

Scientific Repositories as Indices for Ranking of the Iranian Universities of Medical Sciences

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Abstract

Aim: Webometric is the quantitative study of production aspects and use of information resources, structures on the Web. This study aimed to evaluate and rank the websites of Iranian medical science' universities with an emphasis on their scientific repositories.

Method: 48 websites of target universities were surveyed and examined during 23 March 2017 through 28 March 2017 using webometric tools and methods.

Findings: The findings showed that Shahid Beheshti, Tehran and Ahvaz Universities of Medical Sciences had the highest ranks among the other universities in terms of their website properties, respectively. Also, scientific repository of Mashhad with 20.43 percent of the total score of the survey, Ardabil with 17.60 percent, and Artesh University of Medical Sciences with 14 percent of the total score of the survey showed to have the greatest impact on their academic webometric ranking in general.

Results: The results showed that the majority of the universities of medical sciences under study did not use their repository properly, and in most universities websites, scientific repository did not appear to have a significant impact on their academic webometric ranking.

Keywords: Webometric, Websites, Repository, Medical Science Universities, Webometric ranking Iran.

Introduction

Some important features of the information age are the quick and easy access to information and reduction in response time. Universities have moved through physical into the virtual world, influenced by new and modern information and communication technologies. Hence, taking advantage of the said technologies has provided the first steps towards accessibility using their services easily. The first steps in this regard were website designed for the introduction and delivery of their activities and services, and especially providing valuable and useful information on the web (Danesh et al, 2012). When the Internet and, subsequently, the World Wide Web emerged, the use of Web capabilities in the dissemination of knowledge and information prevailed over time and space constraints and valued the right to choose for the audiences. After years, as the web penetrated into different layers of human life, the benefits and disadvantages of this phenomenon became clear to everybody. The importance and universality of this emerging phenomenon has led web professionals and practitioners to work from their own point of view to address the disadvantages and raise the benefits of it. So, they searched for different aspects to diagnose and quantify the bugs and benefits of the web. These professionals intended to discover or create criteria and frameworks for evaluation of the Web. One of the ways from which researches and efforts of various experts came was the "Webometric" method. As Thellwal (2005) explains, Webometric has a number of interpretations as a new term. The most general of them is the concept of quantitative Web studies which makes it similar to computer science, and its most particular interpretation presented it as a research carried out by information specialists who call themselves webmasters. This interpretation limits the term Webometric to web research and information research that derives from bibliometric and scientism (Thellwal, 2005). Already this notion had had developed that Webometric has led to an understanding that the Web is a huge repository of documents, many of which are college degrees (Almind & Ingwersen, 1997). Therefore, so far the extent of web coverage and the accuracy of the results has been the main goal of such researches. However, it is not possible to measure some of the Web-based scientific activities by using traditional indicators. On the other hand, the emergence of databases and large scientific networks necessitates the definition of new indicators that can be used to measure web-based activities. Considering the topics discussed in this section, as Wilkinson, Harries, Thelwall & Price (2003) denote, we can say that now Webometric tools have been largely tested on university websites and the results obtained from the related studies are exploited as a new type of information in the study of scientific communication in campus environments, given the importance of extracted data from the Web. University websites are of great importance, and the quantitative and qualitative improvement of these websites increases the chances of universities to be retrieved and seen in the virtual world. Studying the success rate of university websites in presenting and communicating themselves in the virtual Web space, and in general, evaluating the performance of these websites, such as evaluating and ranking the performance of universities, is very important because the results of such evaluations will develop and raise the spread of scientific findings through the Web. Improving the status of websites of the universities and institutions in accordance with webometric criteria means better, faster and further web site visibility through search engines and, ultimately, more visits for the websites. This research through addressing details of the indicators, and by using the formulas mentioned in the research methodology section, studied the websites of the Iranian universities of medical sciences based on webometric indices, emphasizing on scientific and research systems (scientific repository), in order to put forward suggestion for improving it in various global rankings.

Literature Review

Several studies have surveyed the webometric aspects of websites of Iran universities, such as Nowruzzi, 2005; Aminpour et al, 2009; Nowkarizi et al., 2009; Nowkarizi et al., 2012; Sedghi, et al. 2011; Abdollahi, et al., 2014 and Farhadi, et al., 2014 who have studied the Webometric aspects of the Iranian universities. However, none of these studies singled out scientific repository as a property under the university Website. Dastani (2013) reviewed the webometric features of Iranian medical journals in a separate study of which the results showed that websites with higher academic credibility had also higher webometric rankings.

