OIOS
Office of Internal Oversight Services

INTERNAL AUDIT DIVISION

REPORT 2016/125

Audit of reporting, business intelligence and visualization systems in the Department of Field Support

Some good control processes had been implemented but improvements were needed in project governance, quality control and user support

27 October 2016
Assignment No. AT2015/615/04

Audit of reporting, business intelligence and visualization systems in the Department of Field Support

EXECUTIVE SUMMARY

The objective of the audit was to assess the adequacy and effectiveness of governance, risk management and control processes for reporting, business intelligence and visualization systems in the Department of Field Support (DFS). The audit covered the period from 1 January 2015 to 31 March 2016 and included a review of the processes in place at the United Nations Global Service Centre (UNGSC), the Information and Communications Technology Division (ICTD) and the Umoja Office relating to project management and information and communications technology (ICT) support systems used for the Field Support Suite (FSS) reporting, non-FSS business objects-based reporting, Geospatial Information System (GIS) visualization, and Umoja business intelligence (BI) reporting.

DFS and the Department of Management (DM) had established some good control processes for implementing the reporting systems, including management support, knowledgeable technical resources, good user requirements definition and configuration, complete technical documentation, and a stabilized web-based reporting environment. In addition, DM, with support from DFS, had taken several steps to address performance concerns in the Umoja BI landscape. However, some control weaknesses were identified in project governance, risk management and quality control for FSS reporting systems, data in source systems, procurement reporting, testing, access controls and systems support.

OIOS made eight recommendations. To address the issues identified in the audit:

DFS needed to: (i) establish and implement minimum quality control controls and standards for all FSS reports; (ii) conduct a comprehensive analysis of all the data and systems utilized during the entire life-cycle of the reporting process and identify the issues affecting the reliability of data; and (iii) establish service level agreements with all missions and strengthen Umoja BI support for end users in missions.

DM needed to: (i) establish a formal project plan for Umoja BI reporting with assigned resources and target dates for completion; (ii) remove links to procurement supplier relationship management reports that are not functioning and evaluate the need for replacement reports; (iii) establish a target date to implement the semantic layer for Umoja BI reporting and provide adequate Umoja BI training; (iv) ensure that users do not have access to Umoja BI reports that are under development until the reports are completed, tested, and signed off by the business owners; and (v) require all business owners to develop a data security model for power user role incompatibilities with respect to sensitive data for their business areas.

DFS and DM accepted the recommendations and have initiated action to implement them.

CONTENTS

Audit of reporting, business intelligence and visualization systems in the Department of Field Support

I. BACKGROUND

1.   The Office of Internal Oversight Services (OIOS) conducted an audit of reporting, business intelligence and visualization systems in the Department of Field Support (DFS).

2.   DFS provides administrative and logistical support services to the Department of Peacekeeping Operations (DPKO) and the Department of Political Affairs (DPA) through the delivery of support to United Nations peace operations and special political missions. This includes services in the areas of human resources, finance and budget, conduct and discipline, logistics and information and communications technology (ICT).

3.   The Information and Communications Technology Division (ICTD) within DFS is responsible for various ICT services and support to field operations, including: (i) providing ICT, operational, logistics and administrative support to field operations; and (ii) managing the Secretariat's global telecommunications infrastructure that underpins field operations, including the wide area network and the DFS teleport located at the United Nations Global Service Centre (UNGSC) in Brindisi, Italy, and the communications facility in Valencia, Spain.

4.   The Service for Geospatial, Information and Telecommunication Technologies (SGITT) at UNGSC is the service within DFS responsible for providing connectivity and hosting services to field missions and staff. UNGSC was based in two locations as an essential risk mitigation measure for disaster recovery and business continuity.

5.   The DFS reporting, business intelligence (BI) and visualization systems include reporting for the Field Support Suite (FSS), Umoja and the Geospatial Information System (GIS). FSS is an integrated suite of applications developed by ICTD for all field missions. The main purpose of this system was to replace the large number of locally hosted and often internally developed ICT applications. The FSS reporting system consisted of a Business Objects (BO) web-based reporting system and centralized data marts for reporting purposes. Microsoft SQL was the database management system supporting FSS real-time reporting.

6.   Umoja is an application of the SAP enterprise resource planning (ERP) software that supports management activities related to finance, budget, human resources, supply chain, central support services, and other core business functions. This system replaced and integrated numerous existing legacy information systems across the United Nations Secretariat. Umoja contains a BI component for reporting purposes that uses a BO platform. The Department of Management (DM) has been leading the implementation of the Umoja project through the Umoja Office. Umoja BI is a self-service reporting and data analysis component that turns transactional data into meaningful reports.

7.   GIS is a visualization system under development that utilizes topographic and base mapping, satellite imagery, and geospatial databases to provide the ability for missions and field offices to visualize, analyze, and interpret data to understand patterns, relationships and trends.

8.   Comments provided by DM and DFS are incorporated in italics.

II. AUDIT OBJECTIVE, SCOPE AND METHODOLOGY

9. The objective of the audit was to assess the adequacy and effectiveness of governance, risk management and control processes over the effectiveness of reporting, BI and visualization systems in DFS.

10. The audit was included in the OIOS work plan for 2015 in view of the high risks associated with the reporting, BI and visualization systems in DFS.

11. OIOS conducted the audit in April and May 2016. The audit covered the period from 1 January 2015 to 31 March 2016 and included a review of the processes in place at UNGSC, ICTD and the Umoja Office relating to project management and ICT support systems used for FSS reporting, non-FSS business objects-based reporting, GIS visualization, and Umoja BI reporting.

12. The audit methodology included: (a) interviews of key personnel; (b) review of relevant documentation; (c) walkthroughs of systems and applications; and (d) analytical reviews of data.

