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Implications of SUSHI for analysis of usage statistics of e-resources: A case study of UGC-INFONET Digital Library Consortium

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The usage of e-resources is one of the most important parameters to judge effectiveness of a consortium. Manual downloading and analysis of usage statistics is a time-consuming process for a consortium like UGC-INFONET Digital Library Consortium having more than 180 core members. COUNTER and SUSHI standards have the potential to ease the work of a consortium administrator by minimizing the time involved in manual downloading of usage statistics allowing more time for analyzing the usage statistics for better decision making. The article gives a brief of the implication of SUSHI for creating a usage statistics portal at the INFLIBNET Centre for monitoring the usage of the member universities.

Keywords: e-resources, usage statistics, SUSHI, COUNTER

Introduction

With evolution of the electronic resources including e-journals, e-books and online databases, libraries and the publishers have come up with a number of access and subscription models for extending access to scholarly content to the end user. Online access to scholarly content and the convenience it offers to the user, led to a trend of acquiring online resources through consortia at highly discounted rates of subscription. In India, a number of Government-funded consortia have emerged based on the types of institutions, funding agencies and subject interests of member institutions.

The UGC-INFONET Digital library Consortium was set-up in 2004 with an aim to provide access to scholarly content to universities in India. The UGC-INFONET Digital Library Consortium is fully-funded by the University Grants Commission (UGC) and executed by the INFLIBNET (Information and Library Network) Centre, Ahmedabad. The Consortium provides differential access to more than 7,500 journals and 11 bibliographic databases to more than 200 universities that come under the purview of the UGC. The INFLIBNET Centre spends nearly Rs. 100 crore on subscription to e-resources for its member institutions. Considering the huge investment on subscription to e-resources, one of the major responsibilities of the Centre is to monitor usage of e-resources and subsequent evaluation and analysis.

Standards for usage statistics

Evaluation of impact of library resources on quantity and quality of research output has always been a challenging task for libraries. Statistics on usage of resources is generally accepted as an important input for collection development activity. Usage statistics is considered as a new measure for justifying investment on library resources, especially e-journals that requires long-term financial commitment. Libraries analyze the log-files of servers to track the usage of e-resources. The ARL (Association of Research Libraries) came up with a programme named “ARL New Measures Initiative” in order to develop standards and specifications for delivery of usage statistics in a uniform and standardized format essentially to facilitate comparison of usage amongst different resources and publishers and assess cost-effectiveness and value of electronic resources. The International Coalition of Library Consortia (ICOLC) has also proposed a Guideline for Statistical Measures of Usage of Web-based Information Resources in 2001. It specifies a set of minimum requirements for usage data, and also provides guidance on privacy, confidentiality, access, delivery and report formats.

So far, two widely accepted standards for usage statistics, namely COUNTER and SUSHI have been developed. A brief description of these two standards is given below.

COUNTER

The COUNTER (**C**ounting **O**nline **U**sage of **N**etworked **E**lectronic **R**esources) Code of Practice, launched in March 2002, is an international initiative serving librarians, publishers and intermediaries by setting standards that facilitate recording and reporting of online usage statistics in a consistent, credible and compatible way. The first COUNTER Code of Practice, covering online journals and databases was published in 2003[1]. It is widely accepted by most publishers and librarians as an invaluable standard for comparing usage statistics from different vendors. The recent version, Release 4 of COUNTER Code of Practice was published in April 2012.

The COUNTER4 deals with the usage statistics of journals, databases, books, reference works and multimedia content. Major features of COUNTER 4 over the earlier release are as follows[2]:

- Inclusion of JR1 GOA (Gold Open Access) for providing a special report for usage of Gold Open Access articles for better cost analysis of journals / journal packages;
- Providing tab separated value instead of the earlier available comma separated value for usage reports;
- Inclusion of Journal DOI and Book DOI in the usage reports for linking of usage data to other data relevant to collection of online contents;
- Modified database reports that excludes session counts;
- New report named as Platform Report 1 for providing details of total searches, result clicks and record views by Month and Platform eliminating the earlier Database Report 3 and Book Report 6;
- New Multimedia Report covering the usage of non-textual multimedia resources, such as audio, video and images, by reporting the number of successful requests for multimedia full content units;
- New optional reports which provides usage on mobile devices;
- Addition of Institutional Identifier for providing a common identification to a institution throughout all the publishers and platforms; and
- Inclusion of proprietary identifier for linking the usage report data with KBART title data.