Shukla and Pulro, 2012, in a research entitled "Webometric Analysis and Indicators of Selected Indian State Universities" showed that scientific repositories, promotion of free access, scientific researches, collaboration with other universities and online communities on the websites of universities increased the level of visibility of universities on the web level.

Orduña, 2013, in a study titled "The Performance of Web of Units of Internal Universities as a Quantitative Analysis of a University System: A Case Study in Spain", surveyed Spanish universities' webometric indices. The results of the study showed that the effect of scientific reservoirs was relatively negligible.

Orduña and Lopez, 2015, in reviewing the scientific resources of Latin America, showed that indexing of resources in Google and Google Scholar was not enough. The web indices evaluated in the study included the number of pages, the number of rich files, the number of external links, as well as the number of documents stored in the repositories. Storing research outcomes in websites or scientific reservoirs affects webometric indices. Institutions depended online information systems can independently save researchers' research output in a more structured way than web pages of groups and research teams, while their help to improve the webometric indices of institutions is more clearly and easier to analyze.

Fan, 2015, in a study titled "The Contribution of Organizational Scientific Reserves from the Chinese Academy of Sciences", suggested, based on webometric indices that organizational scientific repositories had a positive effect on the number of Google and Google Scholar pages, the number of rich PDF files, and open access repositories. Therefore, these organizational reservoirs, especially free access repositories, had a considerable impact on the visibility and presence of websites.

Lee et al. 2015, in a case study, surveyed that how much organizational reservoirs could influence the availability and accessibility of the articles on the Web. For this purpose, 170 open access journal articles were placed in the organizational knowledge reservoir of the State University of Florida. To analyze the impact of organizational knowledge repositories on making the availability of articles to search for title, Google 3 and Google Scholar 4 were addressed. The results showed that from a total of 170 articles, 145 articles were retrieved, with 96 full-text articles. The results of the positive effect of the reservoir confirmed the availability of information.

Objectives

- Webometric survey of Medical Sciences Universities of Iran.
- Webometric survey of scientific repositories of the universities of Medical Sciences Universities of Iran.
- The survey of the role of scientific repositories of the universities on the webometric rank of Medical Sciences Universities.

Questions

- How is the webometric status of Medical Sciences Universities of Iran websites?
- How is the webometric status of scientific resources' systems of Medical Sciences Universities of Iran?
- How is the role of scientific repositories of the universities on the webometric rank of Medical Sciences Universities?

Research Methodology

Data Collection: The 48 websites of the Iranian Universities of Medical Sciences were evaluated in 23 March 2017 to 28 March 2017 . To extract the number of indexed web pages (size) Google search engine was used by the following formula: Site: site name domain. Moreover, to extract the number of rich files in the Google search engine, the formula Site: sitename.domain filetype: pdf was used, and to extract the number of scientific resources retrieved, the researchers used Google Scholar search engine and formula Site: sitename.domain. To calculate and obtain the number of links received the MOZ search engine available at the [www.Opensiteexplorer.org](http://www.opensiteexplorer.org) was used.

Open Site Explorer is powered by Mozscape, SEOmoz's index of the links is on the internet. Beyond the standard link data, such as linking URLs, linking domains, and anchor text, Mozscape includes unique metrics that provide insight into the authority and trust of pages and domains. The major search engines, Google, Yahoo, and Bing built similar indexes to help evaluation the importance and relevance of the content on the web. Data comes from the World Wide Web itself. Indexing large amounts of data is allowing relevancy research and finds continued activities in competitive community driven for general purpose to web scale search engine (Geetha & Sathiyakumari, 2012). Number of pages recovered from four engines: Google, Yahoo, Live Search and Exalead. The total number of unique inlinks (Visibility) by a site can only be confidently obtained from MOZ Search Engine.

After the evaluation of their relevancy to academic and publication activities and considering the volume of the different file formats, the followings were selected: Adobe Acrobat (.pdf), Adobe PostScript (.ps), Microsoft Word (.doc) and Microsoft Power point (.ppt). The data were extracted by using Google.