III. OVERALL CONCLUSION

13. DFS and DM had established some good control processes for implementing the reporting systems, including management support, knowledgeable technical resources, good user requirements definition and configuration, complete technical documentation, and a stabilized web-based reporting environment. In addition, DM, with support from DFS, had taken several steps to address performance concerns in the Umoja BI landscape. However, some control weaknesses were identified in project governance, risk and quality control for FSS reporting systems, data in source systems, procurement reporting, testing, access controls and systems support.

IV. AUDIT RESULTS

A. Project management

Need to strengthen project governance for Umoja BI reporting

14. According to the project management framework of the United Nations Secretariat, ICT initiatives should be supported by adequate governance mechanisms with clear identification of roles, responsibilities, authorities, reporting, and quantification of costs and benefits.

15. OIOS review of project governance for Umoja BI reporting showed that management planned to implement additional functionalities throughout the various business areas of DM. Some progress had been made in establishing working groups, defining their terms of reference, and identifying the reports needed in the various business areas. However, the project had not been formalized and there was no detailed project plan to include the activities and resources of both the Umoja Office and those of the business owners. There were also no target dates defined for completion. The human resources (HR) business area had made some progress in establishing HR requirements, designing and developing prototype reports, and assigning resources for testing. However, HR was waiting for the Umoja Office to address stability and performance issues of the BI platform to move forward with the testing as well as the project plan with clear milestones for technical development. Other offices within DM were in various stages of implementing Umoja BI.

16.   Standard Umoja BI reports were available to users in various business areas of DM (such as Finance, HR and Organization Management). However, these reports were designed in 2014 when the development of the BI process was in its initial stage. Although the reports were delivered in accordance with the requirements submitted to the Umoja Office at that time, interviews with users of the reports revealed that they did not find the reports useful. Most business areas had a very limited number or no standard reports at all, as in the case of Travel, for example. Users relied on reports made available in the shared folder of the Umoja BI solution which had been built with no quality control mechanisms in place.

17.   This condition was due to the lack of a formalized project for Umoja BI reporting which may prevent the development of Umoja BI reports within time and budget and also lead to potential errors and omissions in financial and operational reporting.

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(1) DM should: (i) establish a formal project plan for Umoja Business Intelligence (BI) reporting with assigned resources and target dates for completion; (ii) provide technical resources and target dates for the development and testing of BI reports in progress; and (iii) require all DM business owners to implement the activities necessary to develop and deliver standard BI reports in their areas.

DM accepted recommendation 1 and stated that the Office of Information and Communications Technology (OICT) has established a formal project plan for the Umoja BI reporting, with target timelines for implementation and in partnership with process owners. OICT is conducting bilateral workshops with business units globally, to assess and update the plan for Umoja BI implementation in their respective functional areas. In this regard, and as agreed by the Global Business Intelligence and Reporting Steering Committee, corporate and statutory reports will be delivered by OICT and business owners will implement ad-hoc and operational reports. Reports are categorized into seven scenarios, according to the level of governance, flexibility and user types. Scenarios range from S1 (statutory reports; broad audience; low flexibility; high governance) to S7 (operational, departmental reports; narrow audience; high flexibility; low governance). A sample of the relevant supporting documents has been provided to OIOS. Recommendation 1 remains open pending receipt of the formal project plan for Umoja BI reporting, with defined timelines and actions agreed with business owners for developing and delivering standard reports in their respective areas.

Project management of the GIS visualization system was satisfactory

18.   OIOS reviewed the progress of the GIS visualization system which was still being implemented at the time of the audit. A GIS Section had been established at UNGSC to deliver services for topographic and base mapping, as well as spatial and terrain analysis. The purpose of GIS was to create synergy, remove duplication of functions, and standardize projects and services to achieve cost savings. The major projects associated with GIS included:

    (i)   Imagery acquisition and management;

    (ii)   Publishing of global image services;

    (iii)   Topographic and base mapping to provide standard geospatial databases and topographic line maps critical for military, security and logistical operations in field missions;

    (iv)   Geospatial terrain and environmental analysis to provide advanced studies and analysis to support mission planning including optimal campsite selection, line of sight analysis for positioning of telecommunication towers, change detection and site monitoring and ground water exploration to sustain military and staff;

(v)   Geospatial solution activity to provide web map applications, web image map services and multiplatform solutions; and

(vi)   Standardization of geospatial data models, products and services to ensure integrated and harmonized base and operational geospatial databases to implement the global developed solutions.

19.   The following were noted with regard to the GIS project:

(i)   Project governance requirements were well documented for the various project components;

(ii)   The project team was knowledgeable and qualified;

(iii)   There was adequate documentation regarding the assignment of project responsibilities and the management of issues and risks;

(iv)   Project activities and deliverables were well documented;

(v)   The progress of various activities was documented and reported, including summaries of achievements and accomplishments; and

(vi)   The completed components of the system delivered to date were functioning as expected.

20.   Based on the review conducted and evidence provided, OIOS concluded that the overall project management for the GIS visualization system was satisfactory.

B.   ICT support system

Technical documentation was generally adequate

21.   The professional standards defined in the Control Objectives for Information and Related Technology (COBIT) framework recommends the issuance of formal and clear documentation to ensure the transfer of adequate knowledge and skills for supporting ICT systems in an effective and efficient manner.

22.   DFS and DM prepared detailed technical documentation for the administration and configuration of the various DFS reporting and BI systems. The documentation included technical diagrams of the reporting framework, data models, data flows, and messaging diagrams. In addition, system and business requirements were adequately documented and reflected in the configuration that was implemented in the system.

23.   Based on the review conducted and evidence provided, OIOS concluded that the technical documentation for DFS reporting, BI and visualization systems was generally adequate.