SUSHI

Although COUNTER is a standard that provides for consistency is recording and reporting and usage data over various platforms, still a lot of time is required by the library staffs to collect the usage data by logging onto different platforms and downloading usage statistics for further analysis. COUNTER does not address the issue of automatic harvesting, storage and manipulation of usage data. SUSHI addresses the issue of automatic import of usage statistics that would save the time of staff and obviate the need for a separate system for this function[3].

The National Information Standards Organization (NISO) has come up with the Standardized Usage Statistics Harvesting Initiative (SUSHI) Protocol, which defines an automated request and response model for the harvesting of electronic resource usage data utilizing a Web services framework[4]. The SUSHI standard is built on SOAP (Simple Object Access Protocol) which takes the users details as SOAP request and gives the usage report in XML format as a response. The NISO and COUNTER have signed a Memorandum of Understanding that assigns the responsibility for maintaining the XML schema version of COUNTER reports to NISO.

The SUSHI protocol has been widely accepted by many publishers for providing COUNTER compliant usage statistics. Till the writing of this article, the SUSHI server registry listed 38 publishers / service providers with details of the SUSHI URLs and basic information for making SUSHI requests to their servers.

Tools for downloading usage statistics using SUSHI

Since the adaptation of SUSHI protocol by publishers, various proprietary ERM software have incorporated features for automated usage statistics management using SUSHI protocol. It has eased the process of maintaining the usage statistics management for libraries. Several institutions have also come up with free or open source utility / software for downloading and managing the usage

statistics using SUSHI protocol. Few software tools listed on the NISO website are given below:

SUSHI Toolkit & Web Client from University of Pennsylvania

The University of Pennsylvania has developed the SUSHI Toolkit to harvest SUSHI1.6 / COUNTER 3.0 data[5]. This software was released under the Apache 2 License. It is written in Java and is one of earliest SUSHI client for downloading the usage statistics. The SUSHI Toolkit provides an option to download the COUNTER XML file and convert it into Excel format.

MISO: Serials Solutions' Open-Source Code for SUSHI Client

The Serials Solutions has developed an open source command-line client named as MISO for connecting to multiple SUSHI servers and downloading the usage report in either COUNTER XML format or COUNTER CSV format[6]. The software is basically created for Windows platform and requires Microsoft .NET Framework 2.0. It was designed to download XML report and convert it into a CSV, which can then be uploaded to 360 Counter of Serial Solutions.

SUSHIStarters Client from JISC

The SUSHIStarters Client[7], developed by the Joint Information Systems Committee (JISC), is a web-based tool for downloading the COUNTER compliant usage report in XML format. It also provides the option for converting XML file into COUNTER Excel format. The web-based tool is written in PHP. The SUSHIStarters Client has come up as a product under the JISC-funded Journal Usage Statistics Portal Project (JUSP) carried out in partnership with Cranfield University.

Usage statistics collection at INFLIBNET Centre

The UGC-INFONET Digital Library Consortium, executed and monitored by INFLIBNET Centre, subscribes to e-journals and databases for more than 200 universities. It is a huge task to download and store usage statistics for all the member universities. It takes 15 to 21 days of dedicated work for one staff member to download the usage statistics for all member universities from different publishers and compile a summary report on usage for each university. The usage data used to be stored and manipulated using Excel spreadsheet which in itself is a time-consuming process. As such, these usage reports were being prepared only once in a year for all the member universities.

With the availability of SUSHI Standards and its adoption by a large number of publishers, the Centre started experimenting with SUSHI Standard and different SUSHI clients, available on the NISO Website, in mid 2011. The MISO Client and SUSHI Toolkit by the University of Pennsylvania were tested to get the csv reports. The SoapUI Client was also used to make SUSHI calls and get the response in XML format. Number of SOAP requests was made using both the SoapUI and the MISO client to get the usage report in XML format. Once the SHUSHI clients were successfully tested for fetching the reports automatically, the Centre worked on creating a web interface for uploading the usage data from the XML file to a database which can eventually be made available to the universities directly for viewing their usage statistics as soon as it is available. However, since the MISO client did not meet all the requirements of the Consortium, the Centre started working on creating a SUSHI Client for downloading the usage reports and storing the data in our database. As such, a client was developed using PHP that is used frequently for managing various activity of the Consortium. By the end of 2011, the Centre had developed the client and created a usage portal for harvesting the usage statistics and providing automated usage report to the member universities.

