



## Educational Software Audit

### Auditoría de software educativo

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#### abstract

This article describes an audit in the IT field, namely the audit of software using the example of Kazan (Volga Region) Federal University. The most significant goal of the audit is to discover the full list of programs installed on the enterprise's machines. This list should include all software products without exception: both used by employees to solve their daily questions, and those programs that were not used at all, but simply downloaded for interest. It is noted, including incorrectly deleted software that has retained its fingerprints in the system. In the work, a comparison was made of the most well-known and used products of Microsoft System Center Configuration Manager and Kaspersky Security Center and a comparative integration of all the information that collects these funds was performed. Collecting and processing data on the software installed on the machines of an educational institution is a time-consuming task. The system of automated software audit connects remotely to computers on the local network and accumulates data about the software installed on them. To improve this process, a program with the necessary interface has been written, which allows obtaining a database that contains data about all computers with the software installed on them. This will further make it possible to formulate recommendations for the further development of the computer park on the example of KPU.

**Keywords:** audit, inventory, software, Microsoft System Center Configuration Manager, Kaspersky Security Center, control, software, database, DBMS.

Este artículo describe una auditoría en el campo de TI, es decir, la auditoría de software utilizando el ejemplo de la Universidad Federal de Kazan (Región del Volga). El objetivo más importante de la auditoría es descubrir la lista completa de programas instalados en las máquinas de la empresa. Esta lista debe incluir todos los productos de software sin excepción: ambos utilizados por los empleados para resolver sus preguntas diarias, y aquellos programas que no se utilizaron en absoluto, sino que simplemente se descargaron por interés. Cabe señalar, incluido el software eliminado incorrectamente que ha conservado sus huellas digitales en el sistema. En el trabajo, se realizó una comparación de los productos más conocidos y usados de Microsoft System Center Configuration Manager y Kaspersky Security Center y se realizó una integración comparativa de toda la información que recolecta estos fondos. Recopilar y procesar datos en el software instalado en las máquinas de una institución educativa es una tarea que requiere mucho tiempo. El sistema de auditoría de software automatizado se conecta de forma remota a las computadoras en la red local y acumula datos sobre el software instalado en ellas. Para mejorar este proceso, se ha escrito un programa con la interfaz necesaria, que permite obtener una base de datos que contiene datos sobre todas las computadoras con el software instalado en ellas. Esto permitirá formular recomendaciones para un mayor desarrollo del parque de computadoras en el ejemplo de KPU.

**Palabras clave:** auditoría, inventario, software, Administrador de configuración de Microsoft System Center, Kaspersky Security Center, control, software, base de datos, DBMS.



## Introduction

As noted in [1], one of the important components of market relations is control. Control can be both state and independent. Independent control is called an audit. The concept of "audit" comes from the Latin word audio - I listen. The main objective of the audit is to ensure the control of the accuracy of the information.

Software audit is the study of all software installed on the organization's network equipment. The audit makes it clear how software is used effectively, and what opportunities there are to improve this performance. The software audit is carried out in four necessary steps:

1. Setting tasks
2. Collect all required information and data
3. Analysis of acquired information
4. Registration of the results in the form of a report

All these tasks can be carried out both manually and automatically using special software.

Audit of the organization's software is designed to solve the following tasks:

- establishing the legality of the software used on the company's computers to prevent penalties;
- determination of the compliance of established programs with business processes and goals of the company and increasing their efficiency;
- reducing or optimizing software maintenance costs; increasing the level of security of the company's information networks.