Need to strengthen quality controls for FSS reports

24.   Best practices for the development of reports include standard information that should be displayed on all reports to identify their contents and the parameters used to generate them. In addition,

report titles and headings should match the data contained in the reports, and the live production system should contain only formally approved reports.

25.   OIOS reviewed a sample of reports related to the FSS applications, including: the F.10 system (used to support tracking, viewing, and controlling of travel requests); the PT.8 system (used for high level reporting on staff member travel); and the Check-In/Check-out system (used to generate reports on staff members checking in and out of missions). The review showed the following control weaknesses:

(i)   The Regional Service Centre in Entebbe Check-Ins' Yearly, Half Yearly, Quarterly, Monthly, and Weekly reports had been modified since the original requirements were implemented and the data no longer reflected the title of the report. The title and headings of the report had not been changed to reflect the modifications. According to the development team, the titles and headings were not changed because the user did not specifically request these particular changes;

(ii)   The F.10 reporting system had two old test reports (F.10 detailed report and F.10 pending claims report) in production that did not function properly and should have not been in the production environment;

(iii)   There was lack of basic information printed on many reports that should have been standard, including input parameters related to the timeframe, dates or years selected, and the name of the mission or department to which the data pertained; and

(iv)   The pending check-ins aging report had a typographic error in the heading of the report.

26.   These weaknesses were due to a lack of quality control over user-specified reports, which could lead to miscommunication of data and process inefficiencies.

> **(2) DFS should: (i) establish minimum quality control controls and standards for all Field Support Suite (FSS) reports; (ii) implement monitoring procedures for the reports environment to ensure that only current and valid reports are released in production; and (iii) enhance the report development procedures to require that all future FSS reports include standard minimum information related to date range parameters and the name of the mission or department to which the data pertains.**
>
> *DFS accepted recommendation 2 and stated that: (i) the recommendation has been implemented. Quality controls and standards for FSS reports have been developed. The reports are unit tested by developers before going to the quality assurance group for test case-based testing. The final user acceptance testing is done by the client(s); (ii) DFS will carry out periodic review of the reporting environment to ensure that only current and valid reports are released in production; and (iii) as earlier indicated there are new reports, with improved templates that now indicate basic information more clearly. Sample reports of the Event Booking Management System, as well as the Functional Requirements have been provided to OIOS.* Recommendation 2 remains open pending receipt of the procedures developed by DFS defining the minimum quality control standards for FSS reporting, and the mechanisms to ensure that only valid reports are released in production.

Reporting mechanisms in the SAGE and eBilling systems were satisfactory

27.   COBIT recommends that a system design and configuration should meet the requirements and business needs/processes specified by the users, based on requirements that are actionable, measurable, testable, and traceable.

28.   OIOS reviewed the DFS reporting system SAGE, which was the United Nations standard platform for incident reporting and mapping for peacekeeping missions. The purpose of the SAGE system was to provide a means to efficiently collect, validate, search, retrieve, analyze and share critical situational information across mission components, across multiple missions, and with Headquarters. The SAGE reporting system included an online dashboard and standard reporting capabilities. The benefits of the reporting mechanism were to allow the ability to generate and display useful statistics, access historical information for trend analysis, search and report capability by different dimensions of the collected data, and provide the ability to view information for one mission, group of missions, or all missions from a single interface. The SAGE system was implemented satisfactorily and had met the required deliverables.

29.   The eBilling system is a standardized, web-based telephone billing system for all field missions to facilitate the recording, approval/certification and cost recovery of all phone calls originated by field telecommunications assets. The purpose of the reporting component of the eBilling system was to provide an automated, online tool to allow users to run BO reports through self-service processes. The extraction of source data was done through an automated process and aggregated to meet the dashboard business requirements. The reporting functionality was to be simplified with the information readily available for decision making purposes. Overall, the eBilling system was found to be adequate and met the requirements specified by the business owners.

Inadequate data management process

30.   According to the Secretary-General's Bulletin ST/SGB/2004/15 on the use of ICT resources and data, staff members should use their best efforts to ensure the accuracy of any ICT data for which they are responsible. In addition, professional standards defined in the COBIT framework recommend that data displayed on reports should be valid, accurate and complete.

31.   As shown in Table 1, there were several reports that displayed missing or erroneous data due to issues concerning data in the source systems.

Table 1: Reports with missing or erroneous data

Reporting System and Source System	Report Name	Data discrepancy
PT.8	PT.8 Daily Report	Missing data in "Travel ID Number"
PT.8	Report on Certifier of PT.8 and Authorizer of PT.8	Missing data in "Certifier Name" and "Authorizer of PT.8"
eBilling	Top lowest usage by month	Invalid dates in "Year" data field (i.e. 1899,1901,1902,1903, etc.)
eBilling	Top 10 access codes utilized by system	Missing data in "Access Code" data field

32.   Although the reporting functionality was operating as designed, the reports reflected erroneous data from the source systems. This was due to the lack of adequate analysis of data and systems to identify issues affecting the reliability and flow of data. This could lead to inefficiencies, errors and omissions in operational and financial reporting in Umoja.

> **(3) DFS should: (i) conduct a comprehensive analysis of all the data and systems utilized during the entire life-cycle of the reporting process; (ii) identify the issues affecting the reliability of data between DFS systems and reporting/Business Intelligence systems; and**

> **(iii) design and implement corresponding mitigating mechanisms to ensure the efficient and reliable completion of data.**
>
> *DFS accepted recommendation 3 and stated that: (i) it is further strengthening the reporting process and will perform the analysis on an ongoing basis; and (ii) the recommendation has been implemented. The issues affecting the reliability of data are usually checked as part of various testing stages mentioned in response to the previous recommendation. Microsoft's Application Lifecycle Management tool is used to flag and highlight any changes on source systems that may impact the data mart and reports. This process is fully functional and is being utilized by source (transactional systems) and target (reporting systems) developers; and (iii) it wishes to clarify that the reports typically show data as captured in the source system. DFS will look into the possibility of creating exception reporting for data quality checks, which can be shared with the transactional systems development team.* Recommendation 3 remains open pending receipt of documented evidence of: (i) the analysis conducted by DFS on the data utilized during the reporting process; (ii) the issues identified with the reliability of data between DFS systems and reporting BI systems; and (iii) the reports generated with the Microsoft Application Lifecycle Management tool.