Google Scholar provides the number of papers and citations for each academic domain. These results from the Scholar database represented papers, reports and other academic items (<http://www.webometric.info/methodology.html>). These four ranks were combined according to a formula where each one had a different weight: The Webometric analysis can be performed with number of inlinks, outlinks, number of Web Pages and number of rich files. Webometric Rank (WR) = 4*Rank V + 2*Rank S + 1*Rank R + 1*Rank Sc, Where V = Visibility, S = Size, R = Rich Files and Sc = Google Scholar (Shukla & Poluru, 2012).

Findings

In the following 3 tables containing the findings are inserted.

Webometric of Medical Sciences Universities website

Table 1 shows that Beheshti, Shiraz and Tehran universities of Medical Sciences had the highest score in webometric scales among the 48 target universities, respectively. Table 1 also showed the score of webometric indicators, including the size (number of pages), the number of retrieved Google Scholar articles, incoming links (visibility), and the rich files of each medical sciences university.

Table 1: Webometric Rating of Iran Medical Science Universities

Rank	University	Website	Size	Scholar	Visibility	Rich Files	Score
1	Shahid Beheshti	sbmu.ac.ir	1,270,000	39,500	60581	135,173	2,956,997
2	Tehran	tums.ac.ir	1,200,000	28,600	108000	76,693	2,937,293
3	Ahvaz	ajums.ac.ir	549,000	2,000	6777	22,947	1,150,055
4	Kerman	kmu.ac.ir	545,000	4,680	4652	13,892	1,127,180
5	Tabriz	tbzmed.ac.ir	475,000	5,770	18751	60,117	1,090,891
6	Isfahan	mui.ac.ir	501,000	7,720	8042	41,800	1,083,688
7	Boabol	mubabol.ac.ir	530,000	0	2901	2,337	1,073,941
8	Iran	iums.ac.ir	499,000	7,290	10347	24,072	1,070,750
9	Shiraz	sums.ac.ir	455,000	2,120	9266	48,523	997,707
10	Hamedan	umsha.ac.ir	461,000	1,420	3885	17,035	955,995
11	Uromie	umsu.ac.ir	377,000	9,600	4351	67,664	848,668
12	Kermanshah	kums.ac.ir	353,000	3,430	9474	47,521	794,847
13	Birjand	bums.ac.ir	374,000	1,490	3122	6,943	768,921
14	Mashhad	mums.ac.ir	327,000	14,700	16267	19,295	753,063
15	Qazvin	qums.ac.ir	275,000	2,830	2649	20,306	583,732
16	Ardabil	arums.ac.ir	246,000	6,740	4075	11,671	526,711
17	Booshehr	bpums.ac.ir	224,000	4,090	10717	15,822	510,780
18	Golestan	goums.ac.ir	234,000	2,350	2655	17,777	498,747
19	Artesh	ajaums.ac.ir	210,000	3,370	7915	25,808	480,838
20	Yazd	ssu.ac.ir	210,000	3,210	4078	32,891	472,413
21	Zanjan	zums.ac.ir	215,000	2,560	3149	16,997	462,153
22	Yasooj	yums.ac.ir	214,000	1,420	2508	6,565	446,017
23	Arak	arakmu.ac.ir	208,000	2,490	3424	10,884	443,070
24	Gilan	gums.ac.ir	206,000	2,470	3530	12,252	440,842
25	Qom	muq.ac.ir	175,000	652	4364	12,584	380,692
26	Alborz	abzums.ac.ir	174,000	46	2396	7,315	364,945
27	Neyshaboor	nums.ac.ir	175,000	171	153	782	351,565