The result of the audit is the creation of a list of

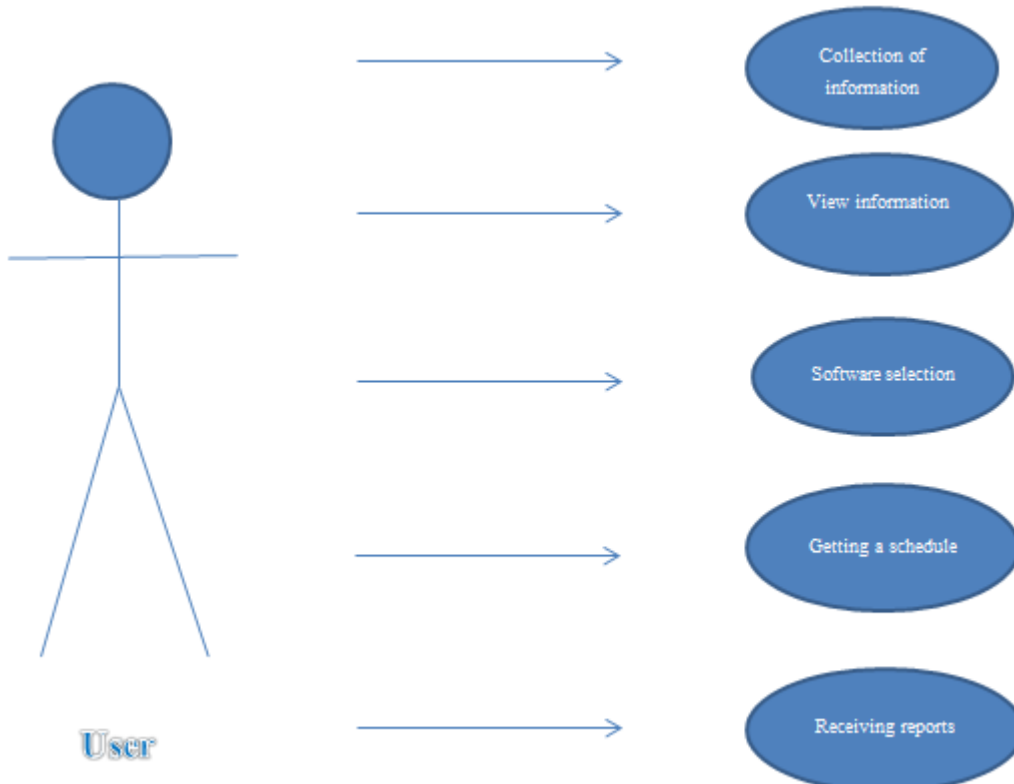
documentation containing detailed information about the software installed on the organization's computers, as well as a set of proposals for improving the quality of operations, improving security, security and efficient use of the software. This paper presents an IT software audit using the example of Kazan (Volga Region) Federal University and outlines methods for constructing services for effective software auditing.

## Methods and Tools

One of the important tasks of the staff of the System Administration Department of the Telecommunications and Information Systems Engineering Center is the collection of data on the software installed on electronic devices of the Kazan Federal University.

Currently, ISTIS KFU employees collect information using products such as Microsoft System Center and Kaspersky Security Center. The collection and processing of data on the software installed on the machines of Kazan Federal University is a time-consuming task. The system of automated audit software KFU remotely connected to computers on the local network and accumulates data about the software installed on them. Schemes of the system of automated audit software KFU presented in Figure 1.

Designation: User - user, Collection of information - Information collection, View information - Software selection - Software selection, getting a schedule - Receiving a schedule, receiving reports - Receiving reports.





### Fig.1 The system of automated audit software KFU

The main problem encountered by the employees of the system administration department when conducting an audit of software is the lack of integrity and completeness of data. This paper compares the two main audit products and integrates all the information that these funds collect. Consider in brief these products.

#### **Microsoft System Center Configuration Manager**

Microsoft's System Center Configuration Manager is a tool for centrally updating and deploying applications, auditing computers and software, and monitoring. [2,17] The product also includes Asset Intelligence. Asset Intelligence compiles installed software with support for software agents. The automatically updated catalog contains a description of more than 300 thousand items from different manufacturers.

SCCM includes workstation management tools. This software product is used in a complex IT infrastructure.