Need to address issues relating to SAP procurement reports

33.   According to SAP and ICT best practices, reports made available to users in the production environment and the associated links to those reports should work properly.

34.   OIOS selected the procurement area for a detailed review of reporting. The SAP system provided standard procurement reports for Supplier Relationship Management (SRM). The Umoja system had a designated area for SRM reports accessible through the Employee Self Service (ESS) portal. Several SRM reports available through the portal were not functioning. Out of 55 reports, 48 did not run and one resulted in an "overflow" error message. Only seven reports ran successfully.

35.   This condition was due to the lack of comprehensive analysis and testing of the SAP delivered SRM reports in Umoja. The presence of non-functioning SRM reports in the production system could lead to a lack of user confidence in the system, inefficient and ineffective reporting, and errors and omissions in operational and financial reporting.

> **(4) DM should remove links to procurement Supplier Relationship Management (SRM) reports that are not functioning and evaluate the need for replacement reports that would be of use to procurement users in the SRM reporting area.**
>
> *DM accepted recommendation 4 and stated that on the basis of the audit observation, the Procurement Division has raised a request for service for the removal of the standard SRM reporting links, which are not utilized by the United Nations Secretariat. Following this, the Procurement Process Expert has raised a change request, which will be reviewed by the Umoja Team. The reports identified by OIOS are part of standard SAP software and Umoja will assess the feasibility of removing them from the standard SAP SRM menus. A copy of the change request has been provided to OIOS.* Recommendation 4 remains open pending receipt of evidence demonstrating that the links to the procurement SRM reports have been evaluated and replaced, as required.

Need to improve user experience for BI reporting

36.   According to the Umoja vision statement for BI, the purpose of implementing the BI solution was to promote the integration of business intelligence reporting and analytics. This was to be accomplished

by empowering self-service for BI users to employ data-driven decision making across the Organization's business operations, effectively improving transparency and process efficiency. This approach required users to acquire an adequate understanding of the various data elements used in reporting and their corresponding business terminology.

37.   The following weaknesses were noted in Umoja BI procurement reporting:

    (i)   Users had a perception of data inconsistencies due to differences in how data was displayed in the different modules;

    (ii)   There was no evidence of an Umoja BI reporting data quality management process in place for procurement data;

    (iii)   There was lack of standardized procedures for procurement users to utilize BI reporting in their day-to-day operations;

    (iv)   Global procurement users relied heavily on procurement reports made available in the "Shared Analysis BI area" that were not developed by the Procurement Division and did not require quality control or sign off by the procurement business owners at Headquarters; and

    (v)   Procurement users had not received adequate Umoja BI training.

38.   DM was in the process of implementing a semantic layer (a component of BI architecture that provides a translation of the underlying database structures into business user-oriented terms and constructs). However, since this was not yet implemented, there were misunderstandings among users.

39.   This condition was due to lack of adequate business processes integrated with Umoja BI, and lack of data information and training of end users, which could prevent the Organization from fulfilling its vision and generate valid, accurate reports.

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(5) DM should: (i) establish a target date to implement the semantic layer for Umoja Business Intelligence (BI) reporting; (ii) strengthen and provide adequate Umoja BI training to the appropriate users in all business areas, including how to use Umoja BI in day-to-day operations, cross-functional understanding, and the semantic layer; and (iii) implement a data quality management process for all business areas.

DM accepted recommendation 5 and stated that: (i) the first phase of delivery for the semantic layer across major functional pillars in Umoja is nearly finalized and is envisaged to be completed by the first quarter of 2017. The semantic layer will require continuous enrichment and update based on the functionality deployed as part of Umoja Extension 2, International Civil Service Commission, continuous process improvements and the SAP upgrade. A copy of the work plan has been provided to OIOS; (ii) since June 2015, the Finance Process Owner in cooperation with Umoja, the Office of Central Support Services (OCSS), the Office of Human Resources Management (OHRM), and DFS has been conducting a BI training programme for provisioned Analytic and Power User staff. Since its inception, the programme has delivered 31 foundation courses and 22 advanced courses to 373 foundation participants and 219 advanced participants. In the past year, the programme was expanded to include a train-the-trainer initiative to enable duty stations to build and maintain their own capacity. Train-the-trainer sessions have been conducted for all of the previously mentioned duty stations. The foundation and advanced BI courses are in Inspira and available for staff to self-register; and (iii) OICT has initiated a data quality initiative, starting with a data inventory of the

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> *Umoja Business Warehouse. The relevant supporting document has been provided to OIOS.* Recommendation 5 remains open pending receipt of evidence demonstrating the: (i) implementation of the semantic layer; (ii) completion of Umoja BI training to appropriate users; and (iii) implementation of the data quality management process for all business areas.

Need to restrict access for Umoja BI reports under development and testing

40.   Professional standards (COBIT) recommend that products under development and in the process of being tested should be kept separate from users until the reports are fully tested and signed off by the business owners.

41.   There were development and testing folders in the Umoja BI reporting production environment for HR reports that were in progress. The HR unit used this environment because there were no development and testing environments separate from the production environment available to them to test Umoja BI reporting. These reports were still waiting for official testing and completion, but because they were in the production environment, HR users were able to prematurely access the reports.

