UTILIZATION OF CLOUD COMPUTING AS A SMART ELECTRONIC ADVISING MANAGEMENT SYSTEM FOR THE STUDENTS AT UNIVERSITY OF HA'IL

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ABSTRACT: *The study aims to extrapolate the effect of using cloud computing in the academic advising system among the students and academic advisors at the University of Hail, KSA, as well as the importance of modern technology in improving academic guidance in the university and the challenges that both students and academic advisors of the university facing in "Cloud Computing System (CCS)". In order to get sufficient information on this topic, the research adopts descriptive and analytical methodology by designing a questionnaire for the purpose of data collection, analysing it, and draw a conclusion. Seventy-nine (79) academic advisors and two-hundred-and-ninety-seven (297) students from different colleges of the university were used as a sample for this study. The study found that the academic advisors at the university are highly competent to use the "CCS" and its applications, as they also highly satisfied with the university's provisions for it, while moderately satisfied with the current academic advising system. As for the university's students, the study found that they are highly satisfied with the current academic advising system too, and moderately satisfied with the university's provisions for "CCS". While their satisfaction with the way the academic advisors relate with them and their competency in using "CCS" is low. The study recommends the following: it is important for the university to organise (from time to time) intensive training courses on using "CCS". It also suggests conducting extra field studies to be acquainted with the technical obstacles facing the advisors in using "CCS" for academic advising. The study concluded by developing a technical concept for the strategy of applying "CCS" to the academic advising system in the University of Hail.*

Keywords: cloud computing, i-cloud, academic advising, student, advisor.

INTRODUCTION

Today, humanity is witnessing rapid and tremendous development in numerous aspects of life, due to rapid progress in the evolution of knowledge and acceleration of information. Therefore, a general sentiment has grown in most of the developed and developing countries tending to believe that society is undergoing a shift towards the computerized world, as a consequence of revolution invades the world of information and computer industry. Thus, the computer is expected to play a fundamental role in various aspects of professional and educational life in our society [1].

"Cloud Computing" is one of the most important developments in the history of computing. However, it is not widely known nor accepted, valued, and economically sustained until recent developments in technologies emerged, despite that the foundation of computing has been in existence for a while. In addition to its importance, it opens room for more innovation in order to address the challenges that IT professionals and business tycoons facing today.

It might be said that the need for "Cloud Computing" is more important at this present time when the technical innovations and the challenges and opportunities posited by educational developments are overlapped. In the aspect of technology, "Cloud Computing" is a prominent factor in achieving major technological developments such as mobile computing, big data, the Internet of things (IoT), machine learning, artificial intelligence, etc. As for the aspect of educational developments, "Cloud Computing" is an important technical model that can help address some basic challenges facing educational developments and their government applications in relation to digital transformation, the transformation of education systems, service provision, and ability to act to meet the needs of the concerned departments, societal challenges, etc., due to the agile, cost-effective and innovative nature of "Cloud Computing" [2].

Upon taking a closer look at these transformative technology trends, one can easily recognize that cloud services represent a catalyst and an enabler for each of these trends. For instance, "Cloud Computing" can help store the "data deluge" which we have reached today and provide the ability to analyze and derive information from it faster than ever before. It can also aid the emergence of "huge data centers" that will provide low-cost storage capacity and unprecedented computing capacity at the same time. In addition, with emerge of new researches in technology and algorithm for data search and extraction, and developments in machine learning and artificial intelligence, governments, and educational institution would be helped to make smarter decisions more quickly and provide better-services to workers, customers, and citizens. [3]

Cloud computing can also help governments and educational institutions gain greater flexibility and capacity to act rapidly by providing new services quickly at extreme low-cost, which reduces the risk of failure, as well as managing business routine more smoothly than traditional methods. By virtue of cloud computing technology, governments and educational institutions will be able to create new generations of services that focused on day-to-day business processes and issues instead of focusing on purchasing and managing the entire technology chain, such as hardware, networks, management, security, etc., that the cloud platform is really interested in [4].

This study proposed a smart system for academic counseling using cloud computing technology. The study analyzed the current system of the University of Ha'il and highlighted the features that need to be improved as well as implementing cloud computing technology.