System Center Configuration Manager organizes software distribution from a single console, counts programs, compares installed and authentic configuration values, scales the conclusion, minimizes risks, makes it possible to distinguish security problems, remotely connects to a computer from a common console, updates offline, interacts with System Center Virtual Machine Manager and provides a service of virtual machines stored in the library.

This product is licensed by KFU since the automatically updated catalog contains a description of more than 300 thousand items from different manufacturers. Catalog and categories can be updated independently. AI has special import tools, server licensing resources, processor licenses, etc. The price of the System Center Configuration Manager, which includes the AI, is approximately \$ 40 for the license you need to buy for each computer. Of course, only the Windows platform is supported.

#### **Kaspersky Security Center**

Kaspersky Security Center is a mechanism for managing a security system that gives a system administrator access to detailed information about the degree of network security. [3] This powerful and convenient software product helps to ensure the correct operation of the company's IT infrastructure and increase the productivity of its business.

In addition to detailed control over the security of the IT infrastructure, KSC contains system administration tools that provide an opportunity to increase efficiency and reduce operating costs.

Kaspersky Security Center allows you to adjust the operating system images: create, copy and deploy.

In Kaspersky Security Center there is a function of remote installation of software, which saves time for system administrators and reduces the size of the traffic transmitted over the network.

Kaspersky Security Center allows you to manage software and monitor software licenses. This software product contains the function of automatic accounting of hardware. To monitor the programs used in the KSC there is the possibility of creating reports. [4,16]

Consider the use of the described tools for auditing.

To use System Center Configuration Manager, you need to connect to a virtual private network (VPN). By completing the VPN connection to the kfu corporate network, you can use SCCM. With the help of the System Center Configuration Manager software product, it is possible to view information about computer hardware and software of Kazan Federal University installed on them. During the work, it was found that more than 5,000 computers are used at the KFU.

SCCM software product allows you to view information about used computers. In particular, using this program, you can get the computer name, information about the hardware, information about the software, etc. Figure 2 shows one of the SCCM screens.



Значок	Имя	Клиент	Код сайта	Активность клиентов
	CLASS-05-102-14	Нет	PRM	
	CLASS-12-305-01	Да	PRM	Активное
	CLASS-12-307-01	Нет	PRM	
	CLASS-13-211-01	Да	PRM	Активное
	CLASS-14-108-01	Да	PRM	Активное
	CLASS-14-109-01	Да	PRM	Активное
	CLASS-14-1213-1	Да	PRM	Активное
	CLASS-14-1311-0	Да	PRM	Активное
	CLASS-14-1313-1	Да	PRM	Неактивное
	CLASS-14-216-01	Да	PRM	Активное
	CLASS-14-218-02	Да	PRM	Активное
	CLASS-14-309-01	Да	PRM	Активное
	CLASS-14-312-01	Да	PRM	Активное
	CLASS-14-402-01	Да	PRM	Активное
	CLASS-14-403-01	Да	PRM	Активное
	CLASS-14-404-01	Да	PRM	Активное
	CLASS-14-409-01	Да	PRM	Активное
	CLASS-14-411-02	Да	PRM	Неактивное
	CLASS-16-310-01	Нет	PRM	

Fig. 2. Issuance of information about customer activity.

With the help of the SCCM program, it is possible to make queries in the SQL language and build various reports on these requests. Figure 3 presents a request for a sample of all software, versions and software manufacturers.