INFLIBNET Usage Portal

A number of software tools are available for managing usage statistics of an individual institution. Since we could not identify suitable open source software or interface for managing the usage statistics of the Consortium, INFLIBNET's Usage Portal was created for providing usage statistics to the member universities. The INFLIBNET Usage Portal provides the following functionalities for the member universities:

- Member universities are able to view their consolidated usage statistics for all the publishers for each year (Fig. 1);
- Member universities can download the journal level usage statistics for each publisher in COUNTER csv format (Fig. 2);
- Member universities can download the journal usage for all the journals as a csv file;
- INFLIBNET Administrator can view the usage statistics of all the publishers for each member university for every year (Fig. 3);

- INFLIBNET Administrator can view the publisher-wise usage statistics for all the member universities;
- INFLIBNET Administrator can update the usage statistics using SUSHI Client; and
- INFLIBNET Administrator can upload the usage data in COUNTER csv or COUNTER XML format (Fig. 4).
- RSS feeds for the usage updated on the Usage Statistics Portal.

Current status

The INFLIBNET Usage Portal provides automated harvesting of usage statistics for 15 publishers available under the Consortium. However, the portal cannot be considered complete and effective unless it provides usage statistics for all the resources subscribed under the Consortium through a single interface. Since the Centre has already developed the interface for uploading the usage statistics available in COUNTER XML format, the usage statistics of those publishers for whom the usage is available in COUNTER XML format are downloaded manually and uploaded in the portal. It also saves time since there is no need of compiling the usage data using the excel sheets. As such, usage statistics of several publishers was uploaded and was made available through the portal. However, usage statistics for some of the publishers are available only in csv format. The Centre developed an add-on for uploading COUNTER Compliant csv files on the portal to overcome this limitation.

Member Name: Himachal Pradesh University **Period:** 1-2011 to 12-2011

Platform	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Total
ScienceDirect	0	0	0	194	912	1814	1881	1203	881	769	1376	1389	10419
JSTOR	175	129	206	68	282	407	160	535	855	167	286	414	3684
Wiley-Blackwell	283	221	276	13	321	274	261	214	193	239	312	244	2851
American Chemical Society	116	124	210	23	252	207	289	239	306	299	212	246	2523
Institute of Physics	142	90	149	41	93	139	191	82	128	278	151	128	1612
Springer Link	413	468	724	0	0	0	0	0	0	0	0	0	1605
APS	143	67	153	27	183	128	188	89	110	156	59	42	1345
American Institute of Physics	96	35	59	12	138	97	117	56	90	332	137	95	1264
Oxford University Press	92	72	83	12	51	22	52	39	59	25	78	57	642
Taylor and Francis	0	0	0	0	0	0	0	47	93	183	224	81	628
Royal Society of Chemistry	23	20	20	13	42	35	75	31	60	40	33	42	434
Cambridge Univ Press	33	17	18	11	38	37	30	18	37	11	14	14	278
Project Muse	0	8	5	0	0	0	0	0	1	9	4	217	244
T&F - Jan to Apr	34	103	90	14	0	0	0	0	0	0	0	0	241
Annual Reviews	3	12	12	1	5	7	37	6	3	2	6	8	102
Nature	4	0	2	0	8	1	7	10	33	7	11	16	99