Theoretical Framework

The use of "Cloud Computing" in teaching and education has gradually become a platform approved by individuals, industries, and academic institutions [5]. For example, the constant need for new buildings in the developing countries' universities prompted decision-makers in educational institutions to resort to technical and educational advancements in the formal education sector. For this reason, "Cloud Computing" and its applications are basic needs for the future of distance education worldwide [6].

There are many capabilities in "Cloud Computing" that facilitate effective participation in the scope of "smart clusters". Smart environments contain connections between incompatible devices yet maintain their stability and durability. Among the common challenges faced by "Cloud Computing" are the large capacity required by high Internet speed, which will lead to additional operational costs. In addition, the reliability and security of information may interfere with multiple uses of the same equipment and devices by multiple users, which could make using completely uncontrolled by the user. [7]

In a collaborative context, "Cloud Computing" has become the focus of educational researchers, especially in the context of overcoming the underlying problems of information exchange across the mixed space of the internet. It is also enabled teachers and trainers to communicate with their students, especially for the purpose of discussing and learning specific educational tasks. However, despite the importance of cloud services today in education and teaching, our knowledge of their applications in higher education is still limited [8].

Research Problem:

The problem of the study lies in investigating the importance of using "Cloud Computing Technology" in improving the academic advising service from the student's point of view and academic advisors, as this technology is considered among the modern innovations in the field of information technology (IT) that provides better infrastructure, skilled experiences, faster learning, and higher quality procedures [7]. One of the most important features of a cloud host is that it reduces the time factor to realize the value of software, provides flexible absorptive capacity at the infrastructure and human resources level to manage its structure. In some cases, the cloud allows faster access and connection than ever before [2]. And instead of storing data-packed app on local devices, the administrative personnel can get the tools they need directly from the cloud, which saves space and keeps devices and networks operating at their highest efficiency. [9]

Research Objectives

The study aims to evaluate the reality of using "Cloud Computing" in academic counseling among students and academic advisors of the University of Hail, KSA. In order to get information about:

1- The degree to which students at the university benefit from the use of "CCS" for academic counseling.

2- The challenges facing students and academic advisors at the university in utilizing "CCS" in academic counseling.

3- The experience of the university in the utilization of "CCS" in academic counseling from the student's and advisors' side.

Significance of the Research

The significance of the research might be summarized in the following points:

1- The study's interest in extrapolating the students and academic advisors' opinions on the impact of using "CCS" for academic advising at the University of Hail, KSA, and ways to develop it from their point of view.

2- The study's interest in searching for weaknesses and shortcomings, quality and the distinctions of the academic advising services provided through the "CCS" as observed by the beneficiaries, students, and academic advisors.

3- Research's proposal for the best ways to promote academic advising, as observed by the students.

4- This study is one of the few studies that sought to evaluate and develop an important aspect of the University of Hail's experience in using "CCS" for distance education.

RESEARCH METHODOLOGY

The research adopts the descriptive and analytical approach to analyse the collected data for the study.

A- Research Population: The study population consists of all the regular students and academic advisors at the University of Hail, KSA.

B- Research Sample: The sample used in this study is comprised of seventy-nine (79) academic advisors and two-hundred-and-ninety-seven (297) students of the University of Hail, KSA, for the academic year 2019AD.

C- Research Tool: Theoretical framework and previous literature related to the research were used to design a questionnaire for this research, in order to identify the cloud computing service that is been used in academic advising through the observation of students and academic advisors.

Presentation of Data Analysis

First Field of Study: Academic Advisors' View

Answer to the first question about the academic advisors' view on the current system of academic advising at the University of Hail.

To answer this question, the frequency, percentage, and mean of the responses of the study sample to the first section of the questionnaire were calculated, which includes the question about the academic advisors' view on the current system of academic advising at the University of Hail. The results were as shown in the table below:

Table 1: Frequency, percentage, and mean of the responses of the study sample to the academic advisors' view on the current system of academic advising

