A BRIEF HISTORY OF COUNTER AND SUSHI:
the evolution of inter-dependent standards

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The COUNTER (Counting Online Usage of Networked Electronic Resources) Code of Practice came about as a result of a collaboration among librarians, publishers, and vendors. The year was 2002, and librarians were witnessing more of their collections (and budgets) transitioning from print to online. While some publishers and content providers offered usage statistics, the usage reports available to librarians were not consistent in format, terminology, or even rules of counting—plus it wasn't uncommon for publishers to not provide usage statistics at all. Figure 1 offers a timeline for the evolution of the COUNTER Code of Practice and the supporting Standardized Usage Statistics Harvesting (SUSHI) standard.

2000 – 2003: COUNTER formed

The timeline shows 2002 as the year the COUNTER initiative was launched, but the work that led up to this had begun in earnest a few years before. Under the auspices of the Publishers and Libraries Solutions (PALS[1]) group, librarians and publishers had been discussing the challenges of usage statistics for online resources. In September 2000, the PALS Usage Statistics Working Group was created, with Richard Gedye from Oxford University Press serving as chair. This led working group organized an international forum on usage[2] the following year that directly lead to the creation of the COUNTER Code of Practice.
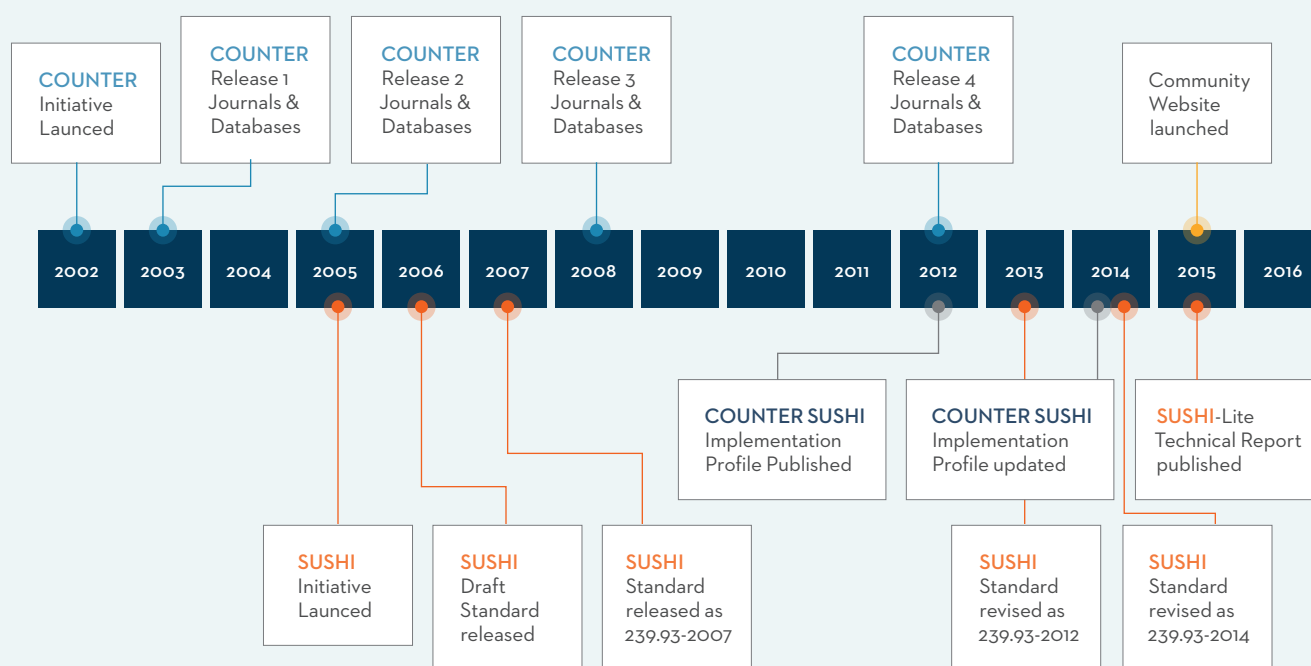
Figure 1: A timeline for the development of COUNTER and SUSHI

COUNTER was officially launched in March of 2002 with the first release of the COUNTER Code of Practice (COUNTER, 2002) for online journals and databases published in January of 2003.

The COUNTER Code of Practice lists a series of usage reports a content provider is expected to make available; it also specifies the formatting of those reports, the metric types to be included, and rules about how logs should be processed to count usage.