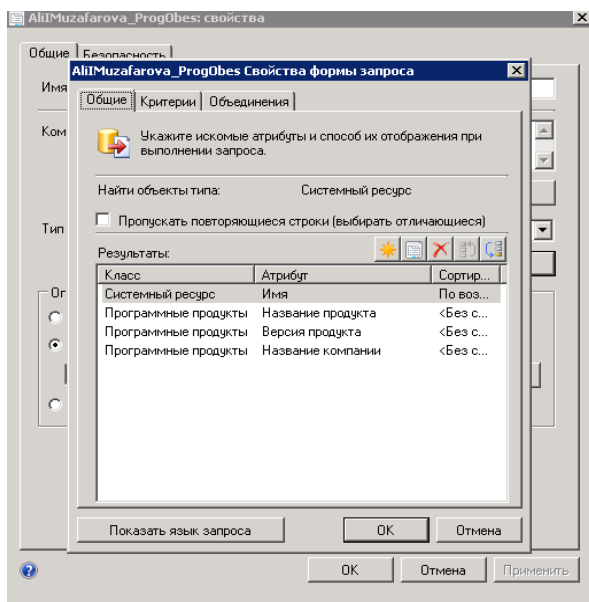


Fig. 3. Request for selection of all software,

versions and software manufacturers

The following query was created for selecting software, versions and manufacturers in MS SQL:

```

Select
CM_PRM.dbo.[vSMS_R_System].[Name0],CM_
PRM.dbo.vSMS_G_System_SoftwareProduct.
[ProductName],CM_PRM.dbo.vSMS_G_System_
SoftwareProduct.[ProductVersion],CM_PRM.dbo
.vSMS_G_System_SoftwareProduct.CompanyNa
me
FROM
CM_PRM.dbo.vSMS_R_System,CM_PRM.dbo.v
SMS_G_System_SoftwareProduct
Where CM_PRM.dbo.vSMS_R_System.ItemKey
=
CM_PRM.dbo.vSMS_G_System_SoftwareProduc
t.ClientId
Order
by
CM_PRM.dbo.[vSMS_R_System].[Name0]

```

The query results were exported to excel (Fig. 4). It turned out 533178 different software products.



	A	B	C	D
108607	DVS-05-217-05	SetACL	2, 1, 3, 0	Helge Klein
108608	DVS-05-217-05	Microsoft Windows Operating System	5.5.0031.0	Microsoft Corporation
108609	DVS-05-217-05	Microsoft Setup Bootstrapper	14.0.7011.1000	Microsoft Corporation
108610	DVS-05-217-05	Microsoft Office 2010	14.0.7006.1000	Microsoft Corporation
108611	DVS-05-217-05	Microsoft Office 2010	14.0.6009.1000	Microsoft Corporation
108612	DVS-05-217-05	Watson Subscriber for SENS Network Notification	14.0.7011.1000	Microsoft Corporation
108613	DVS-05-217-05	Microsoft® Visual Studio® 2010	10.0.40305.0	Microsoft Corporation
108614	DVS-05-217-05	Microsoft Office 2010	14.0.7011.1000	Microsoft Corporation
108615	DVS-05-217-05	Microsoft Office 2010	14.0.6022.1000	Microsoft Corporation
108616	DVS-05-217-05	DSConfig	1.0.0.1	MONOGRAM Multimedia, s.r.o.
108617	DVS-05-217-05	Microsoft Office 2010	14.0.7010.1000	Microsoft Corporation
108618	DVS-05-217-05	Microsoft OneNote	14.0.6009.1000	Microsoft Corporation
108619	DVS-05-217-05	Adobe Acrobat text extractor for non-PDF files	11.0.0.379	Adobe Systems Incorporated
108620	DVS-05-217-05	Microsoft Office 2010	14.0.7007.1000	Microsoft Corporation
108621	DVS-05-217-05	Microsoft Office Help Viewer	14.0.7010.1000	Microsoft Corporation
108622	DVS-05-217-05	Microsoft Application Error Reporting	14.0.7011.1000	Microsoft Corporation
108623	DVS-05-217-05	Microsoft Office 2010	14.0.7005.1000	Microsoft Corporation
108624	DVS-05-217-05	Microsoft Office 2010	14.0.7005.1000	Microsoft Corporation
108625	DVS-05-217-05	Microsoft Office 2010	14.0.6108.5000	Microsoft Corporation
108626	DVS-05-217-05	SelfCert	14.0.7011.1000	Microsoft Corporation
108627	DVS-05-217-05	Bootstrapper Small	11.0.0.379	Adobe Systems Incorporated
108628	DVS-05-217-05	Intel(R) Graphics	1, 5, 47, 0	Intel Corporation
108629	DVS-05-217-05	Intel(R) Installation Framework	1, 4, 1, 0	Intel Corporation

Fig.4. Query results in excel from SCCM

Similar actions were performed in Kaspersky Security Center. In the MS SQL DBMS, a request was made to select all software, versions and software producers installed on computers of the Kazan Federal University.