Academic Advising Services	Frequency & Percentage	Academic Advisors' View					Mean
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
Able to accommodate large numbers of male / female students	F	0	54	0	14	11	2.77
	%	0	68	0	18	14	
Provides all necessary information about the male and female student	F	0	26	23	26	4	3.10
	%	0	33	29	33	5	
Provides sufficient information about the study plan and course descriptions	F	0	45	0	20	14	3.04
	%	0	57	0	25	18	
It has decision support systems	F	2	33	10	23	11	3.10
	%	3	42	13	29	13	
Academic advising instructions and procedures are available	F	1	34	10	23	11	3.11
	%	1	43	13	29	13	
Supports the means of communication between the advisor and the students	F	0	24	30	22	3	3.05
	%	0	30	38	28	4	
Supports the means of communication between the advisor and the college	F	0	24	18	32	5	3.23
	%	0	30	23	41	6	
Supports the means of communication between the advisor and the Deanship of Student Affairs	F	0	27	22	29	1	3.05
	%	0	34	28	37	1	
Overall Mean	3.05						

Answer to the second question about the academic advisor's knowledge of cloud computing.

To answer this question, the frequency, percentage, and mean of the responses of the study sample were calculated in the second section of the questionnaire, which includes the question about the extent of the academic advisors' knowledge of the University of Hail with cloud computing technology. The results were as shown in the table below:

Table 2: Frequency, percentage, and mean for the responses of the study sample to the expressions of the field of academic advisors' knowledge of cloud computing

Knowledge of cloud computing technology	Frequency & Percentage	Academic Advisors' View					Mean
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
Knowledge of cloud computing technology	F	4	7	12	31	25	3.84
	%	5	9	15	39	32	
Applications and services provided by cloud computing technology	F	2	7	18	29	23	3.81
	%	3	9	23	37	29	
Knowledge of I-cloud technology on I-pad and i-phone	F	0	17	16	28	18	3.59
	%	0	22	20	35	23	
Knowing websites that rely on cloud computing applications such as Google Drive	F	0	5	8	39	27	4.11
	%	0	6	10	49	34	
Cloud computing enables you to interact with the system from anywhere and from any device	F	0	8	11	37	23	3.95
	%	0	10	14	47	29	
Knowing that cloud computing reduces system costs	F	2	5	8	37	27	4.04
	%	3	6	10	47	34	
That cloud computing provides data centres	F	0	8	10	38	23	3.96
	%	0	10	13	48	29	
That cloud computing provides storage space	F	0	5	9	31	34	4.19
	%	0	6	11	39	43	
Overall Mean	3.94						

Answer to the third question about the academic advisors' view on what the university offers in terms of cloud computing services.

To answer this question, the frequency, percentage, and mean of the responses of the study sample were calculated to the third section of the questionnaire, which includes the question about the academic advisors' view on what the university provides regarding cloud computing services. The results were as shown in the table below:

Table 3: Frequency, percentage, and mean of the responses of the study sample to the academic advisors' view on what the university provides regarding cloud computing services

The academic advisors' view on cloud computing services at the university	Frequency & Percentage	Academic Advisors' View					Mean
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
The university owns the infrastructure that enables the application of cloud computing	F	0	10	7	34	28	4.01
	%	0	13	9	43	35	
Top management understands the benefits of cloud computing	F	0	8	14	29	28	3.97
	%	0	10	18	37	35	
Technology managers understand the benefits of cloud computing	F	0	8	12	39	20	3.89
	%	0	10	15	49	25	
Employees understand the benefits of cloud computing	F	0	17	8	26	28	3.82
	%	0	22	10	33	35	
The university provides appropriate technical support	F	0	8	11	34	26	3.98
	%	0	10	14	43	33	
The university provides adequate technical training on using modern technologies for the university employee.	F	0	16	8	33	22	3.77
	%	0	20	10	42	28	
The university has partnerships that enable it to benefit from cloud computing services	F	0	17	16	22	24	3.67
	%	0	22	20	28	30	
Overall Mean		3.87					

Second Field of the Study: Students' View

The first question about students' opinions on the current academic advising system at the University of Hail.