The complete list of reports in Release 1 was:

1 *Level 1 reports (required)*

» Journal Report 1: Number of Successful Full-Text Article Requests by Month and Journal

» Journal Report 2: Turnaways by Month and Journal

» Database Report 1: Total Searches and Sessions by Month and Database

» Database Report 2: Turnaways by Month and Database

» Database Report 3: Total Searches and Sessions by Month and Service

2 *Level 2 reports (optional)*

» Journal Report 3: Number of Successful Item Requests and Turnaways by Month, Journal, and Page-Type

» Journal Report 4: Total Searches Run by Month and Service

Figure 2 shows how Release 1 of the COUNTER Code of Practice expected Journal Report 1 to be formatted. As we progress through the timeline we will use Journal Report 1 as an example to show how the reports have evolved since release 1.

	PRINT ISSN	ONLINE ISSN	JAN-01	FEB-01	MAR-01	CALENDAR YTD
Total for all Journals			6637	8732	7550	45897
Journal of AA	1212-3131	3225-3125	456		521	665
Journal of BB	9821-3361	2312-8751	203	251	275	3465
Journal of CC	2464-2121	0154-1521	0	0	0	0
Journal of DD	5355-5444	0165-5542	203	251	275	2978

Figure 2: Journal Report 1 as specified in Release 1 of the COUNTER Code of Practice

2004 – 2007: SUSHI developed

In August of 2004, the Digital Library Federation (DLF) published "Electronic Resource Management: The Report of the DLF Initiative" (Digital Library Federation, 2004). As well as being the foundation for the electronic resource management (ERM) systems which were just coming on the market in 2004, the "ERMI" report, as it is often called, acknowledged the importance of usage data. Project COUNTER was singled out in the report as "an increasingly important standard in this area," and the document particularly noted that the XML DTD for COUNTER reports would "pave the way for smoother and more effortless transport of usage data".

Indeed, the COUNTER Code of Practice created an opportunity for the ERM to offer support for usage analysis. Before COUNTER, it would have been impractical to attempt to offer cross publisher/vendor usage analysis, because usage reports just weren't consistent enough, but with COUNTER that all changed. The promise of consistent reporting meant that usage analysis could become a practical feature of the ERM. The challenge was the growing number of content providers offering COUNTER reports and the effort to collect and load those reports into the ERM. The belief was that there must be a way to automate this.

It was this belief, and an impromptu meeting among Ted Fons (Innovative Interfaces, Inc.), Adam Chandler (Cornell University), Timothy Jewell (University of Washington), and Oliver Pesch (EBSCO) during the Chicago ALA conference in June of 2005, that was the start of an initiative that is now known as the Standardized Usage Statistics Harvesting Initiative (SUSHI).

That meeting lead to prototypes being built, and by November 2005 both Innovative Interfaces and Ex Libris were automatically harvesting usage from EBSCO and Swets using the SUSHI protocol. Also in November of 2005, NISO announced (NISO, 2005) the formation of the SUSHI working group. SUSHI was released as a draft standard during the summer of 2006, with the final standard being accepted by NISO membership and receiving ANSI accreditation in 2007 as ANSI/NISO Z39.93-2007.

The concept behind SUSHI was to use a client-server model that utilizes the Simple Object Access Protocol (SOAP) (Wikipedia, "SOAP") to enable machine-to-machine exchange of COUNTER reports. In this model, publishers and other content providers create a SUSHI server that delivers XML-formatted COUNTER reports to a SUSHI client. The SUSHI client (most likely built into an ERM or usage consolidation system) sends a specially formatted request to a SUSHI server to request a COUNTER report representing a library's usage over a range of months; the SUSHI server then prepares the report and returns it in a response that the ERM can then automatically process. Once the configuration details for each publisher host have been stored in the ERM, the usage consolidation application has what it needs to automatically retrieve the COUNTER reports on a regular basis.