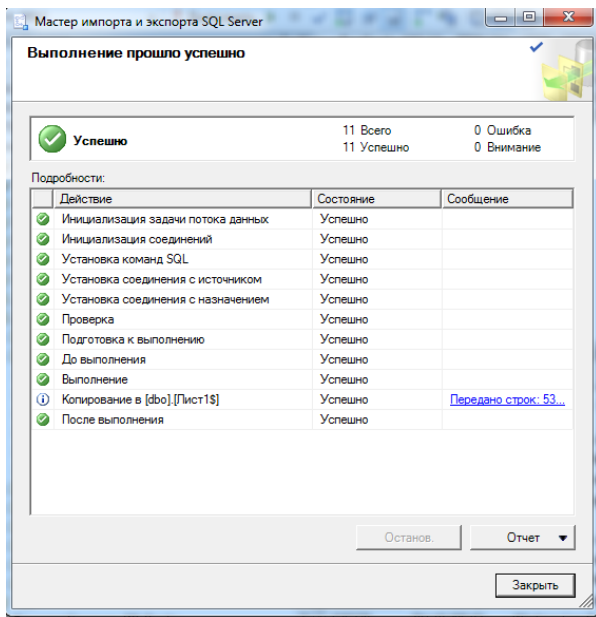
select  
h.wstrDisplayName,  
a.[wstrPublisher],  
a.wstrDisplayName,

a.wstrBuild  
from  
KAV.dbo.v\_akpub\_host as h  
INNER JOIN  
KAV.dbo.v\_akpub\_application as a  
ON h.nId = a.nHostId  
ORDER BY h.wstrDisplayName ASC  
Results of export to excel, 324621 different software products:

MICROSOF-408452	J-Link ARM V4.59d	V4.59d	SEGGER Microcontroller Systeme GmbH
КА-ПК	ScanSnap Organizer	V5.1L42	PFU
ИРИНА-ПК	SAMSUNG Android USB Modem Software	V5.28.2.1	
КА-ПК	CardMinder	V5.2L20	PFU
NEWWORKER	Drive Space Indicator v5.3.5.5	v5.3.5.5	DougieFresh's
IF-12-1109-15	Drive Space Indicator 5.3.6.4	v5.3.6.4	DouglasSoft LTD
IGNGT-13-111-06	Auslogics BoostSpeed	v5.4.0.10	alert30
DO-01-114-01	ScanSnap Manager	V5.5L10	PFU
UMU-02-110B-01	ScanSnap Manager	V5.5L10	PFU
UMU-01-114-03	ScanSnap Manager	V5.5L10	PFU
DO-01-116-18	ScanSnap Manager	V5.5L10	PFU
IFMB-04-38-02	MiraScan 6.1(5550 series)	V6.1(5550 series)	Benq Scan
КА-ПК	ScanSnap Manager	V6.2L24	PFU
DO-01-123-18	ScanSnap Manager	V6.5L40	PFU
IFMB-11-203-01	mp3Tag Pro	v7.2.0.526	ManiacTools
IFI-33-209B-03	Total Commander	v7.56 Final	oszone.net
IFI-33-122-02	Total Commander	v7.56 Final	oszone.net
IF-12-101B-06	ALZip 8.51	v8.51	ESTsoft Corp.
OFFICE-1	VueScan 9.0.57	v9.0.57	© ZverDvD
IFMB-11-203-01	VueScan 9.0.61	v9.0.61	Hamrick Software
MYCOMP	UltraISO	v9.3.5 Build 2716	oszone.net
IVMT-14-1206-01	TeXnicCenter Version 1.0 Stable RC1	Version 1.0 Stable RC1	TeXnicCenter.org
IVMT-14-1206-08	TeXnicCenter Version 1.0 Stable RC1	Version 1.0 Stable RC1	TeXnicCenter.org