To answer this question, the frequency, percentage, and mean of the responses of the study sample to the fourth section to the questionnaire were calculated, which includes the question about the students' view on the current academic advising system at the University of Hail. The results were as shown in the table below:

Table 4: Frequency, percentage, and mean of the responses of the study sample to the students' view on the current academic advising system

Academic Advising Services	Frequency & Percentage	Students' View					Mean
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
I was aware of the courses to be registered for the current level	F	0	0	64	82	151	4.29
	%	0	0	21.5	27.5	50.7	
I had full knowledge of the electronic registration process	F	1	0	62	87	147	4.27
	%	0.3	0	20.8	29.2	49.3	
I did not encounter any problems during the online registration process	F	4	0	68	88	137	4.19
	%	1.3	0	22.8	30.0	46.0	
Resources to help me complete the course registration were available	F	3	2	32	154	106	4.20
	%	1.0	0.7	10.7	51.7	35.6	
The academic advisor in the department was cooperating with me to fulfil my desires for courses registration	F	3	2	30	156	106	4.21
	%	1.0	0.7	10.1	52.3	35.6	
The waiting period for completing the registration process by Student Affairs was acceptable in the department	F	4	2	58	118	115	4.14
	%	1.3	0.7	19.5	39.6	38.6	
The academic advisor explained to me the link between the courses and the department's study plan details	F	24	5	52	136	80	3.82
	%	8.1	1.7	17.4	45.6	26.8	
The academic advisor was committed to guide me or solve my problem	F	26	5	50	133	83	3.81
	%	8.8	1.7	16.8	44.8	30	
The academic advisor was following up on my progress during the semester	F	24	6	44	147	76	3.82
	%	8.1	2.0	14.8	49.5	25.6	
The academic advisor uses to advise and guide me during the semester	F	46	46	0	82	123	3.64
	%	15.5	15.5	0	27.6	41.4	
My academic advisor used to encourage me to develop my ideas and approaches in my field of study	F	26	26	43	170	32	3.53
	%	8.8	8.8	14.5	57.2	10.8	
Overall Mean		3.99					

Second Question about students' relationship with the academic advisor
To answer this question, the frequency, percentage, and mean of the responses of the sample used in section five of the questionnaire were calculated, which includes the question about the students' views on their relationship with the academic advisor at the University of Hail. The results were as shown in the following table:

Table 5: Frequency, percentage, and mean of the responses of the students' views on their relationship with the academic advisor

Students' Relationship with Academic Advisor	Frequency & Percentage	Students' View				Mean
		No	Sometimes/ A bit	Unknown	Yes	
Do you always resort to the academic advisor for advice when you face problems?	F	38	162	-	97	2.19
	%	12.8	54.55	-	32.66	
Does the academic advisor have fixed times for the interview?	F	42	22	10	222	2.68
	%	14.14	7.41	3.37	74.75	
The academic advisor is present during the office hours designated for academic advising.	F	61	-	-	236	2.59
	%	20.3	-	-	79.3	
Do you feel that the academic advisor solves your problems?	F	53	53	-	191	2.46
	%	17.85	17.85	-	64.31	
Is the academic advisor keen to solve the students' problems in a freeway and confidentiality?	F	92	46	-	159	2.22
	%	30.98	15.49	-	53.54	
Overall Mean		2.43				

The third question about students' knowledge of cloud computing
To answer this question, the frequencies, percentages, and means of the responses to the sixth section of the questionnaire were calculated, which includes the question about the extent of students' knowledge at the University of Hail about cloud computing. The results were as follow in the table below:

Table 6: Frequencies, Percentages, and Means of the Responses to the Students' Knowledge of Cloud Computing

Students' Knowledge of Cloud Computing	Frequency and Percentage	Students' Opinion			Mean
		No Knowledge	Simple Knowledge	Perfect Knowledge	
Knowledge of Cloud Computing Technology	F	50	53	194	2.48
	%	16.84	17.85	65.32	
Knowledge of Applications and Services Provided by Cloud Computing Technology	F	42	89	661	2.42
	%	14.14	29.97	55.29	
Knowledge of I-cloud technology on I-pad and i-phone	F	32	128	137	2.35
	%	10.77	43.09	46.13	
Knowledge of sites that Rely on Cloud Computing Applications such as Google Drive	F	47	62	188	2.47
	%	15.82	20.87	63.29	
Knowledge of Cloud Computing Enables you to Interact with the System from Anywhere and from Any Device	F	46	71	180	2.45
	%	15.49	23.91	60.60	
Cloud Computing Reduces System Costs	F	27	126	144	2.39
	%	9.09	42.42	48.48	
The knowledge that Cloud Computing Provides Data Centers	F	40	97	160	2.40
	%	13.47	32.66	53.87	
The knowledge that Cloud Computing Provides Storage Space	F	36	198	63	2.09
	%	12.12	66.67	21.21	
Overall Mean		2.38			

Fourth question the students' view on the university's provision for "CCS".
In response to this question, the frequencies, percentages, and arithmetic means of the responses to section seven of the questionnaire were calculated, which includes the question about students' view on the University of Hail's provision regarding "CCS". The result is as shown in the following table:7.

