from September to December 2014. Both phases of the Project, directly affecting all UNDP staff, had been successfully implemented by the time of the audit. In phase one, 22,000 email accounts with 80 terabyte of data were migrated to the public cloud. In phase two, access to OneDrive for Business and Office 365 productivity tools was rolled out across UNDP.

The one time project costs, consisting of change management, migration and conversion of legacy data, were estimated at \$1.05 million with the actual cost being \$0.97 million, and it was foreseen that over a period of five years the project would lead to cost savings of more than \$20 million or more than \$4 million per year, which seemed fairly realistic given the actual cost savings of \$3.9 million achieved in 2015, the first full year after project implementation.

The Office's Technology Innovation Services Department was managing the implementation of the Project.

II. Audit results

Satisfactory performance was noted in the following areas:

- (a) Governance – project initiation. The decision to initiate the Project was based on a sufficiently detailed document that addressed all the relevant areas for the decision making process such as (a) expected benefits, (b) estimated costs, (c) potential cost savings, and (d) potential risks of cloud computing.
- (b) Cloud service provider management – selection of cloud service provider. The selection of the cloud service provider followed a rigorous process, including an ex-ante review by the Advisory Committee on Procurement.
- (c) Cloud service provider management – contract/service level agreement management. The contract with the selected cloud service provider complied with the requirements of United Nations Office of Legal Affairs as well as with those of UNDP's Legal Office. Furthermore, arrangements regarding the service level agreement covering the services provided were found to be adequate.
- (d) Cloud computing security. The information and communication technology security set-up of the selected cloud service provider was adequate and in line with UNDP's requirements. The Office ensured appropriate integration of the cloud computing services with UNDP systems for managing security and privacy.

OAI made two recommendations ranked medium (important) priority.

Low priority issues/recommendations were discussed directly and agreed with the Office and are not included in this report.

² Microsoft's system for unified communications (including instant messaging, voice over internet protocol, and Web conferencing) in the enterprise.

Medium priority recommendations, arranged according to significance:

- (a) Improve project management for future projects by fully adhering to the accepted project management method (Recommendation 1).
- (b) Improve the project management process for future projects to ensure specific risk assessment is conducted (Recommendation 2).

The detailed assessment is presented below, per audit area:

A. Governance

1. Project management

Issue 1 Weaknesses in project management

Project management is a methodical approach to planning and guiding project processes from start to finish. As per UNDP's Information and Communication Roadmap 2012-2013, all major projects will be managed according to current UNDP standards, guided by PRINCE2 (Projects in Controlled Environments)³ and other methodologies, and by their respective project boards. The use of PRINCE2 as the project management methodology was reinforced in the Project Management Guideline prepared by the Office in March 2015.

A review of the project management structure in place for the Project showed that the Office had a practice in place with applicable key controls such as establishing a project team comprising staff from varied user and technical backgrounds, developing a project implementation plan to guide the project management and implementation among others for managing the Project, in line with the PRINCE2 method. However, there were some aspects of project management that either deviated from the PRINCE2 method or were not in line with internal project management decisions as described below.

- As per PRINCE2, the project manager will submit to the unit manager and the technical team manager the initial project document for their review and if they are in agreement, the project manager will submit the documents to the project board for approval. It was noted that the project implementation document and subsequent changes were *de facto* approved and accepted through routine communications but lacked evidence of formal approval by the Project Board.
- Due to a lack of sufficient documentation it was not clear how many meetings of the Project Board had been held and if for all these meetings minutes had been prepared. Only four meeting minutes were available during the period audited. Furthermore, the lack of documentation made it impossible to assess whether all follow-up actions required from the Project Board had been completed.
- The project implementation document indicated that periodic reporting be made to the Information and Communication Technology Governance Group on the progress and the status of the Project while the Project Manager should submit a project progress report on a weekly basis to the Project Board.

³ PRINCE2 is a structured method for effective project management, recognizing eight process areas (starting up a project, directing a project, initiating a project, controlling a stage, managing stage boundaries, planning, managing product delivery, and closing a project). PRINCE2 fits each process into a framework of essential components (business case, organization, plans, controls, management of risk, quality of a project environment, configuration management, and change control) that should be applied throughout a project. It covers how to organize, manage, and control projects.

However, there was no evidence or records to show that the reporting was done as required. Furthermore, the project implementation document specified that the Project Technical Committee should meet weekly to monitor project progress, issues and risks while resolving escalated issues in Project Board meetings. However there was no evidence to show that this was done.

- As per PRINCE2, once the project board authorizes the project initiation phase, the project manager will update the project file and prepare the project initiation document with related log files (risk, issues and lessons). It was noted that the issues log and risks log pertaining to project implementation were not well maintained and monitored regularly. Available Project Board meeting minutes indicated that some risks were discussed, however, there was no evidence of a risk log maintained on project implementation which would enable monitoring of risks including what actions needed to be taken, by who and within what timeframe.
- As per PRINCE2 and the project implementation document, a project lessons learned register should be activated and regularly updated to ensure ongoing learning and adaptation within the organization. It also facilitates the preparation of the lessons learned report at the end of the project, something which could be beneficial for future information and communication technology projects. However, this was not done. In addition, prior to the start of the Project, several potential benefits were identified, but no formal assessment had been conducted to determine whether the Project had achieved any of these potential benefits.

