

Whitepaper

Standard Software

The six biggest myths in focus

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Standard software in focus



Every new purchase of application software involves a myriad of complex decisions. What is often overlooked but key to future implementation is the question of whether to opt for standard software or an individual solution.

Especially for processes that appear unique, such as product-specific picking in the warehouse, many prospective customers tend to choose individualised programs in the belief that their warehouse is a one-off with its own special set of requirements. In truth, the notion that individual software is a better fit for the requirements of individual warehouses often leads to additional and for the most part preventable costs, as well as higher implementation risks.

At CIM, we have long been convinced that standard software in warehouse logistics can prevent many of the problems associated with individual software or individualised standard software.

This white paper aims to examine some of the key issues around the topic of standard software: What exactly is standard software? Which areas does it cover, and what are the differences between a standardised program and an individual solution? What type of background and structures are required to develop standard software? How is standardised logistics software created and implemented? And what are ultimately the benefits of standard software for the customer?

Six myths about standard software

Standard software has been a buzzword in the warehouse management sector since the early 2000s. WMS manufacturers invariably point out the potential of their products in terms of standardisation and extol the associated benefits.¹

More recently, however, there has been a move towards claiming that standard software is more expensive and offers less potential for individualisation.² Although standard software accounts for a market share of almost 80% in the logistics sector, there is clearly a great deal of uncertainty about the pros and cons of individual versus standard software. For this reason, many WMS manufacturers use marketing jargon such as 'flexible' or 'custom-fit' to refer to standard software, creating the impression that it is possible to combine the best of both worlds.

This masks a discussion dominated by myths about exploding costs, needless functionality and a high degree of complexity associated with purchasing standard software.

Despite the fact that standard software has already been on the market for a number of years, the belief persists among many prospective customers and industry observers that it is not properly geared towards the relevant processes and involves high customisation costs.

The essence of this uncertainty, however, lies in the six myths that have long shaped the debate surrounding standard software and still prevalent today.

¹ Cf. WMS Marktreport 2020. Hg.: Fraunhofer IML

² So auch Werner Rieche im Jahr 2018, Geschäftsführer der Software AG Deutschland.
In: <https://www.industry-of-things.de/ist-standardsoftware-noch-zeitgemaess-a-744278/>.
Called up on 15.6.2021

Mythos 01

Standard software uses plug and play technology

Standard software is generally understood to be a pre-assembled, ready-for-market software solution with a specific range of functions designed to carry out defined tasks. It functions reliably under given conditions and defined parameters without any further adjustments. What's more, standard software is 'instantly' available, provided that it can be implemented without any form of training, specially qualified personnel or customising. The best-known examples of standard software are word processing programs or payroll accounting software which are designed for a broad market and require little parametrisation.³ Microsoft Word can be installed on almost any conventional operating system without having to make any special settings, for example.

This brings us to the core of the first myth surrounding standard software. The high profile of everyday, user-friendly software programs tempts people to think that their features are universal. However, it is essential to consider the specific prerequisites

of the relevant sector with regards to the term 'standard software': Word processing software is basically everyday software with a manageable level of complexity in terms of usage and implementation. The low level of parameterisability enables the system to be used flexibly – the catchphrase is plug and play. Users can get up to speed with the functionality quickly and easily without causing any major damage, either by reading the documentation provided or simply by trial and error.

In terms of responsible software development, this type of approach is not possible in many other sectors – especially in logistics and manufacturing. A plug and play system for warehouse management software can rapidly lead to financial ruin for a logistics company. As explained in the following, the logistics sector not only requires a high level of willingness to test on the part of software developers, but there are also numerous parameters which need to be defined in advance by expert personnel. Should this fail to take place, there can be serious repercussions.

³ Cf. Schwarzer, Bettina; Krcmar, Helmut: Wirtschaftsinformatik. Grundlagen betrieblicher Informationssysteme (Stuttgart, 2010). Page 126f.