Table 7: Frequencies, Percentages, and Means of the Students' Opinions on the University's Provision Regarding "CCS"							
Cloud Computing Services at the University	Frequency and Percentage	Students' Opinion					Mean
		Strongly Disagree	Disagree	Neutral	Agreed	Strongly Agreed	
We have good technical staff	F	0	92	76	129	0	3.12
	%	0	30.97	25.59	43.43	0	
Top management understands the benefits of cloud computing	F	0	15	86	128	68	3.83
	%	0	5.05	28.96	43.09	22.89	
Technology managers understand the benefits of cloud computing	F	0	56	55	142	44	3.58
	%	0	18.85	18.51	47.81	14.81	
Employees understand the benefits of cloud computing	F	55	0	54	147	41	3.40
	%	18.51	0	18.18	49.49	13.80	
The educational institution has the infrastructure that will enable the application of cloud computing	F	75	0	80	124	18	3.03
	%	25.25	0	26.93	41.75	6.06	
Overall Mean	3.39						

SUMMARY OF THE RESULT
Sample of Academic Advisors:
- The responses show that the academic advisors at the University of Hail are highly satisfied with its provision for "CCS", with an average of 3.87 out of 5. And the extent of their knowledge of cloud computing technology and its applications is about 3.94 out of 5.
- The responses also show that the academic advisors at the university are averagely satisfied with the current academic advising system with 3.05 out of 5.

Sample of Students
- The responses show that the students at the University of Hail are highly satisfied with the current system of academic advising with 3.99 out of 5.
- The students' responses also show that they are averagely satisfied with the university's provisions for "CCS" with 3.39 out of 5.

- The responses also show that the university's students' satisfaction with their relationship with the academic advisor is very low, with 2.43 out of 5. And their knowledge of cloud computing is averagely 2.38 out of 5.

Use of "Cloud Computing System" for Technical Visualization of an Academic Advising System
A-   Strategy for Shifting to "CCS" in the Academic Advisory System
A clear strategy is needed for moving to a "CCS". And to make it compatible with the university's general strategy is of great importance. Thus, for the purpose of achieving a successful implementation of the "CCS", this study proposes five stages to implement it as shown in the diagram below (see figure 1).
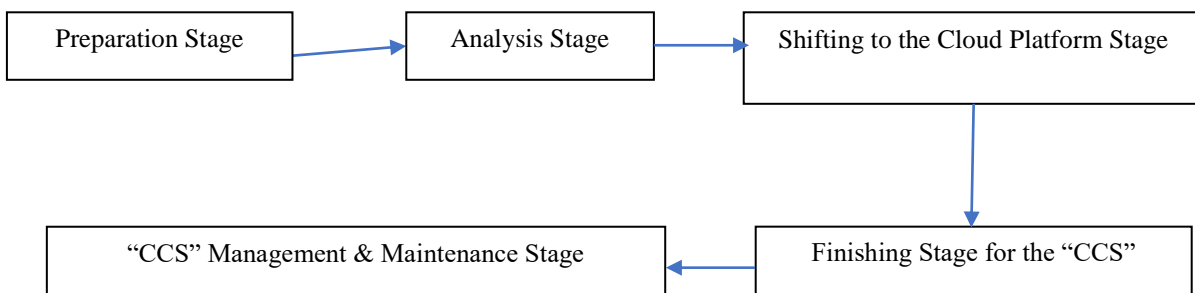

Figure (1) Five Stages of Strategy for Shifting to "CCS"