42.   User access to reports that are under development and not yet tested and signed off could lead to reliance on reports that may produce inaccurate results, which could result in errors and omissions in operational and financial reporting.

> **(6) DM should ensure that users do not have access to Umoja Business Intelligence reports that are under development until the reports are completed, tested, and signed off by the business owners.**
>
> *DM accepted recommendation 6 and stated that a security mechanism for access to Umoja BI reports was established. OICT and the Umoja BI Team will produce and distribute supplemental documentation emphasizing the difference between the types of reports in the BI portal.* Recommendation 6 remains open pending receipt of evidence that a security mechanism has been established for controlling access to BI reports during development and testing.

Need to strengthen user access controls

43.   The access control procedures established for the United Nations Secretariat define the rules for user account management (such as secure log-on procedures; management of expiration of user accounts; removal of access rights; and segregation of duties).

44.   The following access controls were configured and implemented in the DFS BO reporting system:

> (i)   Access to reporting systems was restricted to users with appropriate role assignments;
>
> (ii)   There was an adequate access request process along with a specific access request form for access provisioning;
>
> (iii)   The reporting systems were maintained according to the standard UNGSC policies and procedures regarding expiration of user accounts, removal of access rights and passwords;

(iv)   The reporting systems utilized uniquely assigned user accounts attached to the appropriate access control group; and

(v)   Access to data for all missions was controlled and only given to system administrator roles, system support members and users who run reports for all missions.

45.   The Umoja BI system had three types of user access for reporting:

(i)   Common User (report consumer who can run, print, schedule and distribute formatted reports);

(ii)   Analytical User (data analyst who can utilize the ad hoc report functionality for private use); and

(iii)   Power User (usually trained and certified business user who can customize reports and analysis areas to share with others).

46.   Power users also had other roles in Umoja and could view data in various business areas unless specifically restricted. OHRM had coordinated with the Umoja Office to implement a data security model for HR data and had procedures in place to prevent power users from viewing confidential HR data. However, there was no evidence that other business areas had established such a data security model to regulate power user access.

47.   The detailed procurement review performed by OIOS showed that power users who were also "Requisitioners" could view procurement bid data, which represented a conflict in segregation of duties. The Procurement Division had previously requested the Umoja Office to resolve this issue. However, this request was still in the process of being prioritized and had not yet been addressed.

48.   The absence of data security models for reporting and viewing of data by power users and the ability of requistioner power users to view procurement bid data could compromise the integrity of their functions as well as the confidentiality of the procurement data.

> **(7) DM should: (i) require all business owners to develop a data security model for power user role incompatibilities with respect to sensitive data for their business areas; and (ii) assign priority to analyze and resolve the issue of power user requisitioners' ability to view procurement bid data.**
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> *DM accepted recommendation 7 and stated that: (i) the Office of the Under-Secretary-General for Management will issue a directive to all business owners requiring them to develop a data security model for power user role incompatibilities with respect to sensitive data for their business areas; and (ii) at the request of the Procurement Division, Umoja adjusted the security in the transactional systems to limit access to the solicitation document to the appropriate end users per their requirements. Work is in progress to isolate and restrict the solicitation document data in the Umoja BI system to meet those requirements, and will be completed in the fourth quarter of 2016.* Recommendation 7 remains open pending receipt of evidence of the: (i) security requirements defined by OHRM and OCSS; (ii) disposition of the formal request submitted by OCSS about access to procurement bids; and (iii) terms of reference defined for provisioning BI roles.

<u>Need to strengthen system support</u>

49.   An ICT service management framework should define the level of support required for the continuous and reliable functioning of ICT operations. The framework should detail the criteria and processes to document the requirements of Service Level Agreements (SLA). The framework should also specify the roles, tasks, and responsibilities of internal and external service providers and users.

50.   There were good control practices in place for system support including:

(i)   Periodic performance evaluation reports generated on the basis of a consistent methodology and criteria;

(ii)   Documented incident management process and workflow;

(iii)   Documented and complete "major incident reports";

(iv)   Documented change management process (including risk assessment methodology and criteria; and

(v)   UNGSC/SGITT had signed a SLA for the provision of services to the United Nations Organization Stabilization Mission in the Democratic Republic of the Congo (MONUSCO).

51.   However, there were no specific SLA between SGITT and other missions.

52.   The lack of SLAs with other missions could lead to the unavailability of systems support and decreased user satisfaction for those missions. In addition, the SLA between UNGSC and MONUSCO for BI system support did not specifically include Umoja BI reporting, and there was lack of adequate support to users for Umoja BI reporting.

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(8) DFS should: (i) establish service level agreements with other missions; and (ii) strengthen Umoja Business Intelligence support for end users in missions.

DFS accepted recommendation 8 and stated that it has SLAs in place with six client missions. The Department is in the process of finalizing SLAs with the remaining 10 client missions. Recommendation 8 remains open pending receipt of the SLAs established with field missions for the provision of technical support.

V.   ACKNOWLEDGEMENT

53.   OIOS wishes to express its appreciation to the management and staff of DFS, DM and UNGSC for the assistance and cooperation extended to the auditors during this assignment.