Mythos 02

Standard software is easier to develop

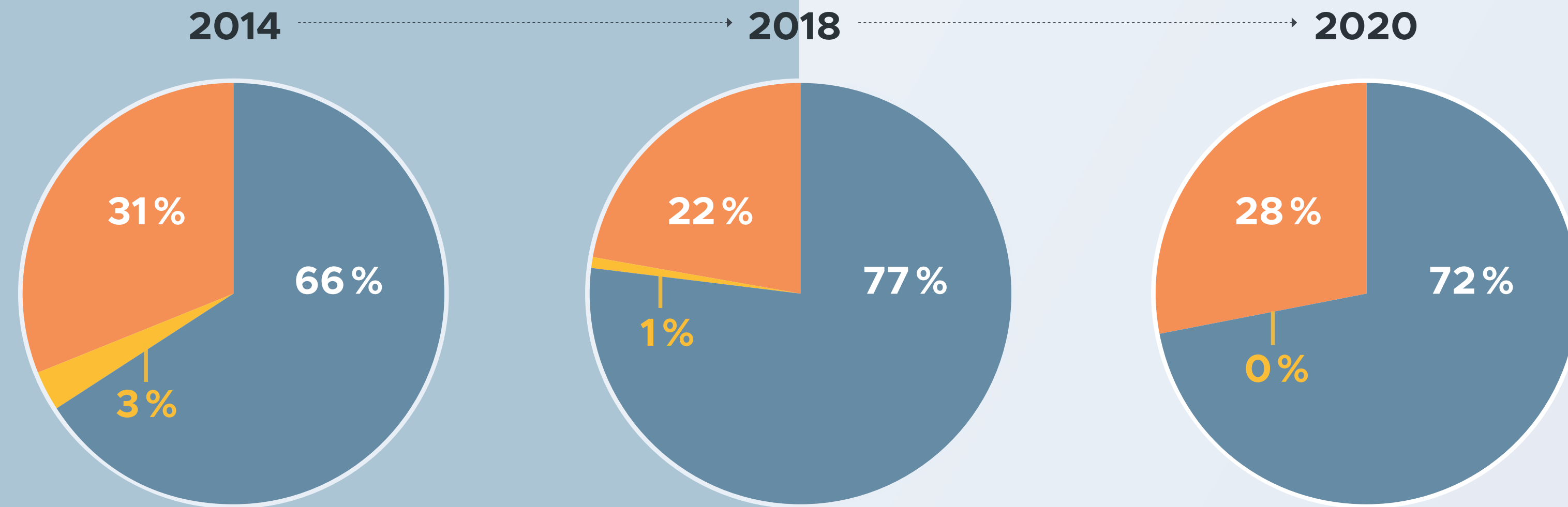
The idea that standard software is easier to develop stems from the preconception that standardised programs are not adapted to the specific needs of the user. It's exactly the opposite, in fact – standard software is adapted to the needs of a wide range of users.

To establish an information processing program as a standard, any external influencing factors need to be either integrated or eliminated. This is based on the insight that standard software – unlike individual software – does not run in isolation on one and the same system. Instead, it is confronted with a range of different hardware and software requirements. The aim of development is therefore to design a program that clashes as little as possible with other programs and operating systems – a system created to work with the specific environments of different potential and actual users. For logistics systems, this means on the

one hand using a stable platform that runs without too many complications. **PROLAG World** uses browser-based control, which functions sustainably on practically any system. Any disruptions that might occur with more machine-oriented programming are thus excluded from the outset.

Another factor to consider in designing standard software is the implementation of interfaces. To prevent clashes with existing systems, research is required to establish the most common systems on the market – ERP systems, for example – and integrate them by means of a suitable interface. Ideally, the program ought not be disturbed by its environment, nor should it be the cause of any disturbance. For developers, the production of standard software therefore has consequences which are reflected across almost all areas of an IT company.