While work on SUSHI was progressing, COUNTER had been working on updates to its initial Code of Practice, with Release 2 being published in April of 2005 (and becoming the valid Code of Practice in January of 2006). The majority of changes in Release 2 were clarifications and additional definitions designed to assist vendors in creating COUNTER-compliant usage reports. COUNTER reports were made

	PUBLISHER	PLATFORM	PRINT ISSN	ONLINE ISSN	JAN-01	FEB-01	MAR-01	YTD TOTAL	YTD HTML	YTD PDF
Total for all Journals		Platform Z			772	972	1165	2909	1032	1877
Journal of AA	Published X	Platform Z	1212-3131	3225-3123	456	521	665	1642	522	1120
Journal of BB	Publisher X	Platform Z	9621-3361	2312-6751	203	251	275	729	290	439
Journal of CC	Publisher Y	Platform Z	2464-2121	0154-1521	0	0	0	0	0	0
Journal of DD	Publisher Y	Platform Z	5355-5444	0165-5542	113	200	225	538	220	318

Figure 3: Journal Report 1 as specified in Release 2 of the COUNTER Code of Practice

	PUBLISHER	PLATFORM	PRINT ISSN	ONLINE ISSN	JAN-01	FEB-01	MAR-01	YTD TOTAL	YTD HTML	YTD PDF
Total for all Journals		Platform Z			772	972	1165	2909	1032	1877
Journal of AA	Published X	Platform Z	1212-3131	3225-3123	456	521	665	1642	522	1120
Journal of BB	Publisher X	Platform Z	9621-3361	2312-6751	203	251	275	729	290	439
Journal of CC	Publisher Y	Platform Z	2464-2121	0154-1521	0	0	0	0	0	0
Journal of DD	Publisher Y	Platform Z	5355-5444	0165-5542	113	200	225	538	220	318

Figure 4: Journal Report 1 as specified in Release 3 of the COUNTER Code of Practice

more legible with the addition of header rows and columns to indicate the publisher of the journal or database and the platform from which the usage comes. Figure 3 shows how Journal Report 1 evolved with Release 2.

Readers will also notice in Figure 3 that Journal Report 1 includes HTML and PDF totals. These metrics were added to the report to increase the transparency of usage reporting in the wake of the "interface effect" phenomenon that Phil Davis described in his 2005 paper, "eJournal Interface Can Influence Usage Statistics: Implications for Libraries, Publishers, and Project COUNTER" (Davis, 2005). With these new metrics, librarians can better judge if HTML usage counts are being inflated because of the design of a user interface (i.e., if the HTML full text is displayed by default, a subsequent viewing of the PDF will result in an additional 'full text request' being counted).

Up until this point, the focus for COUNTER had been usage reporting for serial publications. That changed in March of 2006 with the publication of *Release 1 of the COUNTER Code of Practice for Books and Reference Works* (COUNTER, 2006). The Code of Practice for books introduced a series of reports that allowed reporting of eBook usage

whether the book was delivered in a single PDF (Book Report 1) or in sections (Book Report 2). Turnaways due to exceeding simultaneous-use limits were counted at the title level in Book Report 3, with a summary of turnaways presented in Book Report 4. Searches and Sessions were counted by title in Book Report 5 and summarized by platform in Book Report 6.

2008-2012: Focus on implementation

The period of 2008 through 2012 saw activity mostly designed around improving reliability of COUNTER reports and their implementation. In August 2008, COUNTER published Release 3 of the COUNTER Code of Practice for Journals and Databases (COUNTER, 2008), with August of 2009 being the deadline for vendor implementation. Release 3 of the code of practice did not include any significant formatting changes as demonstrated in Figure 4, in which we can see the only change to Journal Report 1 is an update to "R3" in the title.

Release 3 included the following:

- The incorporation of SUSHI into the Code of Practice and the provision of XML versions of reports became a requirement for compliance.

- A requirement that publishers of journal archives provide either:

  » Journal Report 1a: Number of Successful Full-text Article Requests from an Archive by Month and Journal (which was an optional additional usage report in Release 2) OR

  » Journal Report 5: Number of Successful Full-text Article Requests by Year of Publication and Journal.

- Introduction of new metric types so that federated and automated search activity would be reported separately in Database Report 1 and Database Report 3.

- Addition of two Consortium Reports for reporting journal and database, respectively, at the consortium level, with a breakdown by consortium member. These reports are available only via SUSHI due to their potentially large size.

During this period, the number of vendors achieving compliance with release 3 of the COUNTER Code of Practice for Journals and Databases jumped more than 70 percent from 80 in 2009 to 137 in 2012, and the number of compliant vendors for Books and Reference works doubled to 50.