(*Signed*) Eleanor T. Burns
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STATUS OF AUDIT RECOMMENDATIONS

Audit of reporting, business intelligence and visualization systems in the Department of Field Support

Rec. no.	Recommendation	Critical[1]/ Important[2]	C/ O[3]	Actions needed to close recommendation	Implementation date[4]
1	DM should: (i) establish a formal project plan for Umoja Business Intelligence (BI) reporting with assigned resources and target dates for completion; (ii) provide technical resources and target dates for the development and testing of BI reports in progress; and (iii) require all DM business owners to implement the activities necessary to develop and deliver standard BI reports in their areas.	Important	O	Receipt of the formal project plan for Umoja BI reporting, with defined timelines and actions agreed with business owners for developing and delivering standards reports in their respective areas.	31 December 2017
2	DFS should: (i) establish minimum quality control controls and standards for all Field Support Suite (FSS) reports; (ii) implement monitoring procedures for the reports environment to ensure that only current and valid reports are released in production; and (iii) enhance the report development procedures to require that all future FSS reports shall include standard minimum information related to date range parameters and the name of the mission or department to which the data pertains.	Important	O	Receipt of the procedures developed by DFS defining the minimum quality control standards for FSS reporting, and the mechanisms to ensure that only valid reports are released in production.	30 June 2017
3	DFS should: (i) conduct a comprehensive analysis of all the data and systems utilized during the entire life-cycle of the reporting process; (ii) identify the issues affecting the reliability of data between DFS systems and reporting/Business Intelligence systems; and (iii) design and implement corresponding mitigating mechanisms to ensure the efficient and reliable completion of data.	Important	O	Receipt of documented evidence of: (i) the analysis conducted by DFS on the data utilized during the reporting process; (ii) the issues identified with the reliability of data between DFS systems and reporting BI systems; and (iii) the reports generated with the Microsoft Application Lifecycle Management tool.	30 September 2017

[1] Critical recommendations address critical and/or pervasive deficiencies in governance, risk management or control processes, such that reasonable assurance cannot be provided with regard to the achievement of control and/or business objectives under review.

[2] Important recommendations address important (but not critical or pervasive) deficiencies in governance, risk management or control processes, such that reasonable assurance may be at risk regarding the achievement of control and/or business objectives under review.

[3] C = closed, O = open

[4] Date provided by DM and DFS in response to recommendations.

STATUS OF AUDIT RECOMMENDATIONS

Audit of reporting, business intelligence and visualization systems in the Department of Field Support

Rec. no.	Recommendation	Critical[1]/ Important[2]	C/ O[3]	Actions needed to close recommendation	Implementation date[4]
4	DM should remove links to procurement Supplier Relationship Management (SRM) reports that are not functioning and evaluate the need for replacement reports that would be of use to procurement users in the SRM reporting area.	Important	O	Receipt of the formal project plan for Umoja BI reporting, with defined timelines and actions agreed with business owners for developing and delivering standards reports in their respective areas.	31 March 2017
5	DM should: (i) establish a target date to implement the semantic layer for Umoja Business Intelligence (BI) reporting; (ii) strengthen and provide adequate Umoja BI training to the appropriate users in all business areas, including how to use Umoja BI in day-to-day operations, cross-functional understanding, and the semantic layer; and (iii) implement a data quality management process for all business areas.	Important	O	Receipt of evidence demonstrating the: (i) implementation of the semantic layer; (ii) completion of Umoja BI training to appropriate users; and (iii) implementation of the data quality management process for all business areas.	31 March 2017
6	DM should ensure that users do not have access to Umoja Business Intelligence reports that are under development until the reports are completed, tested, and signed off by the business owners.	Important	O	Receipt of receipt of evidence that a security mechanism has been established for controlling access to BI reports during development and testing.	31 March 2017
7	DM should: (i) require all business owners to develop a data security model for power user role incompatibilities with respect to sensitive data for their business areas; and (ii) assign priority to analyze and resolve the issue of power user requisitioners' ability to view procurement bid data.	Important	O	Receipt of evidence of the: (i) security requirements defined by OHRM and OCSS; (ii) disposition of the formal request submitted by OCSS about access to procurement bids; and (iii) terms of reference defined for provisioning business intelligence roles.	31 December 2016
8	DFS should: (i) establish service level agreements with other missions; and (ii) strengthen Umoja Business Intelligence support for end users in missions.	Important	O	Receipt of the SLAs established with field missions for the provision of technical support.	30 September 2017

APPENDIX I

Management Response

TO: A:	Mr. Gurpur Kumar, Deputy Director Internal Audit Division, Office of Internal Oversight Services	DATE:	21 October 2016

THROUGH: Christian Saunders, Director
S/C DE: Office of the Under-Secretary-General for Management

FROM: Mario Baez, Chief, Policy and Oversight Coordination Service
DE: Office of the Under-Secretary-General for Management

SUBJECT: **Draft report on an audit of reporting, business, intelligence and visualization systems**
OBJET: **in the Department of Field Support (AT2015/615/04)**

1.   We refer to your memorandum dated 7 October 2016 regarding the above subject draft report and provide you the comments of the Department of Management in the attached Appendix I.

2.   Thank you for giving us the opportunity to provide comments on the draft report.

16- 02445
24 Oct 2016

Management Response

Audit of reporting, business intelligence and visualization systems in the Department of Field Support

Rec. no.	Recommendation	Critical[1]/ Important[2]	Accepted? (Yes/No)	Title of responsible individual	Implementation date	Client comments
1	DM should: (a) establish a formal project plan for Umoja Business Intelligence (BI) reporting with assigned resources and target dates for completion; (b) provide technical resources and target dates for the development and testing of BI reports in progress; and (c) require all DM business owners to implement the activities necessary to develop and deliver standard BI reports in their areas.	Important	Yes	Chief, Global Services Division, OICT	31 December 2017	The Office of Information and Communications Technology (OICT) has established a formal project plan for the Umoja Business Intelligence reporting, with target timelines for implementation and in partnership with process owners. OICT is conducting bilateral workshops with business units globally, to assess and update the plan for Umoja Business Intelligence implementation in their respective functional areas. In this regard and as agreed by the Global Business Intelligence and Reporting Steering Committee, corporate and statutory reports will be delivered by OICT and business owners will implement ad hoc and operational reports. Reports are categorised into seven scenarios, according to the level of governance, flexibility and user types. Scenarios range from S1 (statutory reports; broad audience;

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[1] Critical recommendations address significant and/or pervasive deficiencies or weaknesses in governance, risk management or internal control processes, such that reasonable assurance cannot be provided regarding the achievement of control and/or business objectives under review.