Auslastung im Bereich Standardsoftware



Der Anteil der WMS-Anbieter, die ihr System selbst als Individualsoftware bezeichnen, verringert sich seit 2014 stetig. Es zeichnet sich die Tendenz zur Standardsoftware ab, wobei der Anteil der kundenspezifischen Anpassungen variiert. Einer projektspezifischen Programmierung kann durch die Parametrisierung und die Weiterentwicklung von Standardfunktionalitäten seitens der WMS-Anbieter vorgegriffen werden.

● Standardsoftware ● Individuelles Standard WMS ● Individualsoftware

Mythos 03

There's no such thing as standard software in logistics

The numerous additional parameters and setting options that need to be mapped by standard software for it to function smoothly are mirrored in the organisation of the development team and the overall company. Depending on the complexity of the application software, various different structures are found in the respective IT companies. Market players in the WMS sector are faced with the unique situation that the demand for individualisation continues to be high.

The above diagram from the WMS Market Report 2020 by the Fraunhofer IML shows that the share of individualised standard software has decreased only slightly over the last six years despite an apparent trend to the contrary. Until a few years ago, there were still producers of individual software in the marketplace. These market-specific conditions result from the needs and expectations of prospective customers, as well as a frequent lack of knowledge about internal warehouse processes.⁴

This is the biggest difference between the prerequisites for standard software in logistics compared to other areas where standard software has become firmly established. Warehouse management processes are disproportionately more complex and require a far greater level of specialist knowledge, depending on

⁴ Cf. WMS Marktreport, Page 56

⁵ Cf. ten Hompel, Michael: Intralogistik – Auf dem Weg vom Prozess zum Service. In Baumgarten, Helmut (Hg.): Das Beste der Logistik. Innovationen, Strategien, Umsetzung (Berlin, 2008). Page 105–110; Page 105.

⁶ Ebd. Page 105.

the type and condition of the warehouse and of the items in storage. Any generic description of a WMS includes over 1000 individual functions which need to be structured in an application-specific manner. Even the structure of the most basic of logistics functions such as receiving, putaway, staging or picking results in millions of possible variations.⁵

The more exactly a process and its application are defined from the outset, the greater the amount of data that needs to be processed. Even making an article available within a picking zone requires inventory maintenance, reservation of the requested article and management of the various resources right down to the employee who ultimately picks the article. There are numerous error strategies to be considered if there are technical component failures or scheduled events do not take place.⁶

The high number of individual parameters is comparable to the complexity of an aircraft (with approximately two million individual interlocking parts). Consequently, it appears that a standard solution cannot possibly meet all the challenges faced by one warehouse, but that individualised solutions are necessary.

Mythos 03

Structural consequences of standard software in logistics

Project-based organisation

For this reason, project-based implementation has become the common development practice for many WMS manufacturers, taking account of the sector's special demands for individualisation. With this type of organisational structure in place, project management leads a team of developers and testers whose task it is to adapt the existing standard software to specific customer needs. Business processes that are not covered by the standard version are then added on a user-specific basis. New functions, on the other hand, are integrated into the existing standard software. The relevant project teams therefore need to consult with each other and work on the same standard, otherwise the systems will start to diverge.

A project-based organisational structure brings some definite disadvantages, however. For one, it requires a high level of communication between teams to keep the standard abreast of customer-specific individualisations. Maintaining the core

standard system becomes both time-consuming and cost-intensive, and is often seen in practice as more of a burden than a benefit. Especially given the already high workload of the individual project teams during the various project phases, technical innovations and achievements often go by the wayside. The particularisation of standard software, which varies from team to team, is the inevitable consequence of a high structural concentration on individualised standard software.

For customers, who allegedly benefit from individualisation, project-based programming also increases the risk of exploding costs as well as the likelihood of errors and bugs in the system. This is due to the fact that each individual adjustment is planned, integrated into the system and tested for one specific customer. In addition to the higher effort time-wise, there is a greater risk of failure since the testers can only evaluate the data of this one customer.

