Community Values in the Dublin Core Metadata Initiative

A Look Back With Value Sensitive Design

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ABSTRACT

This paper aims to explore the Dublin Core Metadata Initiative (DCMI) in terms of its inception, organizational growth, and the expressions of values through the process. We will investigate these historic shifts through a Value Sensitive Design (VSD) lens, appraising the key values Community, Consensus, and Urgency, as well as the value tensions that arise. Through an empirical and conceptual probe into archived materials, equipped with a VSD methodology, we aim to gain an understanding of these values in terms of design decisions, how they grew and changed within the organization, and how tensions were treated along the way. From this research we generated a visualized timeline that highlights five major events in the DCMI's history and captures the values during those times.

Author Keywords

Dublin Core Metadata Initiative, Value Sensitive Design, Community, Consensus, Urgency, values, metadata

INTRODUCTION

It is a valid appraisal to say that the Dublin Core Metadata Initiative (DCMI) was organic in its development and continues to operate based on the founding ideals with which it began. It has been a bottom-up, community-based organization from the start. A collective idea of a "*healthy global metadata ecology*" [32] brought together like-minded folks from various institutional perspectives, all orbiting a similar set of values. Of these values apparent in materials generated throughout the DCMI's history, we have chosen Community, Communication, and Urgency to investigate. For our purposes, we are interpreting the historical expressions of these values even if they are not explicitly stated in the archived materials.

We highlighted these values due to their embodiment of the spirit of the impetus and enduring character of the organization and can serve as an entry point to understand how important historical shifts are characterized and as an operationalization to facilitate an analysis of 'design'.

In terms of the scope of our activity, we cannot provide a complete picture of the growth and development through an inferential treatment of the available materials. However, we can glean thematic assessments and draw enough material to begin to sketch a design analysis focusing on these values (Community, Consensus, Urgency) and contextualize the DCMI's moves as they relate to significant shifts in the development of the organization.

This analysis is in no way exhaustive. Instead, we aim to sample a cross-section to detect the contours of these values as they operate in the interplay of group dynamics and collective trajectory.

BACKGROUND

Dublin Core Metadata Initiative

In order to provide background for the DCMI, this is a self description sourced from the archived website on June 17, 2001.

> The Dublin Core Metadata Initiative (DCMI) is an organization dedicated to promoting the widespread adoption of interoperable metadata standards and developing specialized metadata vocabularies for describing resources that enable more intelligent information discovery systems.

> The first Dublin Core Series Workshop took place in Dublin, Ohio in 1995. Since that time, the DCMI has been committed to the continual refinement of a 'core' foundation of property values and types to provide vertically specific (or semantic) information about Web resources, much in the same way a library card catalogs provide indexed information about book properties. [11]

Values

Community

The DCMI community has grown over the years, but it began with fifty-two individuals at the first workshop [32] [33]. It has since involved many, many more. This growth is not the key factor in our choice of community as a value, but rather we look into the shifting focus on the value of community within the organization. In the early stages, workshops were invitation-only and participants were tasked with specific zones of development [33]. In 2001 and after, the value of community was emphasized by the establishment of annual

DCMI conferences instead of workshops [25]. These included calls for papers and presentations with the goal of increasing the community to involve more diverse perspectives. [11]

Consensus

In our research we are distinguishing the concept of consensus from community. While consensus may play an important role in the development of a community, in investigating the history of the DCMI, the two need to be differentiated. For our purposes, consensus is the process in which a collective decision is made to further the development of Dublin Core. Consensus can be understood as the point in which a community of people were able to move beyond debates, disagreements, and tensions. This does not mean that those conflicts were eradicated, but there was enough agreement to allow progression.

Urgency

Urgency is the sense of prioritization and an impending imperativeness. This feeling can be felt from both internal and external circumstances to the self. In regards to the history of the DCMI, we are concerned with how the community of people working from its instantiation may have experienced it from the external pressures caused by the rapid development and expansion of the World Wide Web and to address issues (perceived and forecasted) complicating the access to information on the Web.

