

myWMS – The Open Source Warehouse Management System

Author: Hubert Büchter¹

Owing to the availability of databases, inexpensive hardware and an extensive, efficient network technology the just-in-time inventory management is no longer a problem. With the help of present software the additional throughput, which is required by e-Logistics, can easily be achieved. The functions of a warehouse management are not limited, however, to the management of the inventory and master data. Modern systems have to operate quite a number of different interfaces, consider restricted storage strategies, minimize transport routes and times, support different kinds of stocktaking and many other things. Despite of many repeating functions and interfaces these are often redefined by potential operators of warehousing systems as well as by manufacturers of warehouse management systems and conveyor components. Despite of existing standards, e.g. VDI or FEM which cover partial fields, there are no generally accepted standards for warehouse management systems.

Standards for warehouse management

As a consequence, the operator is bound to his supplier throughout the lifetime of his plant and is thus incompatible to other systems. The data model can only be extended with risky and expensive changes of the core system.

The suppliers of warehouse management systems have to use their own, often limited development capacities for their activities. Because there are no generally accepted interfaces they often have no possibility to purchase external modules – for example for the optimization of trips, for the prohibition to store goods together or for the optimal distribution of weight.

Nowadays, the suppliers of conveyor components often can sell their goods only together with the necessary software. It seldom makes sense to build up own software development capacities and because of a lacking interface standard a strategic collaboration with systems suppliers often is the only suitable solution.

Generally accepted standards, especially for the data model and the interfaces of warehouse management systems, are indispensable to solve the present problems. /1/. Classical standardization methods with their long iterative finding, identification and appeal processes seldom offer the quick solutions, the pragmatic approaches and the universality which are required in practice. More time is needed to broadly apply the passed and published standards.

¹ Dipl.-Ing. Hubert Büchter, scientist at the Fraunhofer-Institut für Materialfluss und Logistik, Joseph-von-Fraunhofer-Straße 2-4, D-44227 Dortmund; e-mail: buechter@iml.fhg.de

Open Source development

Another approach which has already been implemented successfully in many projects is based on openness and transparency and parallelizes some of the above-mentioned processes. The keyword is "Open source": disclosure of all documents and the source codes of a software project as well as a permanent communication between all participants. This makes the interface specifications, the system architecture and the data models available to everyone. Such an open system makes it also possible to integrate developers from different companies and institutions. The permanent discussion serves as forum which does not only support the exchange of opinions between the developers but also integrates the user. This facilitates the worldwide collection and realisation of ideas concerning a further development. (cf. /2/). Many application logs in the Internet developed that way and have become a generally accepted quasi standard. The operating system LINUX certainly is one of the best known open source projects.

"Open" stands for the disclosure and does not in all open source projects mean "free" in the sense of a cost-free use. There are different licence models; the majority of the "open source projects" also offers a free use of the programs. But this does not mean that the projects are also executed free of charge. Analysis, modelling, development, start-up and operation assistance are still made by engineers which provides orders, jobs and profits. When the design is good the programming of a software development is "mere" craftsmanship. In future, money will not be earned with the sales of programs but with consulting and creative engineering.

The warehouse management systems can also benefit from such a development style. Such a project is presently being developed at the Fraunhofer-Institut für Materialfluss und Logistik in Dortmund: **myWMS, the Open Source Warehouse Management System**. This system is designed with modern software technologies and tools with the aim to create a widely accepted warehouse management system with well-defined interfaces and data models. This aim should be achieved with the open source development principle. At first, a core system is implemented by a closed circle of developers. This first development step will be published and released this year (Q2/01). Intermediate results which document the state of the project and above all the results of the analysis will permanently be published also during the development to trigger discussions.

The communication media will be a mailing list, a discussion forum and a newsletter. This should ensure the intensive and timely contact between the participating members of a user group. General information will be published on a web-site /3/.

The implementation

myWMS will be object-oriented and coded in the programming language JAVA. Free software products will be used for the development and operation. LINUX, for example, will be the preferred operating system and PostgreSQL the preferred database. Owing to JAVA the system also runs on other operating platforms and other databases, such as ORACLE, can be used. The complete user interface is browser-based, i.e. it uses the common web browsers. This allows for the use of existing network structures and inexpensive personal computers with almost any operating system as workplace computer.

The first level includes a core system with the inventory management, the master data management and the possibility to enter and process storage and retrieval orders. The functioning is proved by a reference system which in the first level will only consist of a high-bay warehouse with two aisles and a simple cross-conveyor. Although this first reference system will work with a simple first-come-first-serve strategy for the order execution and a totally unoptimized chaotic storage strategy the concept already includes interfaces for the integration of further strategies and optimizations in *myWMS*.

When the first version has been disclosed also external developers can actively participate in the project. In order to align the development activities these will be coordinated by the Fraunhofer IML. After they have passed the tests and the quality assurance the development results will be integrated into the next version.

For practical use *myWMS* has to support concrete interfaces to ERP-systems and the conveyors. For this purpose, corresponding program modules will be developed and saved in a driver library. While the basic system can be used free of charge for non-commercial purposes moderate fees will have to be paid for the use of the driver library. Since all interfaces of *myWMS* are well documented a potential user may also develop his own special drivers.

Perspectives

The further development of *myWMS* includes a coupling to ERP-systems, an extension of the supported conveyor elements, the integration of simple storage strategies and the optimization of and coupling to an e-shop. The interface to SAP-systems will be certified for *myWMS*. The further aims will be determined in detail and prioritized only after they have been discussed in the user group. The further development will be made step by step to use the feedback from practice.

myWMS shall also be used for training and professional education to make it widely known. The free – for commercial use cost efficient - availability and the web-based operation offer ideal conditions. For training purposes a virtual warehouse could be built, for example, where pupils throughout the world can train. Such a project would provide developers important basic data

for a performance analysis and, in addition to this, as a permanent test it would contribute to quality assurance.

Conclusion

Here, the development of an open source warehouse management system is described. The present feedback shows a wide acceptance by planners, system suppliers, manufacturers of components and application service providers. First financial aids for the development of the core system have already been granted.

The wide acceptance offers the possibility to create a defacto standard for the data model and the interfaces of a warehouse management system. The user groups can rely on a planning security, back up their investments, find an inexpensive entrance and revert to trained staff on the labour market.

Literature:

- /1/ Michael ten Hompel: „Lagerverwaltungssysteme“, Praxiswissen GmbH, Dortmund 1999, ISBN 3-3932775-48-1
- /2/ Eric Raymond: „Die Kathedrale und der Bazar“, contribution to the 4. Linux-congress, Linux-Magazin Verlag 1997, <http://www.linux-magazin.de/ausgabe/1997/08/Basar/basar.html>
- /3/ Homepage of the *myWMS*-Project: <http://www.myWMS.de/>