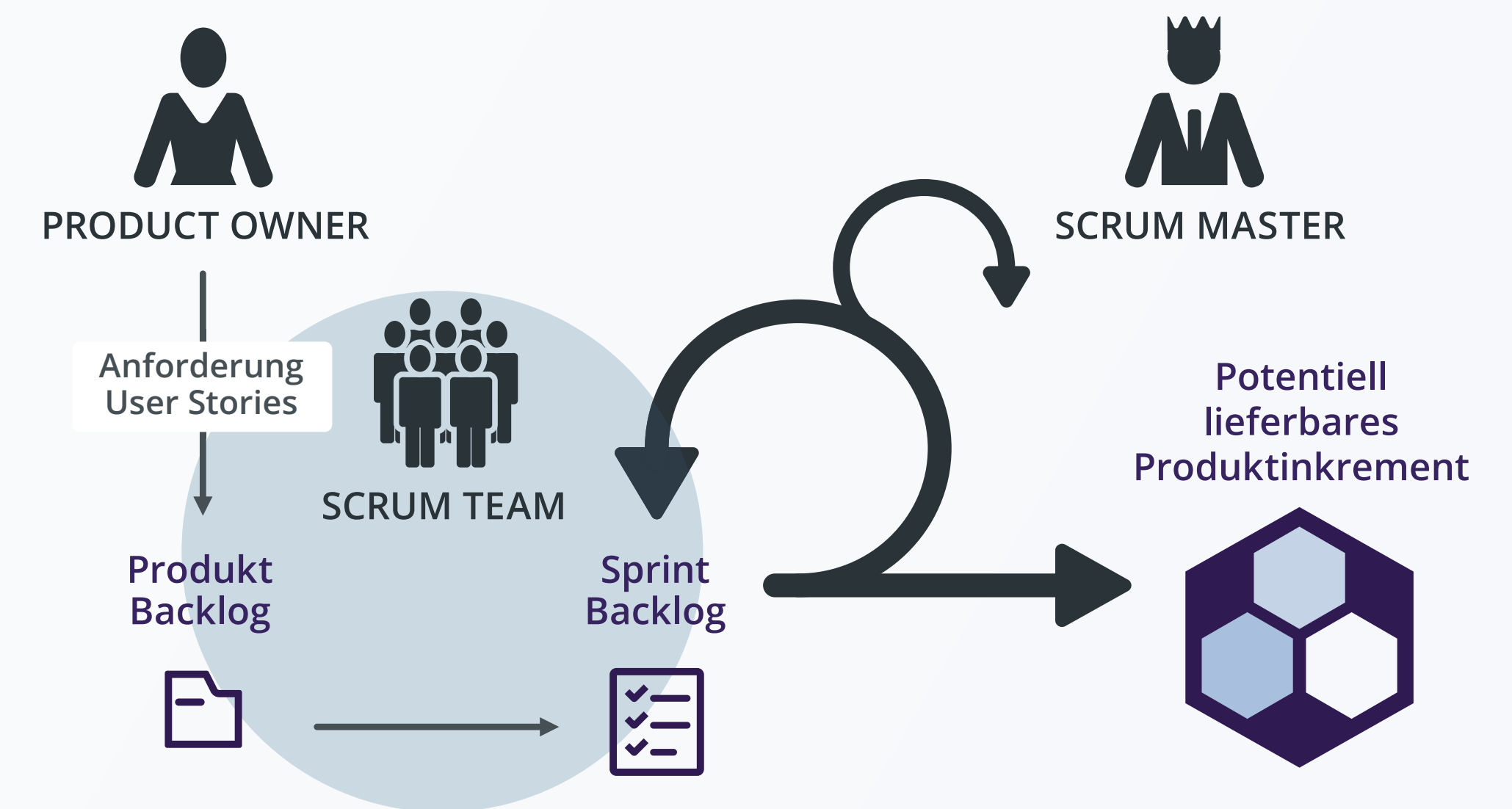
Mythos 03

Agile software development

In order to counteract these problems, CIM decided a few years ago to switch to the scrum method. Based on agile methodologies, the development team is no longer organised on a project basis but works centrally on the standard software. This means that the standard is always up-to-date and serves as the reference for all ongoing projects.