Fig. 5. Query results in excel from KSC

Next, data was imported from the received data collection sources into a new database using the SQL Server Import and Export Wizard. (pic.6)



**Fig. 6.** Importing Data Using SQL Server Import and Export Wizard

As a result of the import, two tables were obtained: dbo. Kaspersky, dbo.SCCM

Further, with the help of the following query, two tables were combined into one, which was called dbo.KS (Fig. 7)

Request:

```
SELECT * INTO[KS]FROM [Diploma (Finished plates)].[dbo].[SCCM]
UNION SELECT *FROM [Diploma (Ready plates)].[dbo].[ Kaspersky]
```

	Name	Name of Product	Version of Product	Name of Company
400	IVMIT-14-910-...	Microsoft SQL Server Data Tools Build Utilities - RUS...	11.1.20627.00	Microsoft Corporation
401	IVMIT-14-910-...	Microsoft SQL Server Database Publishing Wizard 1.3	10.0.1600.22	Microsoft Corporation
402	IVMIT-14-910-...	Microsoft SQL Server Native Client	09.00.3042.00	Microsoft Corporation
403	IVMIT-14-910-...	Microsoft Sync Framework Runtime v1.0 (x64) ru	01.0.1215.0	Microsoft Corporation
404	IVMIT-14-910-...	Microsoft Sync Services for ADO.NET v2.0 (x64) ru	02.0.1215.0	Microsoft Corporation
405	IVMIT-14-910-...	Microsoft System CLR Types для SQL Server 2012	11.0.2100.60	Microsoft Corporation
406	IVMIT-14-910-...	Microsoft System CLR Types для SQL Server 2012 (...)	11.0.2100.60	Microsoft Corporation
407	IVMIT-14-910-...	Microsoft Visual C++ 2005 Redistributable	08.0.61001	Microsoft Corporation
408	IVMIT-14-910-...	Microsoft Visual C++ 2005 Redistributable (x64)	08.0.61000	Microsoft Corporation
409	IVMIT-14-910-...	Microsoft Visual C++ 2008 Redistributable - x64 9.0.3...	09.0.30729.4148	Microsoft Corporation
410	IVMIT-14-910-...	Microsoft Visual C++ 2008 Redistributable - x64 9.0.3...	09.0.30729.6161	Microsoft Corporation
411	IVMIT-14-910-...	Microsoft Visual C++ 2008 Redistributable - x86 9.0.3...	09.0.30729.4148	Microsoft Corporation
412	IVMIT-14-910-...	Microsoft Visual C++ 2008 Redistributable - x86 9.0.3...	09.0.30729.6161	Microsoft Corporation
413	IVMIT-14-910-...	Microsoft Visual C++ 2010 x64 Redistributable - 10.0...	10.0.40219	Microsoft Corporation
414	IVMIT-14-910-...	Microsoft Visual C++ 2010 x86 Redistributable - 10.0...	10.0.40219	Microsoft Corporation
415	IVMIT-14-910-...	Microsoft Visual C++ 2017 Redistributable (x64) - 14....	14.11.25325.0	Microsoft Corporation
416	IVMIT-14-910-...	Microsoft Visual C++ 2017 Redistributable (x86) - 14....	14.11.25325.0	Microsoft Corporation

**Fig.7.** Fragment of the result of a table join query

In the dbo.KS table we have 823006 software products.

