

the bipolar feeling that either the problem at hand is too complicated or that you are just too dumb to solve it. An engineer must have an excellent education. To achieve excellence in engineering requires good governance in our academic institutions and beyond and the freedom to conduct independent research. To the new engineers and scientists gathered together in this room, I'd like to say: Spread out over the world, and change it to a better one. You can do it; your fellow engineers and scientists of the past have paved your way."

Prof. Immink was, for over 25 years, Phillips' leading engineer in the creation and development of digital audio and video products. His many inventions are universally found in all digital media, such as the compact disc (CD), DVD, and Blu-ray disc.

The impact of his work on consumer electronics is so large that it is virtually impossible to cite digital audio or

video that does not reflect his work. In the mid-1970s, Prof. Immink conducted pioneering experiments on digital optical recording that led to the creation of the CD, which gave way to the DVD and Blu-ray disc.

He conducted the very first experiments on digital audio recording using optical discs in 1976. In 1977, Prof. Immink developed the coding method that made digital optical recording much less sensitive to disc damage, making it possible to introduce the CD. In 1982, he conducted the very first experiment with erasable CDs, paving the way for home-recordable discs.

Fueled by his practical contributions, he has made seminal contributions to information theory, shaping the fundamental knowledge of digital coding and techniques. He wrote more than 150 articles on constrained coding and has published widely on the construction and properties of codes. He has authored four

books, including the landmark *Codes for Mass Data Storage Systems*. Prof. Immink has collaborated for several years with the Centre for Telecommunications at UJ, South Africa. His creativity has resulted in more than 1,100 patents across the world, covering inventions in disciplines such as optics, mechanics, coding, and electronics.

Prof. Immink received several tributes that summarize the impact of his contributions to the digital audio and video revolution. Among the accolades he received are the IEEE Edison Medal for a career of creative contributions to the technologies of digital video, audio, and data recording as well as an individual Technology Emmy Award by the National Academy of Television Arts and Sciences. In 2000, Queen Beatrix of The Netherlands bestowed upon him the honor of knighthood.

—Peter Corcoran

Introduction to the IEEE 1874 Open Manual Format, "oManual"

IEEE Standard 1874, *Standard for Documentation Schema for Repair and Assembly of Electronic Devices*, is a simple, open XML-based standard for semantic, multimedia-rich procedural manuals. It is commonly referred to as "oManual" or the open manual format.

The IEEE 1874 specification describes the data model, Web services application programming interface (API), and bundle file format (a collection of structured files containing a category and guide XML files). The specification may be expanded in the future to enable additional types of documents.

AN INTRODUCTION OF MANUALS

Manuals have always included images, part diagrams, and references to other documents. Those links and metadata are a significant part of what makes a manual effective. The Internet is perfect for allowing these documents to come alive, making it possible to connect procedures with tools and reference specifications. Unfortunately, the vast majority of manuals distributed online do not take advantage of this flexibility. PDF documents are static and have no structure to their data.

A huge amount of useful data is buried, trapped in static documents where it cannot be leveraged, built upon, and repurposed. The IEEE 1874 specification, or oManual, solves this problem. Publishing manuals as both user-friendly PDF/

HTML and machine-friendly oManual files allows for the best of both worlds: manuals that retain their ease of use but are also easy to maintain and build upon.

HOW DID oMANUAL GET STARTED?

oManual started when O'Reilly Media [1] (a leading publisher of technical books) and iFixit [2] (the free online repair manual) started searching for a data format to exchange their procedural manuals. The existing XML specifications were overly broad and convoluted, ill-suited for procedural manuals. So a specialized format to fill the gap was created.

WHO IS IT FOR?

oManual is for anyone who wants to publish manuals, whether they are

repair manuals, manuals to create things, manuals to destroy things, how-to guides, work instructions, or any other type of manual that contains step-by-step instructions. oManual is also for developers who want a flexible format that allows them to republish content in new and exciting ways.

WHAT EXACTLY IS A MANUAL?

Manual is an overloaded word, and most dictionaries have outdated definitions referring to instruction books. Here is our definition: a manual is a document that teaches you how to do something. To pick a few examples, we think oManual is a good fit for reference manuals, instruction manuals, user manuals, owner's manuals, how-to manuals, survival guides, and service manuals—but that's just a start.

WHY IS oMANUAL BOTH A FILE FORMAT AND AN API SPECIFICATION?

Traditional documentation—PDFs, Microsoft Word documents, and even complex files like DITA—lives on a single computer. Establishing a “single source of truth” for these documents requires complex document-management systems. Accessing these (often very large) documents from a mobile device

can be challenging because it requires downloading the entire file up front.

Mobile applications usually download information as they need it, from an on-demand API. oManual bridges these two worlds by providing a common data format and allowing the information to be transmitted via legacy offline files or made available as a Web service. An example workflow would be to take XML DITA service manuals, convert them to oManual with an XSLT transform, and load them onto a JSON server for use by mobile applications.

IS oMANUAL COMPATIBLE WITH DITA?

oManual is not a subset of DITA [3], but it would be straightforward to convert from oManual to DITA or from DITA to oManual. We are looking for volunteers to help us write some conversion utilities. One note of caution: “round-tripping” content from DITA to oManual and back again is not recommended, because oManual does not fully support all of DITA. This simplicity of oManual is a feature, not a bug.

WHAT SOFTWARE SUPPORTS oMANUAL?

As of right now, Dozuki [4] is the only software platform that can read and

write oManual packages. We are working with a number of companies to get this standard implemented as part of their software platforms.

CAN I HELP?

Absolutely. We will be expanding the standard as needed. Our driving principles are as follows.

- ▼ The format should be as simple as possible and no simpler.
- ▼ No manual stands alone. oManual should enable prerequisite chaining and semantic linking, referencing external documents as much as possible.
- ▼ Manuals are not simply text. They are dynamic documents that encapsulate images, videos, and other technical details.

REFERENCES

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- [2] iFixit Web site. [Online]. Available: <https://www.ifixit.com/>
- [3] Wikipedia. (2014, Apr.). Darwin Information Typing Architecture. [Online]. Available: http://en.wikipedia.org/wiki/Darwin_Information_Typing_Architecture
- [4] Dozuki Web site. [Online]. Available: <http://www.dozuki.com/>

—Mark Schaffer

iFixit Green Chief

IEEE 1874 Working Group Vice Chair

Behind the Scenes at ICCE 2014

Every year, the faithful of the consumer electronics (CE) industry gather in Las Vegas for the International Consumer Electronics Show (CES). Another smaller group of industry and academic researchers come together in the days following CES to attend the IEEE International Conference on Consumer Electronics (ICCE),

where the research underlying future and emerging technologies is presented for peer feedback and consideration.

If you are active in CE research, you have likely attended ICCE at some point in your career, but in this article, I don't want to focus on the conference itself—we have covered it in various ways in past issues of *IEEE Consumer Electronics Magazine* and the CE Society newsletter. In this article, I would like to highlight the people and organizational

meetings that support and enable ICCE and the CE Society—these activities are ongoing every year against the busy background of CES and ICCE. Based on a set of pictures I took while at ICCE 2014, here is the story in pictures of the people and meetings/events that inform and guide your Society.

These volunteers serve you and your Society, working in the background to develop new member services and manage our existing portfolio of