According to the scrum method, the project manager no longer communicates 'non-standard' customer needs and wishes to the development team, but to the product owner. The employee with the role of product owner compares the requirements with the standard, checks the processes and then forwards any change requests to development and quality assurance – the scrum team. >

Scrum Methode:



Mythos 03

› The scrum master, on the other hand, supports the work of the scrum team as an outsider. As the servant leader, the scrum master discusses the work of the development team in daily scrum meetings including any problems, difficulties or conflicts that need to be resolved. In collaboration with the product owner, scrum master and scrum team, goals are defined with the help of established processes and the customer's adjustment requests are integrated directly into the standard.

Thanks to the close cooperation between development and quality assurance and the collaboration on a central standard software, this organisational structure reduces the risk of additional costs due to duplicate or unnecessary adaptations. At the same time, the project manager can guarantee a much more stable system, since testing capacities do not have to be divided simultaneously among multiple project systems but are always focussed on one system only – the standard software.

Project-independent organisation has another positive spin-off which is often overlooked. It is no longer just one person – the project manager – who is familiar with the end customer's operations and processes. Project management is still necessary for communication, preparation and implementation.

However, services and troubleshooting fall under the remit of a general service team and are no longer a part of the project. The consequence of this is extensive documentation, both with regard to programming and the standard software functions. The user is ultimately no longer dependent on individual persons and can count on structural reliability in the event of problems and service issues.

Mythos 04

Standard software is a finished product

Against the background discussed up to this point, it should be clear that there are numerous factors to be considered in the run up to a standard software release/release upgrade. Given the wealth of functions in the software package, the testing requirements are much more comprehensive, one of the reasons being that the risk of collateral damage for the developer is significantly greater: bugs in standard software usually affect not just one customer but multiple users. It is therefore in

A self-testing system

Automated tests are not just performed once only before the release – the system is designed to run them autonomously as a core part of development. A test framework is created to provide an execution environment for automated testing of the application logic. The software is configured so that any changes made during the (working) day are also checked outside of working hours. At the start of the following working day, the development and quality management teams get the test results showing whether the actual outcome correlates with the expected outcome or if any collateral damage occurred.

the interests of the software development team to find the bugs and fix them prior to release. To simplify processes, automated tests are implemented in all standard software solutions and adapted to the new conditions each time there is an update. An in-house testing team is responsible for ensuring a secure testing environment.

One criticism often levelled at developers of standard software is that there is too much focus on release cycles and release upgrades. This stems from the concern that individual user needs are put aside in favour of unnecessary software updates providing new but non-essential functions. To claim that individual software is less prone to bugs, errors and security issues is a false promise, however. The reality is that individual solutions can never achieve the same level of stability and security as standard solutions, with their copious amounts of test data and testing capacities. Individual systems are rigid, updates are not common and always represent an intervention in the development environment. >

Mythos 04

› Especially when it comes to cyber security, the notion that no further development is required is no longer considered up-to-date. The logistics sector nowadays represents critical infrastructure and needs to stand on a stable foundation not only in times of crisis such as the coronavirus pandemic, but also to fend off potential terrorist or malicious attacks on IT systems. The focus on the release upgrade capability of the user system must therefore be viewed in a broader context. Looking solely at the functional scope of a system is not sufficient to

Release upgrade agreement

At CIM, standard software release upgrades are formalised in a release upgrade agreement detailing the required services. This means that **PROLAG World** always remains up-to-date in terms of security and currentness – major system upheavals, equivalent to a new installation, are a thing of the past thanks to regular release upgrades. CIM is constantly expanding the range of functionality with extra security features and optimised compatibility with current technologies (such as android for **PROLAG Go**). Users receive the latest documentation, the test environment is updated, employees are trained and, if desired, the release upgrade is implemented on site by CIM employees.

describe its benefits. Using standard software complies with the principles of sustainable, future-proof planning through continuous development, system maintenance and training. Seen against this background, the myth that standard software is a finished product requiring no further development seems somewhat misplaced.