[2] Important recommendations address important deficiencies or weaknesses in governance, risk management or internal control processes, such that reasonable assurance may be at risk regarding the achievement of control and/or business objectives under review.

Management Response

Audit of reporting, business intelligence and visualization systems in the Department of Field Support

Rec. no.	Recommendation	Critical[1]/ Important[2]	Accepted? (Yes/No)	Title of responsible individual	Implementation date	Client comments
						low flexibility; high governance) to S7 (operational, departmental reports; narrow audience; high flexibility; low governance). A sample of the relevant supporting documents has been provided to OIOS.
2	DFS should: (a) establish minimum quality control controls and standards for all Field Support Suite (FSS) reports; (b) implement monitoring procedures for the reports environment to ensure that only current and valid reports are released in production; and (c) enhance the report development procedures to require that all future FSS reports shall include standard minimum information related to date range parameters and the name of the mission or department to which the data pertains.	Important				
3	DFS should: (i) conduct a comprehensive analysis of all the data and systems utilized during the entire life-cycle of the reporting process; (ii) identify the issues affecting the reliability of data between DFS systems and reporting/Business Intelligence systems; and (iii) design and implement corresponding mitigating mechanisms to ensure the efficient and reliable completion of data.	Important				
4	DM should remove links to procurement Supplier Relationship Management (SRM) reports that are not functioning and evaluate the need for replacement reports that would	Important	Yes	Delivery Management Team Lead, Umoja	31 March 2017	On the basis of the audit observation, the Procurement Division has raised a request for service for the removal of the standard Supplier Relationship

Management Response

Audit of reporting, business intelligence and visualization systems in the Department of Field Support

Rec. no.	Recommendation	Critical[1]/ Important[2]	Accepted? (Yes/No)	Title of responsible individual	Implementation date	Client comments
	be of use to procurement users in the SRM reporting area.					Management reporting links, which are not utilized by the United Nations Secretariat. Following this, the Procurement Process Expert has raised a change request, which will be reviewed by the Umoja Team. The reports identified by OIOS are part of standard SAP software and Umoja will assess the feasibility of removing them from the standard SAP Supplier Relationship Management menus. A copy of the change request has been provided to OIOS.
5	DM should: (a) establish a target date to implement the semantic layer for Umoja Business Intelligence (BI) reporting; (b) strengthen and provide adequate Umoja BI training to the appropriate users in all business areas, including how to use Umoja BI in day-to-day operations, cross-functional understanding, and the semantic layer; and (c) implement a data quality management process for all business areas.	Important	Yes	Chief, Global Services Division, OICT Business Intelligence Team Lead, Umoja Process Owners: ASG/OPPBA, ASG/OCSS, ASG/OHRM, and USG/DFS	31 March 2017	(a) The first phase of delivery for the semantic layer across major functional pillars in Umoja is nearly finalized and is envisaged to be completed by the first quarter of 2017. The semantic layer will require continuous enrichment and update based on the functionality deployed as part of Umoja Extension 2, ICSC, continuous process improvements and the SAP upgrade. A copy of the work plan has been provided to OIOS. (b) Since June 2015, the Finance Process Owner in cooperation with Umoja, OCSS, OHRM, and DFS has been conducting a Business Intelligence training program for provisioned Analytic and Power User staff. Since its inception, the program has delivered 31

Management Response

Audit of reporting, business intelligence and visualization systems in the Department of Field Support

Rec. no.	Recommendation	Critical[1]/ Important[2]	Accepted? (Yes/No)	Title of responsible individual	Implementation date	Client comments
						Foundation courses and 22 Advanced courses to 373 Foundation participants and 219 Advanced participants. Training has been delivered to staff at ECA, ECLAC, ESCAP, UNHQ, UNON, UNOV, ECA with sessions planned for UNOG and ESCWA. In the past year, the program was expanded to include a train-the-trainer initiative to enable duty stations to build and maintain their own capacity. Train-the-trainer sessions have been conducted for all of the previously mentioned duty stations. The Foundation and Advanced BI courses are represented in Inspira and available for staff to self-register as events are planned. We anticipate a minimum of two events per month to meet the demands of new users. (c) OICT has initiated a data quality initiative, starting with a data inventory of the Umoja Business Warehouse. The relevant supporting document has been provided to OIOS.
6	DM should ensure that users do not have access to Umoja Business Intelligence reports that are under development until the reports are completed, tested, and signed off by the business owners.	Important	Yes	Chief, Global Services Division, OICT, and Business Intelligence Team Lead,	31 March 2017	A security mechanism for access to Umoja Business Intelligence reports is established and the relevant supporting document has been provided to OIOS. End users are provided with training

Management Response

Audit of reporting, business intelligence and visualization systems in the Department of Field Support