Value Sensitive Design

Value Sensitive Design (VSD) is a design philosophy aimed at recognizing and supporting the needs of humans as well as nonhumans in the natural world. Operating in any sociotechnical space, this methodology emphasizes the careful consideration of all stakeholders, humans as well as those in the natural world, contemporary, as well as those in the future. Value is defined as "*what is important in people's lives, with a focus on ethics and morality*" [23]. Through the tripartite methodology of conceptual, empirical, and technical investigation, VSD aims to influence the design process in ways that embrace sensitive and imaginative solutions [23].

In this paper, we aim to use VSD as a lens through which we look at the past. The rise of the World Wide Web, in hindsight, was a tremendous shift in how people communicate, interact, distribute resources, and access information. This phenomenon has had profound implications not just on people, but also the ways people interact with their environments. We aim to use the VSD machinery for a historical analysis to reveal values implicated in the design and growth of DCMI at and beyond this pivotal moment in our sociotechnical history.

METHODS

Researcher Stance

The researchers have a background in the visual arts and library sciences. It is within these prior experiences that we became intrigued with the philosophical, conceptual, and practical labor that was required to provide information systems with searchable, standardized, and semantic structure. One of the researchers has prior professional experience as a metadata cataloguer who utilized the Dublin Core Metadata Elements in past work. In taking on this project we are interested in how to implement VSD methodologically in a historical and anthropological manner. Through this endeavor we seek to learn more and to develop ourselves as researchers.

VSD and Historical Analysis

In our research we decided to employ the VSD methodology to a historical investigation of the DCMI as an organization. This was a novel application of the framework that required conceptual reorientation. In practice VSD assumes the methodology is being implemented in the present alongside either researchers or designers, or both. It also assumes that there is some level of direct access to stakeholders and that they are able to serve as guides in surfacing the values important to the project [23]. Using VSD for a historical analysis meant that we no longer were working concurrently with the project's participants and therefore did not have the opportunity to utilize many of the rich methods that had been developed to elicit stakeholders or values.

Using the tripartite methodology to retroactively discover and analyze stakeholders and values caused us to reimagine how each part could be operationalized for past events. We anticipated conceptual and empirical, as well as abbreviated retrospective technical investigations. Knowing that the long history of the DCMI would not allow us to look at all points in their organizational past, we determined five events that demonstrated notable growth or development. As understood in the classic deployment of the methodology, our process was still iterative.

We began with the empirical investigation which took the form of a document analysis. The documents that we considered contained the information showcasing direct, indirect stakeholders, and the presence of the considered values listed above. In return we used the evidence found in the documents to reinforce our decisions about which events had important stakeholder moments. The abbreviated retrospective technical investigation influenced our empirical research as the leaps in Dublin Core Metadata Element, considered by us to be technical achievements, indicated an advancement in metadata interoperability, a primary goal through the DCMI's history. Similarly, the conceptual investigation impacted the retrospective technical one. As different values become more or less important to the stakeholders over time, this influenced the type of technical developments the DCMI were able to achieve. The iteration between these three investigations directed us to the five events we considered in this study due to the type of development within the DCMI, either technically or as an incorporation, the amount of documentation, and the clear evidence of noted values.

Procedures

Document Analysis

Our empirical investigations looked at mostly primary sources. Documents published by either the DCMI or other direct stakeholders (both organizations and individuals) reporting on developments that were occurring. Documentation sources included types such as conference proceedings, work group conversations archived in a Github repository, Dublin Core metadata specifications issued on dublincore.org, workshop reports, published personal recollections, archived progress reports and articles published in The Magazine of Digital Library Research, and web pages detailing the organizations history, mission, values, organizational stakeholders and relevant news. These web pages were accessed from both the current instance of dublincore.org and throughout its history via the Internet Archive and the Wayback Machine. It is from the documents that we gathered that we conducted VSD methods. While the shortened time frame of the project did not allow for a formal codebook to be generated, we were able to code the documents for stakeholders and values which were used as evidence for our findings and in the production of our value focused timeline.

The five events investigated within the DCMI's history were chosen because we interpreted it as being a noteworthy development either technically or as an organization. Due to the 25 year plus history of the DCMI, there were many periods of time that saw considerable growth. To some extent, the decision process in choosing these particular five events was due to our own interest in what occurred. The decision to choose only five events was an arbitrary scoping determination that was made based off of what we felt we could accomplish in our short time frame.