Further enhancement and maintenance of a standardised application is not only in the interest of the customer, who benefits from regular software updates and comprehensive documentation, but of the provider too – and is often an essential aspect of their business model. The conventions of the respective markets determine the common models. Contrary to what many users think, even the software giants demand payment for maintenance and service. While regular new releases replaced older versions in the past, there has been a trend towards subscriptions in recent years. Even with completely free software solutions, there is usually a profit in the background that is not visible to the user. In the age of Big Data, the potential for earning money with ostensibly inexpensive software has exploded.

Continuous enhancement of the software system is therefore the greatest strength of standard software. While individual software always focuses on the current status, standard software already has the tools for a future change in requirements, enabling a high degree of investment security.

Mythos 05

A standard WMS is prone to errors during the implementation phase

The question of how implementation and customising take place despite the complex requirements of the logistics sector has not yet been addressed. Standard software in logistics is based on the premise that the business processes are predefined. It is true that the majority of business processes are standardised and repetitive.

Experience shows that there are so many similarities between different companies' business processes that the logic can be implemented in software which is configurable using a settings file. To achieve this, the standard software needs to fulfil several conditions. The most important requirement is that the software includes models of business processes that are similar to the actual structures and processes in place within the company. These models need to be clear and transparent and are derived from warehouse data and analysis of the real-life business processes. The standard software must supply documents and examples that can be compared with the existing processes to detect any issues. Test plans or simulations are required in order to verify usability prior to implementation.

The most common individualisations of standard software are related to defining the existing business processes in the predominant standard. The business processes which are already implemented vary depending on the type of warehouse, the nature of the items in storage and on the sector.

PROLAG World is a ready-made software solution with integrated business processes which are adapted to the needs of different sectors. The predefined processes are optimised for efficiency, personnel costs and material costs based on the functional maturity of the system and the most common warehouse types. The standard software thus dictates the user's business processes to a certain degree. Depending on the requirements, certain parameters are provided for configuration to enhance usability and reduce the effort involved in training users. During the requirements analysis and software design phases, the customer's existing business processes are analysed and adapted if necessary in order to achieve optimal results with the new software. >

Mythos 05

› If the business processes deviate from the adjustable parameters in the standard delivery, a cost-benefit analysis must be carried out. Normally, completely individualised business processes that have to be integrated into the supplied software do not achieve the degree of efficiency possible with the calculated and recommended processes. On the other hand, the costs of customising standard software are not commensurate with the benefits, as the transition can be appropriately supported by training the operating staff. If the business processes do not correspond to the recommendations of the system, they need to be adapted manually each time there is an update or functional extension, greatly increasing the system's susceptibility to errors. Automated testing may no longer be effective and unnecessary extra costs are generated due to individual testing requirements.

Whether a standard WMS is prone to problems during implementation depends on the prerequisites of the relevant warehouse, in other words. But even with the necessary training and adjustment of business processes in line with standardised processes, it is true that warehousing problems with a standard system decrease in the medium term given the lower susceptibility to errors and a more stable environment than with individualised software.

Is standard software more stable?

A complex risk calculation:

Software systems usually consist of classes – 5000 classes in **PROLAG World**. Logic methods are implemented in the classes and are called by the various classes when they are needed. There are on average 10 methods in each class, each of which processes around 20 data fields in the class.

If methods are called by classes and these methods in turn call more methods, this creates a dependency. With a set of 5000 classes, it's easy to imagine how many classes and methods are called even by one simple request. Countless dependencies are created, in other words. So what is the probability that one of the methods or classes is incorrect?

If two modules are interdependent, the overall probability that the function is fulfilled is the product of the individual probabilities of the modules. So if a system consists of 10 interdependent modules, all of which individually fulfil their function with a probability of 98 %, the overall probability that these 10 modules fulfil their collective function is only 82 %.