Rank	University	Website	Size	Scholar	Visibility	Rich Files	Score
28	Mazandaran	mazums.ac.ir	155,000	5,270	6177	9,470	349,448
29	North Khorasan	nkums.ac.ir	154,000	2620	5346	8,692	340,696
30	Semnan	semums.ac.ir	155,000	1040	278	8,324	320,476
31	Lorestan	lums.ac.ir	134,000	7,290	2940	8,691	295,741
32	Baqyatallah	bmsu.ac.ir	129,000	463	5080	3,738	282,521
33	Kordestan	muk.ac.ir	131,000	2,870	3241	3,609	281,443
34	Kashan	kaums.ac.ir	125,000	3,450	3132	12,148	278,126
35	Rafsanjan	rums.ac.ir	115,000	1,600	2508	6,377	248,009
36	Ilam	medilam.ac.ir	106,000	1,920	2668	6,329	230,921
37	Bandar Abbas	hums.ac.ir	57,900	3,000	26901	4,185	230,589
38	Sabzevar	medsab.ac.ir	107,000	0	2373	4,430	227,922
39	Zahedan	zaums.ac.ir	102,000	15	2313	5,188	218,455
40	Gonabad	gmu.ac.ir	73,700	1,300	2249	4,701	162,397
41	Shahre Kord	skums.ac.ir	58,300	1,840	2538	4,339	132,931
42	Fasa	fums.ac.ir	52,600	381	2628	4,026	120,119
43	Shahrood	shmu.ac.ir	37,700	753	2958	2,080	90,065
44	Zabol	zbmu.ac.ir	30,900	23	2217	1,628	72,319
45	Jahrom	jums.ac.ir	20,600	114	4398	1,724	60,630
46	Jiroft	jmu.ac.ir	18,600	13	1991	1,092	46,269
47	Torabt Heydarie	thums.ac.ir	13,900	90	92	302	28,560
48	Gerash	gerums.ac.ir	7,860	1	66	1,328	17,313

Webometric analysis of scientific repositories of the universities of Medical Sciences.

As items in Table 2 indicate, scientific repository of Mashhad, Ahvaz and Ardabil universities of medical sciences gained the highest scores among other target universities in the country. It also shows the score of the webometric indices of each of the scientific repository of the universities of medical sciences, respectively.

Table 2: Webometric Rating of Repositories of Iran Medical Science Universities

Rank	University	Repository Website	Size	Scholar	Visibility	Rich Files	Score
1	Mashhad	research.mums.ac.ir	76,900	0	0	0	153,800
2	Ahvaz	behsan.ajums.ac.ir/	54,800	0	7	0	109,628
3	Ardabil	eprints.arums.ac.ir/	40,000	4,230	658	5,841	92,703
4	Shiraz	pajooreshyar.sums.ac.ir/	37,500	11	0	13,560	88,571
5	Artesh	eprints.ajaums.ac.ir	32,300	2,790	60	162	67,792
6	Tabriz	pazhoohan.tbzmed.ac.ir/	23,400	0	7	0	46,828
7	Zanjan	zums.ac.ir/rds/	14,900	0	3000	3	41,803
8	Shahid Beheshti	research.sbmu.ac.ir/	19,600	0	28	8	39,320
9	Arak	vdresearch.arakmu.ac.ir/	14,100	0	7	2,934	31,162

Rank	University	Repository Website	Size	Scholar	Visibility	Rich Files	Score
10	Isfahan	researches.mui.ac.ir/	15,100	0	0	0	30,200
11	Uromie	80.191.214.190/pajoheshyar/	13,700	0	0	0	27,400
12	Kashan	pajouhan.kaums.ac.ir/	12,300	0	4	0	24,616
13	Semnan	rds1.semums.ac.ir/	11,600	0	9	4	23,240
14	Hamedan	http://res.umsha.ac.ir/	10,700	0	1	14	21,418
15	Gilan	http://www.rds.gums.ac.ir/	9,340	0	0	7	18,687
16	Iran	http://research.iuums.ac.ir/	7,400	0	226	107	15,811
17	Zahedan	http://samat.zaums.ac.ir/	7,180	0	14	0	14,416
18	Kordestan	http://research.muk.ac.ir/	7,010	0	3	35	14,067
19	Qazvin	http://research.qums.ac.ir/	5,810	0	0	0	11,620
20	Golestan	http://eprints.goums.ac.ir/	5,010	282	55	672	11,194
21	Sabzevar	http://research.medsab.ac.ir/	5,580	0	2	5	11,173
22	Fasa	http://pajohan.fums.ac.ir/	5,160	1	0	0	10,321
23	Shahrood	http://ris.shmu.ac.ir/	3,730	0	0	2	7,462
24	Babol	http://pajouhan.mubabol.ac.ir/	3,420	0	13	0	6,892
25	Kermanshah	http://5.63.15.58/general/homePage.action	3,370	0	0	0	6,740
26	Gonabad	research.gmu.ac.ir	2,790	0	0	6	5,586
27	kerman	http://research.kmu.ac.ir	1,500	0	0	2	3,002
28	Neyshabour	http://research.numa.ac.ir/	1,340	0	7	4	2,712
29	Bandae Abbas	http://research.hums.ac.ir/	1,180	0	0	0	2,360
30	Tehran	http://research.tums.ac.ir/	868	6	90	234	2,336
31	Yasooj	http://research.yums.ac.ir/	607	0	0	57	1,271
32	Ilam	http://research.medilam.ac.ir/	97	0	0	0	194
33	Lorestan	http://pajouhesh.lums.ac.ir/	55	0	0	3	113
34	Torbat Heyadaie	http://rds.thums.ac.ir/	42	0	7	0	112
35	Mazandaran	syat.mazums.ac.ir	8	0	1	0	20
36	Booshehr	http://ris.bpums.ac.ir/	6	0	0	0	12
37	Baqyatallah	http://research.bmsu.ac.ir/	3	0	0	0	6
38	Birjand	http://research.bums.ac.ir/general/homePage.action	1	0	0	0	2
39	Other	=	0	0	0	0	0