The first event was the OCLC/NCSA Metadata Workshop held in Dublin, Ohio from March 1-3, 1995 [33], This was the first workshop in the DCMI's history that established the Dublin Core Metadata Element Set, and began the custom of holding workshops with invited stakeholders to progress semantic interoperability [33]. The second chosen event was the DC-6: 6th Dublin Core Metadata Workshop held in Washington, D.C., USA from November 2-4, 1998 [6]**.** This was the workshop in which organizations interested in copyright metadata were invited to participate in the workshop, the interested parties solidified and established themselves as the DCMI, and that they began to incorporate legacy maintenance into their design [32]. Our third event was DC-2001 held in Tokyo, Japan from October 24-26, 2001 [25]. When the DCMI transitioned from a workshop style of meetings to annual conferences, they also integrated more educational resources into their conference agendas [25]. The fourth event was the issuance of the Dublin Core Collection Description Application Profile: Data Model in 2004 on the DCMI's website [12]. Although the DCMI had been working on the abstract model for over a decade, this was the first one published to the website that achieved a greater interoperability with other metadata schemas [32]. The final event we chose was the restructuring of the DCMI

as a project of the Association for Information Science and Technology (ASIS&T) announced on June 1, 2013 [2] [17].

Stakeholder Analysis

As a way to understand direct and indirect stakeholders without becoming overly broad or prescriptive with our analysis we decided to make specific scoping decisions of who these populations would include. For this historical analysis we opted to implement a once removal of the direct and indirect stakeholders as if we were doing a concurrent VSD research project. What this meant is that we understood ourselves to be situated as the researchers, the direct stakeholders of our project were all of the direct participants in the DCMI during its five designated points in history. Our indirect stakeholders were then who the DCMI considered their stakeholders to be. It is important to note that there is movement between indirect and direct stakeholders throughout the span of the DCMI. Professionals whose expertise was considered important for a subset of digital resources were brought on as necessary.

Specifically, we defined direct stakeholders as the people, occupations of people, or representatives of different interest groups who were the participants of the workshops and conferences. We considered the DCMI to always be a direct stakeholder. Also included as direct stakeholders were the workshop and conference sponsors. Therefore, the indirect stakeholders were then the people who the direct stakeholders were designing for, including authors, publishers, professionals, and non-professionals who were going to be using the DC in their professional practice.

There are indirect stakeholders that we are aware of that we are considered to be out of scope. These indirect stakeholders include lay users of the internet whose discovery of internet objects was improved by the creation and implementation of Dublin Core and the efforts of the DCMI. Understanding the impact of the DC on the general population is worthy of its own study that we did not have the space to consider here.

The process that we went through to elicit the direct stakeholders was to code for participant roles sponsors in the workshops and conferences. Then to identify the stakeholder organizations that DMCI had partnerships with at the five specific points in time. We were able to learn this information by looking at early publication history and through the DCMI's website accessed through concurrent date ranges using the Internet Archive and the Wayback Machine. Their website had been capturing instances of dublincore.org since March 31, 2001 [11], allowing us to collect information there for our last three events. We used similar tactics to identify indirect stakeholders. Included in who we considered the indirect stakeholders were other metadata schema organizations who DCMI had collaborative relationships but who at those points in time were not involved in the DCMI's metadata design process.

Value Source Analysis

We undertook the value source analysis in much the same way as the stakeholder analysis. We considered documentation that reported on the five events that we had chosen and coded for the presence of values within these. Additionally, for the events that took place after March 31, 2001 we were able to elicit the DCMI's values from their mission statement from similar date ranges as our events using the Internet Archive and the Wayback Machine.

Value Tensions
By discovering values held throughout different points in time through document analysis, this gave us an opportunity to see the conflicts that arose between values. Through our retrospective lens we did not want to be prescriptive in the ways we were attributing the variously held values and their importance. The way in which we discerned the importance of a value in relation to another value was in how often it was discussed in documents and the affect around how it was discussed.

FINDINGS

Stakeholder Analysis
Different populations of stakeholders were brought in at distinct times throughout this history of the DCMI. When the first workshop's participants set out to provide a semantic metadata solution to resource discovery and interoperability, they recognized that they had to greatly scope the objective to be able to make progress [33]. From the first workshop, the OCLC/NCSA Metadata Workshop, the report published, there is evidence that they purposefully excluded different interest groups in the initial development with the understanding that they would be brought in later to tackle different problems [32]. We found this to be a consistent attitude at other points in the DCMI's history. That was movement between direct and indirect stakeholders depending on the immediate short term goals within DCMI's stated objectives.