The above calculation shows that new software requires an enormous amount of testing, an effort which is almost always underestimated. For software producers, the cumulative risks associated with individual classes call for extremely complex and sophisticated testing strategies. Since large volumes of data are available for standard software and the testing effort is operated not just for one but for multiple customers, it is possible to develop automated tests for consistent testing. Standard software is therefore a great deal more stable and reliable than individualised software.

Mythos 06

Standard software is cheaper than individual software

The notion that custom products are more expensive than mass-produced products stems from the age of industrial manufacturing. An assembly line product manufactured in large quantities is inevitably cheaper than a custom-made product – there are volume discounts to lower material costs, the work steps are simplified and standardised. Do the same prerequisites apply to the software industry?

When it comes to software, however, there is a direct correlation between the price and the complexity of the system. In contrast to custom software, standard software usually has multiple parameters to cater to the widest possible target group. Today's customers are looking for a system that maps their processes in the standard in a way that achieves optimum results. This means that standard

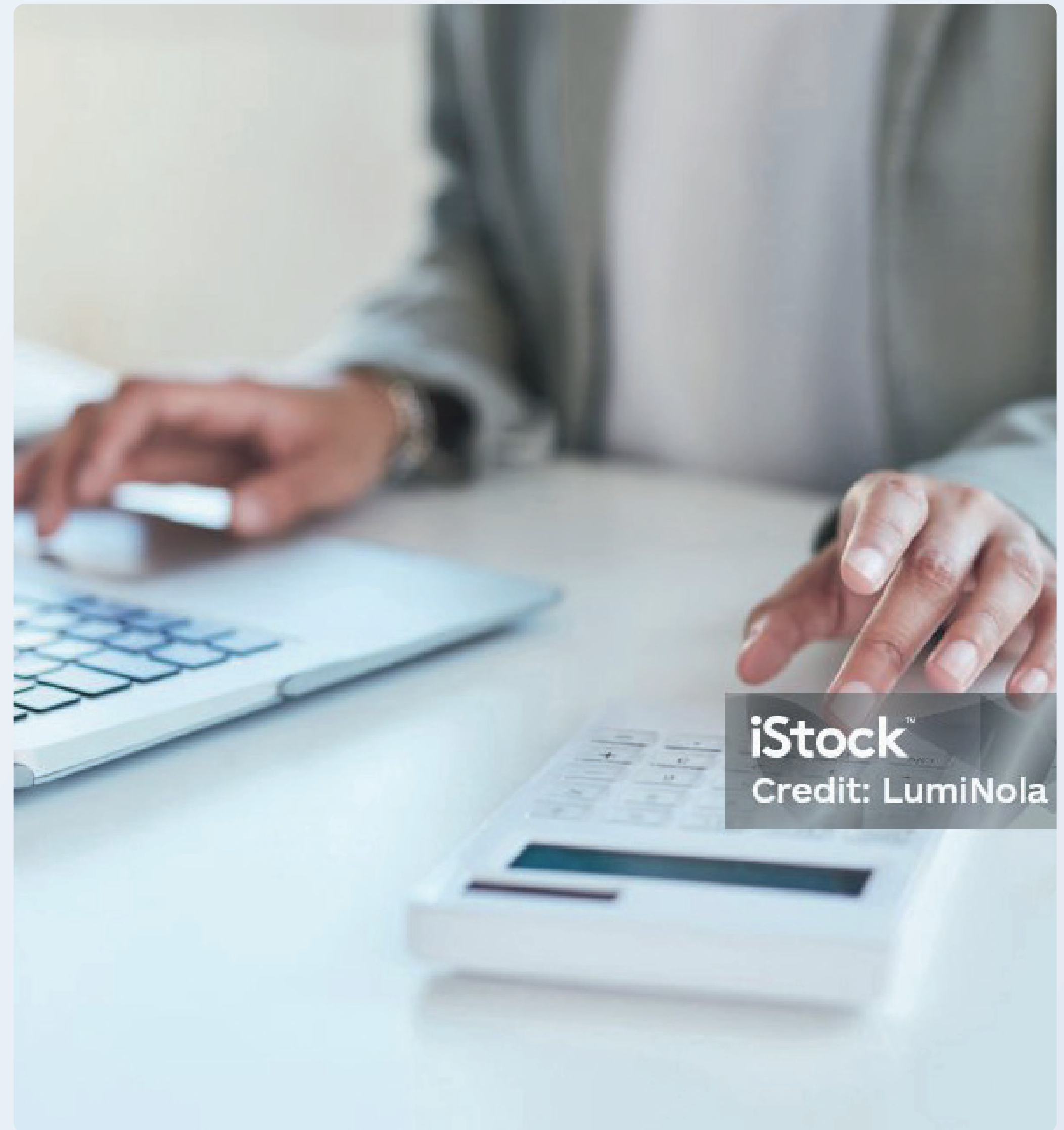
systems need to provide highly flexible configuration options, inevitably leading to increased complexity and higher prices. For reasons already explained above, the demand for parameterisability of warehouse management software is very high due to the nature of the industry.