Bar Chart

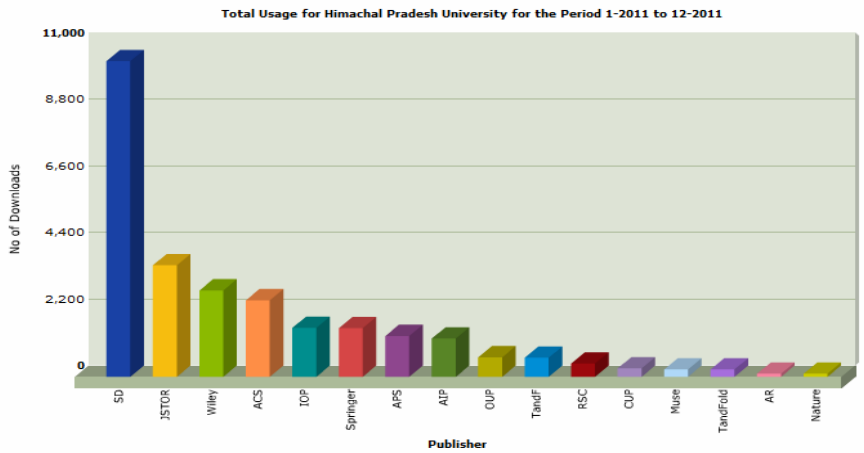

Fig. 1—Consolidated Usage for a single year

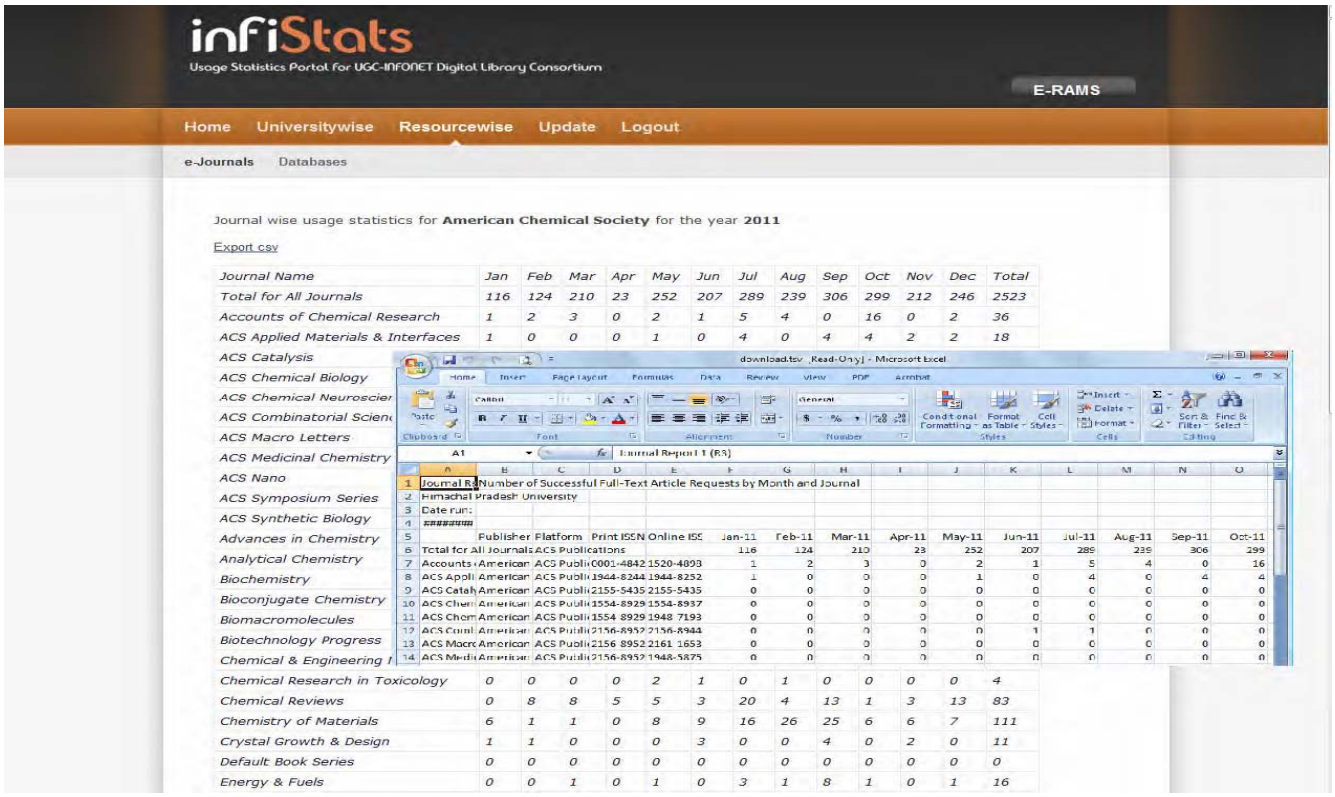

Fig. 2—Journal wise usage statistics & export to JR1 csv file

Fig. 3—Usage statistics for all the universities for a publisher

Presently the usage statistics of all consortium subscribed resources/publishers given in Table 1 is available on the INFLIBNET usage portal.

Future developments

Although the usage portal provides usage statistics of all the resources subscribed by the Consortium, i t still requires enhancements for better delivery of usage statistics as well as tools to analyze the statistics. Enhancements that are proposed to be taken up are as follows:

- Since the usage report provided by the publishers includes all the titles offered on their platform, there is a need to differentiate the usage statistics of subscribed titles and non-subscribed titles. Also the usage statistics contains the usage for the consortia subscribed titles as well as the usage for the titles