Value Source Analysis
There were a multitude of values that surfaced at the five different events we investigated. This was evident through the workshop reports, personal histories, and in DCMI's published mission statements. We were most interested in Community, Consensus, and Urgency and these were the values that were coded most explicitly.

Value Tensions
Without being able to conduct a more direct empirical investigation with stakeholders, we were unable to discern which values might experience tension with one another unless it was clearly stated within a document. Primarily the way we used value tensions was in how prevalent each value appeared in relation to each other over time. We found that each value, Community, Consensus, and Urgency rose and fell in prominence in relation to each other throughout the DCMI's history. This is not to suggest that these were the only values present during each event, but that these were the values we were interested in understanding the relationality of during these particular moments.

DISCUSSION

DCMI Value Focused Timeline
In an attempt to visualize and understand how values within the Dublin Core Metadata Initiative change over time, a Value Sensitive Design Timeline organizes major developments in the progress of the organization. In addition, it weaves a representation of our three chosen values (Community, Consensus, and Urgency) in relational degrees of prominence, as gleaned from the source material. The result is a picture of the DCMI narrative and the values that appear to be present as the organization grows and changes.

Vertically oriented, our timeline begins at the top with a hallway conversation in 1994. The timeline on the left indicates the year, with red arrows indicating our five points of investigation. Additional publications and changes in the organization are also included for context but are beyond the scope of this analysis.

Three color bands follow the progression of the timeline and represent the three values we chose to investigate. Through published and archived materials, we were able to get snapshots of the organization and the people involved at these five points. From these snapshots we inferred a value emphasis for each: Community, Consensus, and Urgency. These were then mapped onto the timeline in representative proportions with orange for Urgency, green for Community, and violet for Consensus.

Since it is difficult to determine the total *amount* of values present at any one time, *proportions* of the identified values were illustrated, assuming an equal amount of total values throughout the entire timeline. This allows us to illustrate our findings regarding these values in relation to each other and in context with the time period.

OCLC/NCSA Metadata Workshop
The timeline begins in 1994 with conversation leading to our first point of reference—the 1995 OCLC/NCSA workshop in Dublin, Ohio, where, among other things, Dublin Core received its name [33]. At this time in the development of the organization, Urgency was high. The impetus for the Initiative was very fresh and the participants were motivated by the rapid growth of the World Wide Web and the increasing difficulty in finding resources therein. Community and Consensus were relatively similar to one another, yet were diminished in relation to Urgency. This does not necessarily suggest that there were fewer people and more disagreement, it suggests that these values, at that time, were less important than Urgency.

DC-6: 6th Dublin Core Metadata Workshop
At our next point in the analysis, 1998, the DC community met for DC-6. This was a particularly contentious meeting [32] where Dublin Core was working to coordinate with INDECS (Interoperability of Data in E-Commerce Systems). This collaboration failed due to differences in philosophical

perspectives—DCMI embraced a bottom-up approach while INDECS utilized a top-down structure [32]. These differences could not be reconciled and resulted in tension and Urgency. Also related are the decreased emphasis on Community as well as Consensus. As illustrated by the timeline, the early years of DCMI were dramatic and shifting, with a greater sense of Urgency than the other values investigated.

DC-2001

2001 indicates a major shift in the narrative. This is the first year the DC community gathered for a conference instead of independent workshops [11]. With DCMI continuing to grow and develop, this point is noteworthy as it illustrates a relative decrease in Urgency and an increase in both Community and Consensus. The fact that conferences replaced workshops suggests that the organization is maturing and slowing its development, but also opening itself to a wider community. This was also apparent in the archived materials. Prior to this point, workshops would occur at necessary points and would include a somewhat exclusive contingent of participants [25]. With the conference model, DCMI was able to accommodate more perspectives and generate a wider sense of consensus.

DC Collection Description Application Profile: Data Model

2004 marks the publication of the DC Abstract Model—a significant advance to increase interoperability. This publication of the Abstract Model represents a key point in the narrative as it required a balance of urgency, community, as well as consensus. The period leading up to this was particularly contentious and an increase in urgency and community illustrate the point. After this stage, we see a levelling of the values, which appear to carry onward to the present.