There is little truth to the myth that standard software is less expensive than individual software, in other words. Although there is no increase in material consumption, there is a greater need for developers as the complexity of the parameterisability increases. This necessarily leads to higher 'production' costs and a higher price. However, the conditions for developing standard software can be improved, keeping costs to a minimum. This is a process that was introduced by CIM a number of years ago with the switch to agile software development. >

Mythos 06

› **PROLAG World** offers a flexibly configurable standard solution which can be tailored to individual sectors, creating considerable benefits with regard to pricing. Thanks to our unique Ultraflex technology at CIM, the system accommodates different sector requirements in the standard and can react easily to the respective procedures and process optimisations.

PROLAG World thus offers a high degree of configurability and numerous setting options, guaranteeing the user a high degree of autonomy from the developer. All of the settings can be made independently. At the same time, the complexity of the standard software is kept to a minimum using the industry-specific parameters. Depending on the sector, redundant parameters are excluded from the outset – which ultimately minimises cost of investment.



Conclusion

These six myths about standard software are widespread. On closer examination, however, they prove to be over-generalised or even untrue. Calling standard software plug and play cannot be generalised, but is highly sector-dependent. Particularly in the logistics sector, a plug and play approach would make little sense and would even be irresponsible. Although in common parlance standard is often used as a synonym for simple, standard software is much more complex to develop than individual software.

For this reason, manufacturers of standard software need to think intensively about the right approach to organising their development team. The Fraunhofer Institute's WMS Market Report 2020 shows that standard software is still the predominant trend in the logistics industry. According to their analysis, the extensive share of individualised standard software is also likely to disappear in the logistics sector in the foreseeable future. The reasons are manifold and have are related to the organisation and structures of the development team as well as the results of the cost-benefit analysis of standard software versus individual software. With the move away from project-based to agile software development, the paradigm shift of the past decades is intensifying. The scrum method brings considerable benefits

in terms of system stability, investment security and cost efficiency, both for the developer and the user. The associated focus on regular release upgrades also means that standard software is gradually becoming the only alternative in the logistics sector. What's more, sophisticated testing strategies for standard software provide a more stable environment for implementing release upgrades. The growing security requirements, both in terms of cyber-crime and occupational safety, can only be met with regular updates and standardised business processes.

The last myth also needs to be dispelled in this context: reliable standard software is not cheaper than individual software for purely structural reasons. As the complexity of the parameterisation increases, so does the price – and likewise the benefits for the user. Due to the numerous integrated parameters, a WMS can be configured as standard software for sector-specific and warehouse-specific use. It thus offers optimum usability – regardless of any future changes or enhancements.

The WMS as standard software is thus an investment in future-proof and sustainable logistics services that guarantee user-friendliness and stability in the long term.



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