The role of scientific repositories of the universities in the webometric ranking of Medical Sciences universities.

Chart 1 and Table 3 show that the repository of Mashhad, Ardabil and Artesh medical universities rank the highest in their university websites based on the ratio of their repository.

Table 3: The score ratio of the scientific repository in the overall rating of the website of Iran Medical Sciences Universities

Row	University	Ratio of the repository	Row	University	Ratio of the repository
1	Mashhad	20.42325808	21	Hamedan	2.240388287
2	Ardabil	17.60035389	22	Qazvin	1.99063954
3	Artesh	14.09871932	23	Iran	1.476628531
4	Ahvaz	9.532413667	24	Shahid Beheshti	1.329727423
5	Zanjan	9.045272886	25	Bandar Abbas	1.023465994
6	Shiraz	8.877456007	26	Kermanshah	0.847961935
7	Kashan	8.850664807	27	Neyshaboor	0.771407848
8	Fasa	8.592312623	28	Babol	0.641748476
9	Shahrood	8.285127408	29	Torbat Heydarie	0.392156863
10	Semnan	7.251713077	30	Yasooj	0.284966717
11	Arak	7.033200172	31	Kerman	0.266328359
12	Zahedan	6.599070747	32	Ilam	0.084011415
13	Kordestan	4.998170145	33	Tehran	0.079529009
14	Sabzevar	4.902115636	34	Lorestan	0.038209109
15	Tabriz	4.292637853	35	Mazandaran	0.005723312
16	Gilan	4.238933677	36	Booshehr	0.002349348
17	Gonabad	3.439718714	37	Baqyatallah	0.002123736
18	Uromie	3.2285888	38	Birjand	0.000260105
19	Isfahan	2.786779959	39	Other	0
20	Golestan	2.244424528			