At the final stage, a request was created, which among all the identical software products selects the product with the largest version. A new table with unique lines was formed, in which all software products are taken with the maximum version. (Fig. 8)

```
Select [Diploma (Finished Plates)]. Dbo.KS.
[Name], [Diploma (Finished Plates)]. Dbo.KS.
[Product Name], [Diploma (Finished Plates)].
```

```
Dbo.KS. [Company Name], MAX ([Diploma
(Finished Plates)]. Dbo.KS. [Product Version]) as
INTO Version [Diploma (Finished Plates)]. Dbo.
[Finished Table] FROM [Diploma (Ready
plates)]. Dbo.KS GROUP BY [Diploma (Finished
plates)]. Dbo.KS. [Name], [Diploma (Finished
plates)]. Dbo.KS. [Product name], [Diploma
(Finished plates)]. Dbo.KS. [Company name]
HAVING COUNT(*) >=1
ORDER BY [Diploma (Ready plates)]. Dbo.KS.
[Name]
```

	Name	Name of Product	Name of Company	Version
562	10TD-1...	Microsoft Lync 2010	Корпорация Майкрософт	04.0.7577.0
563	10TD-1...	Microsoft Outlook	Microsoft Corporation	14.0.7172.5...
564	10TD-1...	Microsoft Setup Bootstrapper	Microsoft Corporation	14.0.7011.1...
565	10TD-1...	Microsoft Visual C++ 2005 Redistributable (x64)	Microsoft Corporation	08.0.61000
566	10TD-1...	Microsoft Visual C++ 2008 Redistributable	Microsoft Corporation	09.0.30729....
567	10TD-1...	Microsoft® Office	Microsoft Corporation	14.0.0370.400
568	10TD-1...	MPC-HC	MPC-HC Team	01.7.10.290 ...
569	10TD-1...	WinScan2PDF SoftwareOK.com	Nenad Hrg (SoftwareOK.com)	2. 7. 1. 0
570	10TD-1...	7-Zip 16.04 (x64)	Igor Pavlov	16.anp
571	10TD-1...	Adobe Acrobat Update Service	Adobe Systems Incorporated	1. 7. 0. 0
572	10TD-1...	Adobe Flash Player 24 NPAPI	Adobe Systems Incorporated	24.0.0.194
573	10TD-1...	Adobe Installation Helper	Adobe	02.0.2.13
574	10TD-1...	BGInfo	Sysintemals	4. 16. 0. 0
575	10TD-1...	Bootstrapper Small	Adobe Systems Incorporated	11.0.0.379
576	10TD-1...	FineReader	ABBYY.	11.0.102.481
577	10TD-1...	FineReader Tech	ABBYY.	11.0.1002.329
578	10TD-1...	Google Update	Google LLC	01.3.34.7
579	10TD-1...	Kaspersky Security Center	AO Kaspersky Lab	10.4.6000.0
580	10TD-1...	K-Lite Mega Codec Pack 12.8.5	KLCP	12.08.2005
581	10TD-1...	KmInstall Core Module	KYOCERA Document Solutions I...	05.1.1202
582	10TD-1...	Kyocera Product Library	KYOCERA Document Solutions I...	05.0.1120
583	10TD-1...	Kyocera TWAIN Driver	KYOCERA Document Solutions I...	02.0.3404
584	10TD-1...	Microsoft .NET Framework 4.6.1	Microsoft Corporation	04.6.01055
585	10TD-1...	Microsoft Equation Editor	Design Science, Inc.	03.янв
586	10TD-1...	Microsoft Visual C++ 2008 Redistributable -x86 9.0.3...	Microsoft Corporation	09.0.30729....
587	10TD-1...	Microsoft Visual C++ 2010 x86 Redistributable 10.0	Microsoft Corporation	10.0.40219

Fig. 8. Query result fragment

**Summary**

Thus, a comparative integration of the two software tools for auditing the Microsoft System Center Configuration Manager and Kaspersky Security Center software was performed. As a result of all the above actions, a database was obtained in which all information about the software of the Kazan (Volga Region) Federal University, collected from two sources of information collection, was collected.