Rec. no.	Recommendation	Critical[1]/ Important[2]	Accepted? (Yes/No)	Title of responsible individual	Implementation date	Client comments
				Umoja		and training is also a prerequisite for Business Intelligence Power User system access. Despite of the training, periodic reinforcement of concepts, such as difference between officially produced reports and reports produced by Power Users is necessary. To that end, OICT and the Umoja Business Intelligence Team will produce and distribute supplemental documentation emphasizing the difference between the types of reports in the Business Intelligence portal.
7	DM should: (a) require all business owners to develop a data security model for power user role incompatibilities with respect to sensitive data for their business areas; and (b) assign priority to analyze and resolve the issue of power user requisitioners' ability to view procurement bid data.	Important	Yes	(a) Director, Office of the Under-Secretary-General for Management, and Process Owners: ASG/OPPBA, ASG/OCSS, ASG/OHRM, and USG/DFS (b) Business Intelligence Team Lead, Umoja	31 December 2016	(a) The Office of the Under-Secretary-General for Management will issue a directive to all business owners requiring them to develop a data security model for power user role incompatibilities with respect to sensitive data for their business areas. (b) At the request of the Procurement Division, Umoja adjusted security in the transactional systems to limit access to the solicitation document to the

Management Response

Audit of reporting, business intelligence and visualization systems in the Department of Field Support

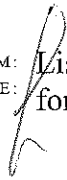| Rec. no.	Recommendation	Critical[1]/ Important[2]	Accepted? (Yes/No)	Title of responsible individual	Implementation date	Client comments
						appropriate end users per their requirements. Work is in progress to isolate and restrict the solicitation document data in the Umoja BI system to meet those requirements, and will be completed in the fourth quarter of 2016.
8	DFS should: (a) establish service level agreements with other missions; and (b) strengthen Umoja Business Intelligence support for end users in missions.	Important				

UNCLASSIFIED

Immediate

TO: Gurpur Kumar, Deputy Director, Internal Audit Division   DATE: 21 Oct 2016
A: Office of Internal Oversight Services

REFERENCE: 2016.UNHQ.AR-BOI.MEMO.27804.2

THROUGH:
S/C DE:

FROM: Lisa Buttenheim, Assistant Secretary-General
DE: for Field Support

SUBJECT: **Audit of reporting, business intelligence and visualization systems in the Department**
OBJET: **of Field Support (Assignment No. AT2015/615/04)**

1.   I refer to your memorandum dated 7 October 2016 regarding the above-mentioned audit. We note that OIOS has taken into account our comments provided on 3 October 2016. Please note that DFS does not have any further comments on the findings and recommendations in the report. We have, however, updated Appendix I to reflect the individual responsible for the implementation of the recommendations with the deadline.

2.   Thank you for the opportunity to comment on the draft report. We stand ready to provide any further information that may be required.

cc: Cynthia Avena-Castillo

Management Response

Audit of reporting, business intelligence and visualization systems in the Department of Field Support

Rec. no.	Recommendation	Critical[1]/ Important[2]	Accepted? (Yes/No)	Title of responsible individual	Implementation date	Client comments
1	DM should: (a) establish a formal project plan for Umoja Business Intelligence (BI) reporting with assigned resources and target dates for completion; (b) provide technical resources and target dates for the development and testing of BI reports in progress; and (c) require all DM business owners to implement the activities necessary to develop and deliver standard BI reports in their areas.	Important	N/A	N/A		DFS trusts that DM would provide its comments on this recommendation.
2	DFS should: (a) establish minimum quality control controls and standards for all Field Support Suite (FSS) reports; (b) implement monitoring procedures for the reports environment to ensure that only current and valid reports are released in production; and (c) enhance the report development procedures to require that all future FSS reports shall include standard minimum information related to date range parameters and the name of the mission or department to which the data pertains.	Important	Yes	Director, ICTD	Second quarter of 2017	DFS' comments are reflected in the report.
3	DFS should: (i) conduct a comprehensive analysis of all the data and systems utilized during the entire life-cycle of the reporting process; (ii) identify the issues affecting the reliability of data between DFS systems and reporting/Business Intelligence systems; and (iii) design and implement corresponding mitigating	Important	Yes	Director, ICTD	Third quarter of 2017	DFS' comments are reflected in the report.

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[1] Critical recommendations address significant and/or pervasive deficiencies or weaknesses in governance, risk management or internal control processes, such that reasonable assurance cannot be provided regarding the achievement of control and/or business objectives under review.

[2] Important recommendations address important deficiencies or weaknesses in governance, risk management or internal control processes, such that reasonable assurance may be at risk regarding the achievement of control and/or business objectives under review.

Management Response

Audit of reporting, business intelligence and visualization systems in the Department of Field Support

Rec. no.	Recommendation	Critical[1]/ Important[2]	Accepted? (Yes/No)	Title of responsible individual	Implementation date	Client comments
	mechanisms to ensure the efficient and reliable completion of data.					
4	DM should remove links to procurement Supplier Relationship Management (SRM) reports that are not functioning and evaluate the need for replacement reports that would be of use to procurement users in the SRM reporting area.	Important	N/A	N/A		DFS trusts that DM would provide its comments on this recommendation.
5	DM should: (a) establish a target date to implement the semantic layer for Umoja Business Intelligence (BI) reporting; (b) strengthen and provide adequate Umoja BI training to the appropriate users in all business areas, including how to use Umoja BI in day-to-day operations, cross-functional understanding, and the semantic layer; and (c) implement a data quality management process for all business areas.	Important	N/A	N/A		DFS trusts that DM would provide its comments on this recommendation.
6	DM should ensure that users do not have access to Umoja Business Intelligence reports that are under development until the reports are completed, tested, and signed off by the business owners.	Important	N/A	N/A		DFS trusts that DM would provide its comments on this recommendation.
7	DM should: (a) require all business owners to develop a data security model for power user role incompatibilities with respect to sensitive data for their business areas; and (b) assign priority to analyze and resolve the issue of power user requisitioners' ability to view procurement bid data.	Important	N/A	N/A		DFS trusts that DM would provide its comments on this recommendation.
8	DFS should: (a) establish service level agreements with other missions; and (b) strengthen Umoja Business Intelligence support for end users in missions.	Important	Yes	Director, GSC	Third quarter of 2017	DFS' comments are reflected in the report.