Also during this timeframe, work was underway on Release 4 of the COUNTER Code of Practice—a fairly significant release that treated journals, databases, books, and reference works using a single code of practice. Among the new features were: the addition of Journal Report 1 Gold Open Access as a new required report for publishers of hybrid journals (Wikipedia, "Hybrid"); Journal Report 5, covering usage by year of publication, became a required report; new metric types were added to Database Reports to count "Result

Clicks" and "Record Views"; and the "Sessions" metric type was retired. The format of COUNTER reports was updated to make it easier to automatically load the statistics into an ERM or usage consolidation module.

The formatting changes can be seen in Figure 5, which shows Journal Report 1 for Release 4. The significant changes include the addition of the customer name and customer identifier (the customer's International Standard Name Identifier, or ISNI) in rows 2 and 3. Release 4 also added Journal DOI and the publisher's proprietary identifier in columns D and E for the title, to assist systems in mapping usage to cost data and/or usage to knowledge-base data. Total columns were placed before the monthly columns so that their location would be predictable, and they were labeled "Reporting Period" rather than "YTD" to reflect the fact that COUNTER reports could be for any range of months and not just a calendar year.

Release 4 of the COUNTER Code of Practice was published in April 2012, with a required implementation date of December 31, 2013.

For its part, the NISO SUSHI Standing Committee was responding to concerns that SUSHI implementations were not reliable and servers were not interoperable. The COUNTER SUSHI Implementation Profile (NISO SUSHI Standing Committee, 2012) was published in August of 2012 as a NISO Recommended Practice. It offered guidance to developers of SUSHI services by providing explicit rules for interpreting both the COUNTER and SUSHI XML schemas, removing the ambiguity that could result from the abstract nature of both standards.

2013 – 2015: Continued revision of both COUNTER and SUSHI

A minor update to the SUSHI Standard was approved and published in early 2013. The most significant change was

	PUBLISHER	PLATFORM	PRINT ISSN	ONLINE ISSN	REPORTING PERIOD TTL.	REPORTING PERIOD HTML	REPORTING PERIOD PDF	JAN-11	FEB-11	MAR-11
Total for all Journals		Platform Z			4449	1566	2733	2223	1285	941
Journal of AA	Published X	Platform Z	1212-3131	3225-3123	1363	601	732	432	376	555
Journal of BB	Publisher X	Platform Z	9621-3361	2312-6751	1312	548	651	625	687	0
Journal of CC	Publisher Y	Platform Z	2464-2121	0154-1521	1717	403	1310	1109	222	386
Journal of DD	Publisher Y	Platform Z	5355-5444	0165-5542	57	14	40	57	0	0

Figure 5: Journal Report 1 as specified in Release 4 of the COUNTER Code of Practice

TITLE	PUBLISHER	PUBLISHER ISNI	PLATFORM	PROP. IDENTIFIER	PRINT ISSN	ONLINE ISSN	METRIC TYPE	REPORTING PERIOD TTL	JAN-15	FEB-15	MAR-15
Total for all titles							ft_total	280	25	26	22
Total for all titles							ft_html	120	10	10	10
Total for all titles							ft_pdf	160	14	15	27
Journal of AA	Publisher X	0000 0004 1111 1111	Platform Z	jnlAA	1212-1212	1212-3232	ft_total	120	10	10	10
Journal of AA	Publisher X	0000 0004 1111 1111	Platform Z	jnlAA	1212-1212	1212-3232	ft_html	60	5	5	5
Journal of AA	Publisher X	0000 0004 1111 1111	Platform Z	jnlAA	1212-1212	1212-3232	ft_pdf	60	5	5	5
Journal of BB	Publisher Y	1111 0000 2222 1111	Platform Z	jnlBB	2321-2351	2321-2873	ft_total	160	15	16	12
Journal of BB	Publisher Y	1111 0000 2222 1111	Platform Z	jnlBB	2321-2351	2321-1873	ft_html	60	5	5	5
Journal of BB	Publisher Y	1111 0000 2222 11111	Platform Z	jnlBB	2321-2351	2321-1873	ft_pdf	100	8	10	22

Figure 6: Journal Report 1 as imagined for Release 5 of the COUNTER Code of Practice

an update to the appendix on Security Concerns, to reflect technology changes and experience gained since the initial release of the standard. Some vendors had been implementing a layer of security that necessitated custom development in SUSHI clients to support their server—a requirement that is inappropriate for a protocol seeking interoperability.

In 2014, the COUNTER SUSHI Implementation Profile was updated, correcting some minor typographical errors.