**Conclusion**

It can be said that Microsoft System Center Configuration Manager accumulates more information than Kaspersky Security Center. The request to SCCM produced 533178 lines, and the KSC request was 208557 lines less. However, KSC collects information more accurately than SCCM. Using these two products allows you to collect information about the installed software of the organization most accurately and extensively.

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**References**

[1]. Information technology audit: A textbook for universities / Grekul V.I. - M.: Gore. Line-Telecom, 2015. - 154 p.

[2]. Managing a Microsoft Lifecycle Policy with the Configuration Manager [Electronic Resource]. - Access Mode: <https://docs.microsoft.com/ru-ru/sccm/core/clients/manage/asset-intelligence/product-lifecycle-dashboard> (Contact Date: 05/06/2019)

[3]. Kaspersky Security Center [Electronic resource]. - Access Mode: <https://www.kaspersky.com/small-to-medium-business-security/security-center> (Contact Date: 05/06/2019)

[4]. Kaspersky Security Center [Electronic resource]. - Access mode: <http://www.csoft.ru/catalog/soft/kaspersky-security-center/kaspersky-security-center.html> (Date of appeal 05/05/2019)

[5]. Textbook for students of institutions of secondary vocational education / G. S. Gokhberg, A. V. Zafievsky, A. A. Korotky. - 8th ed. M: Publishing center "Academy", 2013. - 208 p.

[6]. Programming Languages: Tutorial / OL. Golitsyna, T.L. Partyka, I.I. Popov. - 3rd ed.,



Pererab. and add. - M.: Forum: SIC INFRA-M, 2017. - 400 p.

[7]. Information technology: Textbook / O.L. Golitsyna, N.V. Maksimov, T.L. Partyka, I.I. Popov. - 2nd ed., Pererab. and add. - M.: Forum: INFRA-M, 2008. - 608 p.

[8]. Technical means of informatization: Textbook / N.V. Maksimov, T.L. Partyka, I.I. Popov. - 4th ed., Pererab. and add. - M.: Forum: SIC INFRA-M, 2013. - 608 p.

[9]. Audit: theory and practice: Textbook: In 2 parts Part 1: Theory / L.I. Voronin. - 4th ed., Pererab. and add. - M.: INFRA-M, 2018. - 314 p.

[10]. Audit: Studies. manual / S.M. Bychkova, E.Yu. Itygilova; Ed. IM IN. Sokolova. - M.: Master, 2009. - 463 p.

[11]. Audit: Uch. / Fedorenko I.V., Zolotareva G.I. - M.: NIC INFRA-M, 2016. - 272 p.

[12]. Audit: Workshop: Study Guide / N.V. Parushin, S.P. Suvorov, E.V. Galkina. - 3rd ed., Pererab. and add. - M.: ID FORUM: SIC INFRA-M, 2013. - 288 p.

[13]. SQL - the language of relational databases: Tutorial / Kara-Ushanov V.Yu., - 2nd ed., Sr. - M.: Flint, Publishing House Ural. Un-one, 2017. - 156 p.

[14]. Kultigin, O. P. Database administration. DBMS MS SQL Server [Electronic resource]: studies. allowance / O. P. Kultigin. - M.: MFPA, 2012. - 232 p.

[15]. Microsoft SQL Server 2012: Manual / Bondar AG - St. Petersburg: BHV-Petersburg, 2013. - 608 p.

[16] Baykalova, E. D., Artyna, M. K., Dorzhu, N. S., Ochur, T. K., & Mongush, D. S. (2018). Morphological interference in the process of mastering English speech in conditions of interaction of Tuvan, Russian and English as a foreign language. *Opción*, 34(85-2), 35-60.

[17] Parvizian, F., Ghojavand, K., & Niknejadi, F. (2015). Effectiveness of Emotional Intelligence on Emotional Alexithymia of Married Women Teachers in Yasuj City. *UCT Journal of Social Sciences and Humanities Research*, 3(1), 32-35.