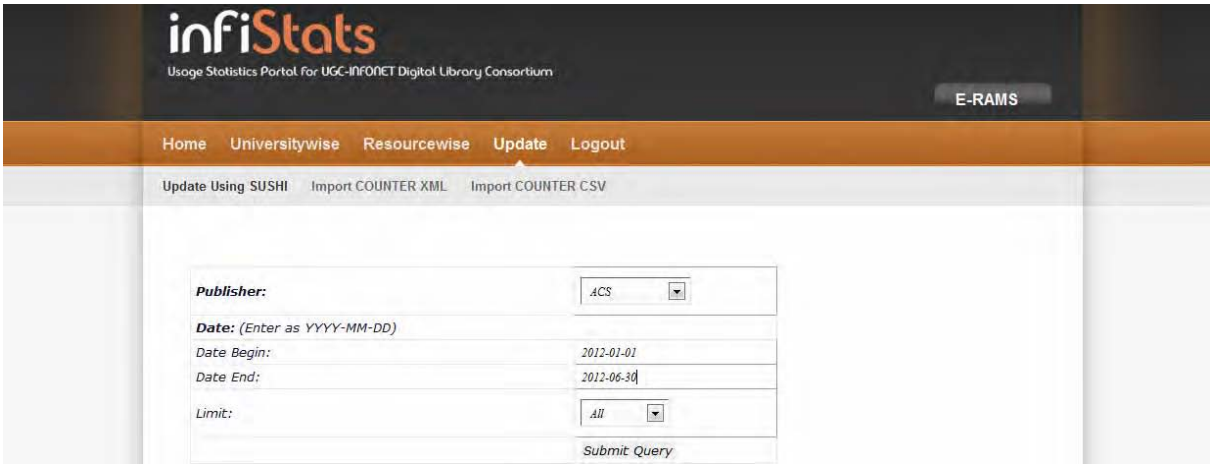

Fig. 4—Usage statistics Update Interface for Administrators

Table 1—Usage statistics handling at the INFLIBNET Centre

Sl. No	Resource Name	Availability in SUSHI registry*	Status of Updation Process in INFLIBNET Usage Portal
1	American Chemical Society	Yes	Updated using SUSHI Client
2	American Institute of Physics	Yes	Updated Using SUSHI Client
3	American Physical Society	Yes	Updated Using SUSHI Client
4	Annual Reviews	Yes	Updated Using SUSHI Client
5	Cambridge University Press	Yes	Currently Updated using CSV file. In communication with publishers for successful harvesting
6	Economic & Political Weekly	---	Not Available
7	Emerald	No	Updated Using SUSHI Client
8	Institute of Physics	Yes	Updated Using SUSHI Client
9	ISID	---	Not Available
10	JCCC	---	No Standard report. Manually updated after compilation in excel file
11	JSTOR	No	SUSHI client is in beta stage. But not able to get report due to large file size
12	MathSciNet	---	No Standard report. Manually updated after compilation in excel file
13	Nature	Yes	Updated Using SUSHI Client
14	Oxford University Press	Yes	Updated Using SUSHI Client
15	Portland Press	No	Updated using COUNTER CSV file.
16	Project Euclid	Yes	Updated Using SUSHI Client
17	Project Muse	Yes	Updated using COUNTER CR1 XML file. Working on update using SUSHI Client
18	Royal Society of Chemistry	Yes	Updated Using SUSHI Client
19	ScienceDirect	No	Updated using COUNTER XML file. In communication with publisher for enabling SUSHI service.
20	SciFinder Scholar	---	No Standard report. Manually updated after compilation in excel file
21	SIAM	Yes	Updated Using SUSHI Client
22	Springer Link	Yes	Updated Using SUSHI Client
23	Taylor & Francis	No	Updated Using SUSHI Client
24	Web of Science	Yes	Updated Using SUSHI Client
25	Wiley-Blackwell	No	Updated Using SUSHI Client

** As available on the SUSHI Server Registry available at http://sites.google.com/site/sushiserverregistry/ (last accessed on 30th June)*

subscribed by the universities which needs to be differentiated.

- Linking of the usage statistics with other services with inclusion of DOI and Proprietary identifier in COUNTER4.
- Presently the usage portal provides only JR1 and DB1 report for the universities. However, since the Consortium has purchased archive for a number of resources, the JR1a reports will soon be included on the portal.
- Tools for plotting and analyzing usage and trends in usage.
- Inclusion of data on expenditure on e-resources for providing cost-benefit analysis and economics of consortium.
- Evolve a core list of journals and resources based on the usage statistics.
- Evolve performance indicator for universities based on average number of downloads by all the member universities.
- The Centre will also invite suggestions from the users in universities and accommodate their suggestions for enhancement.

Conclusion

The SUSHI standard has helped in easy and systematic harvesting of usage statistics and subsequent analysis. The standard has minimized the time and effort on part of the Consortium on collection of data, as such more time can be spent in analysis of usage and its trends. The timely analysis of the usage would enable tracking the access in universities and taking corrective measures in case of low usage because of change in local network settings or other temporary problems. It has also enabled the universities to analyze the journal level usage statistics and for finding out the usage in different subject areas. The university gets to know their most active and idle subject areas and can take corrective measures by imparting awareness programmes for e-resources that are used less often. It is expected that this initiative will indirectly help the Consortium in cost recovery in terms of better usage enabling administrators of the Consortium in the process of informed decision making.

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