Also in 2014, a further update of the SUSHI Standard, which operates under the NISO procedure for "continuous maintenance" (NISO, n.d.), was approved. The update extended "filters" and "report attributes" in SUSHI requests so that, in the future, a SUSHI client could request a customized COUNTER report, for example, one limiting usage to a range of IP Addresses, or a specific department, or request that zero-usage titles be excluded from Journal Report 1. Note that even though Filters and Report Attributes are now part of the SUSHI standard, vendors are not required to implement them to be COUNTER compliant.

Starting in 2014, the NISO SUSHI Standing Committee formed a working group to investigate a lighter-weight version of SUSHI—one that used the more common Representational Transfer State (REST) (Wikipedia, REST) approach to web services with the COUNTER data being returned as JSON (Wikipedia, JSON) rather than XML. The reasons behind SUSHI-Lite were twofold. First, to make it easier to implement SUSHI clients; and second, to pave the way for exchanging snippets of usage data and allow real-time integration of usage data into various library management applications and services. Imagine being able to view usage and cost-per-use in a subscription management system or acquisitions module—SUSHI-Lite would make this possible in a standardized way.

During the summer of 2015, the working group published *SUSHI-Lite: Deploying SUSHI as a Lightweight Protocol for Exchanging Usage via Web Services* (NISO SUSHI Standing Committee, 2016) as a NISO Technical Report that would serve as a draft for trial use. SUSHI-Lite is currently being used by a few institutional repositories and publishers for exchanging COUNTER usage and is something promising results. The expectation is that SUSHI-Lite will play a more significant role going forward, possibly being incorporated into the NISO SUSHI standard and becoming a requirement for compliance with future releases of COUNTER.

Looking ahead

As this is being written, COUNTER is in the process of drafting Release 5 of the COUNTER Code of Practice. The major themes behind Release 5 are standardization, normalization, and streamlining of implementation. Over the years, some of the individual COUNTER reports have evolved separately, creating some inconsistencies among reports. Also, an occasional lack of clarity or ambiguity in the current Code of Practice has created challenges for both implementers (trying to create COUNTER reports) and librarians (trying to consume the sometimes incompatible reports).

COUNTER Release 5 should see a reduction in the sheer number of reports while allowing for more flexibility in

reporting, so that more needs are covered in fewer reports. Ideally, reporting areas will be expanded to include article-level reports and reporting on research data. The Code of Practice will be made clearer by offering more guidance on metric types and which kinds of, and how, user actions are to be counted. Consistency is also a major focus.

In the current code of practice, the XML versions of reports may contain different data from the spreadsheet versions (i.e., in Journal Report 1, the spreadsheet contains only totals for HTML and PDF counts, whereas the XML provides the monthly breakdown). Release 5 of COUNTER will strive for consistency among formats and among reports. Figure 6 shows Journal Report 1 as imagined for Release 5.

The header has been reformatted so each field is labeled and consistent with what is found in the COUNTER XML version. A blank line is included between the header and the body to make it easier for librarians to use Excel sort and filter options. The body of the report is expanded with additional columns to identify the publisher (Publisher ISNI). The spreadsheet will include one row per metric type represented, so that the HTML and PDF totals can be subdivided by month, making the spreadsheet and XML versions comparable. All reports will follow the same structure, so that they will be easier to produce and easier to process by librarians and their automated tools.

The current projection is that COUNTER Release 5 will be presented for public comment in early 2017, with final publication slated for that summer. The anticipated date by which all vendors must be compliant is January of 2019.

The communities involved with the COUNTER and SUSHI initiatives remain very active and the importance and use of their respective standards continue to grow. COUNTER is expanding its area of interest to include distributed-usage logging, tracking alternative metrics such as shares and other social media activities, and by continuing to refine the current code of practice to improve its usefulness.

The NISO SUSHI standing committee supports the success of COUNTER by focusing on improving the automated exchange of COUNTER data through continued development of SUSHI, SUSHI-Lite, and the related schemas and registries.

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FOOTNOTES

1. The Publishers and Libraries Solutions (PALS) group was an organization created by the Jisc, the Publishers' Association (PA), and the Association of Learned and Professional Society Publishers (ALPSP).
2. Vendor Based Online Usage Statistics Forum, a conference organized by the PALS Usage Statistics Working Group, June 22, 2001, Charing Cross Centre, London, UK.

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