DCMI as an ASIS&T Project

The final point on our timeline, 2013, was significant in terms of the organizational makeup, however it had little impact on the value relationships. At this point DCMI partnered with ASIS&T. ASIS&T began providing institutional structure and support to ensure long-term stability [2] [17].

LIMITATIONS

The shortened time frame in which we were able to conduct this research greatly limited what we were able to achieve. Using VSD as a tool for historical analysis is a novel use of the methodology and requires careful consideration in its deployment. In addition, the source materials available in the published papers and archives can only represent certain perspectives on values. This can be limiting if we are to infer organizational values solely from these sources. A deeper investigation could involve direct interviews, but this is out of our scope at this time.

CONCLUSION

The love of internet metadata may be a common trait in 2020, but in 1994 it was a select few who came together to develop what became the DCMI. And we can be thankful they did, because Dublin Core has since become a standard for metadata and has simplified resource finding on the internet. For our analysis of DCMI, we utilized the VSD methodology in a historical context to reveal values and value shifts over the development of the organization. This use of the VSD machinery is novel and has presented interesting challenges and methodological insight. We were able to refocus the VSD lens to perform this historical analysis by scrutinizing published papers and DCMI archives. We focused on three prominent values, Community, Consensus, and Urgency at five points during the growth of DCMI, 1996, 1998, 2001, 2004, and 2013. These points were identified as major shifts in the development of the organization and served as meaningful nodes with which to perform the VSD analysis. The timeline illustrates the value relationships at these different points.

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Urgency

Community

Consensus

1994
Hallway conversation for semantic structure at the Second International World Wide Web Conference in Urbana-Champaign, Illinois (event)

1995
OCLC/NCSA Metadata Workshop in Dublin, Ohio (event)
Third International World Wide Web Conference in Darmstadt, Germany (event)

1996
OCLC/UKOLN Warwick Metadata Workshop in Warwick, UK (event)
CNI/OCLC Image Metadata Workshop in Dublin, Ohio (event)
"On Information Factoring in Dublin Core Metadata Records" (specification)

1997
DC-4: 4th Dublin Core Metadata Workshop in Canberra, Australia (event)
DC-5: 5th Dublin Core Metadata Workshop in Helsinki, Finland (event)
"Metadata Semantics Shared Across Languages" (specification)
"Coverage Element Working Draft" (specification)
"Relation Element Working Draft" (specification)

1998
DC-6: 6th Dublin Core Metadata Workshop in Washington, D.C., USA (event) (incorporation)
"Date Element Working Draft" (specification)   "Dublin Core and z39.50" (specification)
"Representing Peoples Names in Dublin Core" (specification)   "Subelement Working Draft" (specification)
"The Use of Dublin Core Metadata in WebDAV" (specification)   "Data Model Working Draft" (specification)
"A Cross-Domain Attribute Set" (specification)   "Format Element Working Draft" (specification)
Type Element Working Draft" (specification)   "Names in Dublin Core" (specification)
"Plans for distributed registry of Dublin Core in multiple languages" (specification)

1999
DC-7: 7th Dublin Core Metadata Workshop in Frankfurt, Germany (event)
"DCMI Type Working Group - Review of RFC 2413" (specification)   "RDF Schema Declaration of Relation Types" (specification)
"Coverage Working Group - Review of RFC 2413" (specification)   "RDF Schema Declaration of Relation Types" (specification)
"A Syntax for Writing a List of Labelled Values in a Text String" (specification)
"Dublin Core Tags Applied to XML-Data Schemas for Purpose of Description and Categorization (specification)
"Description and Cataloging of XML-Data Schemas" (specification)
"Bibliographic Citation Working Draft" (specification)
"List of Resource Types" (specification)

2000
DC-8: 8th Dublin Core Metadata Workshop in Ottawa, Canada (event)
"DCMI Qualifiers" (specification)
"Education Working Group: Draft Proposal" (specification)
"A Definition of Thesauri and Classification as Indexing Tools" (specification)

2001
DC-2001 in Tokyo, Japan (event)
DCMI Government Application Profile (specification)

2002
DC-2002 in Florence, Italy (event)
"Expressing Qualified Dublin Core in RDF / XML" (specification)
"Expressing Simple Dublin Core in RDF/XML" (specification)