The Office management informed OAI that some of the aforementioned issues could be attributed to inadequate staff resources. For instance, the Project Manager left the organization in June 2014, before the end of the Project, as a result of the Structural Change. The departure of the Project Manager was highlighted as a project risk. However, there was no evidence found that action was taken to replace the Project Manager. The other members of the project team took over the Project Manager's roles and responsibilities but were not formally designated.

Failure to comply with the accepted project management method would make it difficult: (a) to refer back to decisions or actions which had been agreed upon; (b) to track, monitor and take the necessary actions to address concerns pertaining to issues or risks identified; (c) to assess whether the decision to start the Project was based on sound expectations, and (d) whether potential benefits have been achieved or not, all of which could in the long run impact the achievement of the Project objectives and/or lead to a waste of resources.

Priority	Medium (Important)
Recommendation 1:	
As the Project has finished, the Office should improve its project management for future projects by:	
(a) fully adhering to the accepted project management method; and	
(b) implementing mechanisms to ensure that, where applicable, the following documentation will be prepared and maintained:	
i. actions and follow-up actions taken, decisions made, and progress monitoring;	
ii. issues and risks logs;	
iii. a lessons learned report at the end of the project; and	
iv. a post-implementation review to assess whether potential benefits have been achieved or not.	

Management action plan:

The Office will complete and document the improved mechanisms, demonstrating how the mechanisms ensure the necessary improvements (items i through iv) in the project management processes and procedures.

Estimated completion date: December 2016

2 Project implementation

Issue 2 UNDP specific risk assessment conducted after the start of the project implementation process

According to PRINCE2, all the likely risks need to be identified and included in the business case that drives the project. Furthermore, prudent project management would dictate that prior to go-live all identified risks are either mitigated or accepted.

The Public Cloud Brief of December 2012, which could be considered the business case for the Project, lists a number of risks associated with moving to the Public Cloud. However, the listed risks were rather generic and as also indicated in the document still needed to be fully assessed. In June 2013, a white paper on the use of cloud computing in the United Nations system, including recommendations for risk mitigation had been prepared by the United Nations Special Interest Group on Information Security. While informative and useful, the paper did not address risks and actions to mitigate those risks specifically pertaining to UNDP. In April 2014 UNDP's Chief Information Security Officer prepared a similar paper, specifically geared towards UNDP. Whereas, this paper was very informative and addressed all major risks related to cloud computing as well as actions to mitigate those risks, the paper was prepared after the contract with the cloud service provider had been signed and the migration of UNDP's emails to the Public Cloud had started.

The Office management explained that although the UNDP specific risk assessment paper was issued in April 2014, the work underlying this paper had been conducted earlier and if at that stage any issue had been noted that could affect the migration this would have been flagged immediately at which point there might still had been time to mitigate the identified risk before the start of the actual migration.

OAI acknowledges that the actual risk assessment would have been conducted prior to issuance of the paper. However, the detailed assessment of the security architecture of the interface systems between UNDP and the cloud service provider started in April and finished in May 2014, long after the contract with the cloud service provider was signed in November 2013, and the start of the actual migration process in March 2014.

Conducting the UNDP specific risk assessment in such a late stage of the process could lead to unforeseen delays or costs in case the results of the risk assessment would require restructuring / amending the implementation process to mitigate earlier risks not identified.

Priority	Medium (Important)
Recommendation 2: As the Project has finished, the Office should improve its project management process for future projects to ensure that specific risk assessment is conducted and finalized before the actual start of the implementation process.	
Management action plan: The Office will implement the recommendation via well-documented updates to the project management processes and templates. Estimated completion date: December 2016	

Definitions of audit terms - ratings and priorities

A. AUDIT RATINGS

- **Satisfactory** Internal controls, governance and risk management processes were adequately established and functioning well. No issues were identified that would significantly affect the achievement of the objectives of the audited entity.
- **Partially Satisfactory** Internal controls, governance and risk management processes were generally established and functioning, but needed improvement. One or several issues were identified that may negatively affect the achievement of the objectives of the audited entity.
- **Unsatisfactory** Internal controls, governance and risk management processes were either not established or not functioning well. The issues were such that the achievement of the overall objectives of the audited entity could be seriously compromised.

B. PRIORITIES OF AUDIT RECOMMENDATIONS

- **High (Critical)** Prompt action is required to ensure that UNDP is not exposed to high risks. Failure to take action could result in major negative consequences for UNDP.
- **Medium (Important)** Action is required to ensure that UNDP is not exposed to risks that are considered moderate. Failure to take action could contribute to negative consequences for UNDP.
- **Low** Action is desirable and should result in enhanced control or better value for money. Low priority recommendations, if any, are dealt with by the audit team directly with the Office management, either during the exit meeting or through a separate memo subsequent to the fieldwork. Therefore, low priority recommendations are not included in this report.