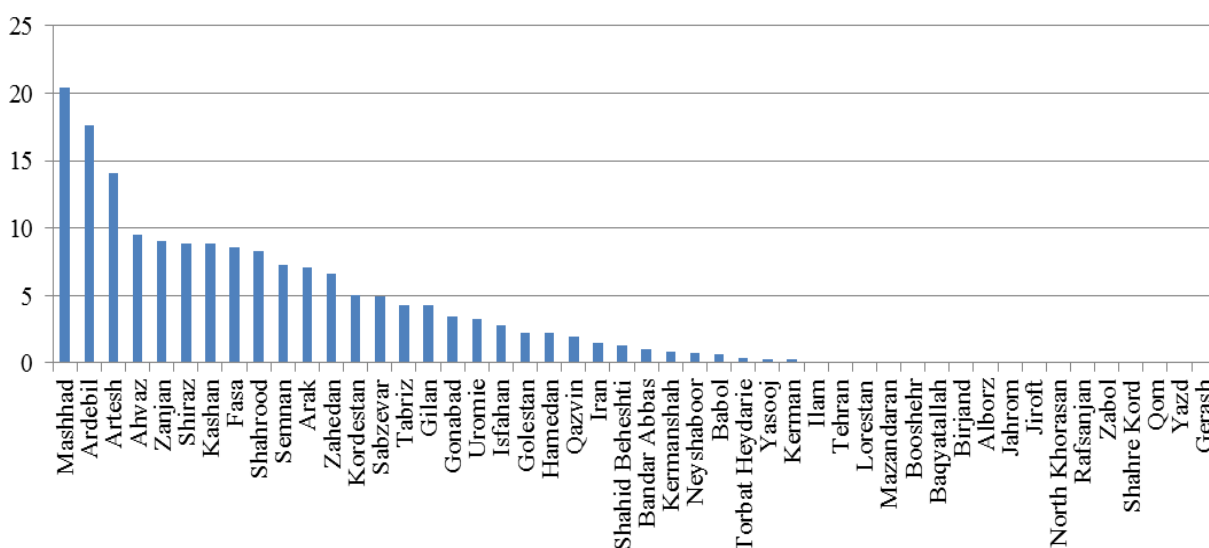


Chart 1: The score ratio of the scientific repository in the overall rating of the websites of the Iranian Universities of Medical Sciences

Conclusions

The findings of the research on the ranking of websites of Iranian universities of Medical Sciences showed that the universities of Shiraz, Shahid Beheshti and Tehran had the highest ranking scores among the all universities of medical sciences, respectively.

Scientific and research repository, because of holding the information and resources available hereof in the university, can present rich resources on the web and have a significant impact on the ranking of the university website. In the ranking of scientific and research repository, Mashhad, Ahvaz and Ardabil universities of medical sciences gained the highest score among all universities. It was also found out that scientific and research resources of medical sciences universities of Mashhad with 20.43%, Ardabil with 17.6%, and Artesh with 14% of the total possible score of their university web site, showed to have the greatest impact on their university web site rankings. As Zuccala, et. al. (2008) indicates, organizational repositories are online archiving systems set up by universities and research institutes to store, publish, and maintain a variety of scientific research results for researchers, faculties and students. Therefore, one can conclude that the faculty and the students of the highly ranked universities are more advantaged compared with those of other universities. Not only this, it can also be concluded that based on the results of the present study, there would be seemingly a relationship between scientific and research repositories and the university ranking. Therefore, it is also expected that those universities with higher ranking in terms of their scientific and research repositories, rank higher as well in the universal university ranking systems. Looking in the world 2018 university ranking results broadcasted recently, it is evident that the named universities are among the top universities in Iran. Therefore, one can conclude that to gain the higher ranking, universities need to simply invest on their scientific and research repositories. However, this notion is required to be examined more cautiously in the future research among a wider domain of universities from all around the world.

Researches of Shukla and Pulro, 2012, and Smith, 2012, and Fan, 2015, have shown that scientific repositories, free access promotion, academic researches, collaboration with other universities and online communities on the universities websites increased the visibility of universities on the web. Urdoña and Lopez (2015) also showed that storing research outputs on websites or scientific reservoirs affects webometric indices. Website function analysis can depend on sectors or departments or platforms such as the scientific repository system of the organization and various sub-domains of sectors and departments (Orduña, 2013). However, the results of the present study showed that most of the universities of medical sciences did not properly use their scientific sources and digital libraries, and in case of most university websites, scientific repository did not show a significant effect.

The results of the present study showed that universities will most probably observe a significant growth in their website ranking and scores, provided that they enrich their scientific

repository with regard to existing resources using top universities modeling in the field. Today, a university website is set up for various purposes. Hence, web-based indicators and presence in the web are the ways to judge the quality of the university on the Web. There are also several ways for the university to increase its web visibility. For example, *content* plays a major role in the dissemination of information. Some suggestions for increasing the website's performance or the visibility of universities can be as follows:

Increase the number of pages published on the websites of the Iranian universities of Medical Sciences both in Persian and English languages for the international visitors.

Continuous reviewing of the best sources of scientific resources in regard with webometric indices and their utilization.

Launching and using scientific open access resources such as E-Prints.

For most websites, DOC and PDF files have been used extensively, while other types of file formats had been used less or never used. This can affect the indexing rate of websites in most search engines, especially Google.

Some academic systems of the universities lacked the domain address title and were only called by the IP, which not only makes them not to be indexed by Google and Google Scholar, but also, to be ignored in the webometric ranking; so, the administrators of these systems need to make sure to assign the title of the domain address.

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