2003
DC-2003 in Seattle, Washington, USA (event)
"DCMI Usage Board Review of Application Profiles" (specification)
"Guidelines for implementing Dublin Core in XML" (specification)
"Expressing Qualified Dublin Core in HTML/XHTML meta and link elements" (specification)

2004
DC-2004 in Shanghai (event)
"DCMI Policy on Naming Terms" (specification)
Dublin Core Collection Description Application Profile: Data Model (specification)
"DC-Libraries – Library Application Profile - Draft" (specification)

2005
DC-2005 in Madrid, Spain (event)
"Guidelines for Encoding Bibliographic Citation Information in Dublin Core Metadata" (specification)
"Dublin Core Application Profile Guidelines" (specification)
"Using Dublin Core" (specification)   "Element Refinement in Dublin Core Metadata" (specification)
"MARC Relator terms and Dublin Core" (specification) 2 Updates to DCAM (specifications)

2006
DC-2006 in Manzonilla, Colima, Mexico (event)
"DCMI Box Encoding Scheme" (specification)
"DCMI DCSV" (specification)
"DCMI Period Encoding Scheme"
"DCMI Point Encoding Scheme"
"Expressing Dublin Core metadata using XML" (specification)

2007
DC-2007 in Singapore (event)
"Dublin Core Collection Description Application Profile" (specification)
"Dublin Core Collection Description Application Profile Summary" (specification)   "DCMI Abstract Model" (specification)
"DCMI Grammatical Principles" (specification)   "Expressing Dublin Core™ metadata using the DC-Text format" (specification)
"Namespace Policy for the Dublin Core Metadata Initiative (DCMI)" (specification)

2008
DC-2008 in Berlin, Germany (event)
DCMI incorporates as its own non-for-profit company apart from OCLC (incorporation)
"Domains and Ranges for DCMI Properties" (specification)
"Expressing Dublin Core metadata using the Resource Description Framework (RDF)" (specification)
"Notes on DCMI specifications for expressing Dublin Core metadata in RDF" (specification)
"The Singapore Framework for Dublin Core Application Profiles" (specification)
"Description Set Profiles: A constraint language for Dublin Core Application Profiles" (specification)
"Expressing Dublin Core metadata using HTML/XHTML meta and link elements" (specification)
"Notes on DCMI specifications for Dublin Core metadata in HTML/XHTML meta and link elements" (specification)
"Expressing Dublin Core Description Sets using XML (DC-DS-XML)" (specification)
"Notes on the DC-DS-XML XML Format" (specification)   "A MoinMoin Wiki Syntax for Description Set Profiles" (specification)

2009
DC-2009 in Seoul, South Korea (event)
OCLC completes transfers of assets and activities to DCMI (incorporation)
"Criteria for the Review of Application Profiles" (specification)
"Interoperability Levels for Dublin Core Metadata" (specification)

2010
DC-2010 in Pittsburg, Pennsylvania, USA (event)

2011
DC-2011 at The Hague, Netherlands (event)
"DCMI Generic Namespace Policy for RDF Vocabularies" (specification)

2012
DC-2012 in Kuching, Sarawak, Malaysia (event)
"DCMI Type Vocabulary" (specification)
"Dublin Core Metadata Element Set, Version 1.1: Reference Description" (specification)

2013
DC-2013 in Lisbon, Portugal (event)
DCMI restructures as a project of ASIS&T (incorporation)
"Dublin Core Collection Description Accrual Method Vocabulary" (specification)
"Dublin Core Collection Description Accrual Policy Vocabulary" (specification)
"Dublin Core Collection Description Frequency Vocabulary" (specification)   "Dublin Core Collection Description Terms" (specification)
"Dublin Core Collection Description Type (CDType) Vocabulary" (specification)
"Dublin Core Collection Type (CLDType) Vocabulary" (specification)

2014
DC-2014 in Austin, Texas, USA (event)
"Kernel Metadata" (specification)

2015
DC-2015 in São Paulo, Brazil (event)

2016
DC-2016 in Copenhagen, Denmark (event)

2017
DC-2017 in Washington D.C., USA (event)
"Linked Data Competency Index (LDCI)" (specification)

2018
DC-2018 in Porto, Portugal (event)