First Stage: The preparation stage, which can be implemented in five steps:
First Step: Understanding "CCS"
This step comprises sending (the technicians at the university, academic advisors, and students) for educational conferences, training workshops, and seminars on the use of "CCS" and consulting the specialists and experts on how it works. It is also necessary to understand the mechanisms of "CCS", its applications, and its benefits and risks.
Second Step: Understanding the User's Needs
It is necessary to understand the needs of the academic advisors and the students in the "Academic Advising System (AAS)".
Third Step: Understanding the Feasibility of the Project
It is necessary to understand the economic, technical, and functional viability of the (AAS) prior to its implementation.
Fourth Step: Strength, Weaknesses, Opportunities, and Threats (SWOT) Analysis
SWOT is a strategic planning technique to identify the strengths, weaknesses, opportunities, and challenges of a project.
Fifth Step: Investment Return Analysis
Second Stage: Analysis Stage
This can be done in five steps, they are:
First Step: Analysis of Technical and Software Requirements and Users
In this stage, the first thing is to start with studying the users and the way they interact with the current system, couple with analyzing the technical and programming requirements of the "CCS".
Second Step: Technical Understanding of the Current System
In this step, the system will be evaluated in terms of technology, its uses, and requirements. This will require consulting the technicians at the university, in order to determine the currently available services, which should be transferred to the "CCS" and what should be preserved.
Third Step: Definition of the Criteria
In this step, the necessary standards for protection-systems and legal-belongings will be defined. Also, these standards will be determined by comparing the university's by-laws with the standards of the "CCS" service providers.
Fourth Step: Preparation of the Project Proposal and Planning for Approval
Prior to full adoption of the "CCS", this step will determine whether to implement a cloud service model or going for a pilot study.
Third Stage: Shifting to the Cloud Platform Stage
It comprises of three steps; they are as follow:
Step 1: Choosing a Service Provider Based on the Approved Criteria
In this step, the strategies and criteria adopted in the second phase will be used to determine the appropriate service provider (company). And it is important to note that the university's basic technical services are not affected.
Step 2: Integration of the New System with the Existing System
In this step, it will be ensured that the "CCS" applications are integrated with the applications of the university's systems so that the internal applications of the university system for academic advising that have not been transferred to the cloud system will be able to work in harmony with the "CCS".

Step 3: Contract and Agreement Approval
The last step is to approve the contract and sign the agreement with the service provider that will provide the university's academic advising requirements in the services that it will provide in the "CCS". By achieving this, the transition to "CCS" may take place gradually, from testing the experimental system for cloud computing to finalizing the applications chosen for cloud computing.
Fourth Stage: Finishing Stage for the "CCS"
This stage can be completed in six steps:
First Step: Project approval or cancellation based on the university's requirements.
Second Step: Implementation of the proposed system.
Third Step: Transfer of data and applications to the approved "CCS".
Fourth Step: Training the users of "CCS"; including academic advisors and students, in order to reach a successful and effective system.
Fifth Step: Monitoring the data transfer process to ensure the implementation of the project successfully.
Fifth Stage: "CCS" Management & Maintenance Stage Recommendations and Suggestions
In light of the research findings, there are a number of recommendations that could contribute to the development of using "CCS" in academic guidance at the University of Hail, KSA. They are as follows:
1- Conducting evaluation studies for using "CCS" in the academic advising system at the University of Hail, to collect the international experiences and global standards, in order to identify the strengths and weaknesses of the system, and to increase educational efficiency.
2- Implementing the study on the extent to which using the "CCS" for academic advising at the "University of Hail" adheres to the "Total Quality Standards" of cloud computing.
3- Conducting a comparative study between the "CCS" that is being used in Saudi universities, to verify their success in the educational process.
4- Improving the level of employees who work in the Deanship of Student Affairs to be able to respond to students' academic inquiries and solve the problems they are facing.
5- Supporting students by developing a training course that will match their academic needs and raise their academic and technical level. And applying the same thing to academic advisors, in order to upgrade their knowledge of interaction with "CCS".
6- Creation of an academic advising forum that will be full of experts and technicians.
7- Creation of a supporting website with Frequently Asked Questions (FAQ) and accessible information and instructions about usage of "CCS" for students.
8- Developing and intensifying a dedicated means of communication that can provide advice for students, in order to facilitate communication between them and the academic advisors, and to receive their complaints and inquiries.

(No. 160615), and its efforts to enrich the scientific research at the University of Ha'il, KSA.

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