

10 CRITICAL SUCCESS FACTORS FOR THE IMPLEMENTATION OF ASSET MANAGEMENT SYSTEMS IN THE ENERGY & UTILITIES INDUSTRIES©



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10 JUNE 2020, VERSION 1.0

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Acknowledgements

The authors would like to thank the following people for their contribution to this white paper: Richard Donaldson (UK & European CEO) for offering his extensive and valuable project experience; Hugh Levey in his role as Editor; and Helen Fisher for proofreading. Thanks also to colleague Simon Nicholson for reviewing and commenting on the document as a whole. Finally, we would like to thank our Energy and Utilities clients with whom we have had the privilege to work with - and learn from - over the last 26 years. Thank you.

CONTENTS

About the Authors	2
George Lightfoot	2
Ian Wright	2
Acknowledgements	2
Introduction	4
CSF 1: The Importance of Industry Knowledge	5
CSF 2: The Position of EAM in its Wider Business Context	6
CSF 3: Product Knowledge and Selection	7
CSF 4: Management Support	8
CSF 5: User Champions	9
CSF 6: Building the Right Team	10
CSF 7: Project Management	11
CSF 8: Gaining User Acceptance of Change	12
CSF 9: Testing	13
CSF 10: Training	14
Appendix 1: Special Considerations for Asset Transitions	15
Appendix 2: Special Considerations for Offshore	16
About BPD Zenith	17

Introduction

This paper is intended for Business Managers who are responsible for Maintenance Management, Engineering Management, Operations Management or Asset Integrity within the Energy and Utilities Industries. It will be of particular interest to those who are planning to implement a new Asset Management system and to their senior IT colleagues.

The integrity, safety and reliable operation of high value assets are common requirements shared by all organizations within these industries. In upstream Oil & Gas and in Power Generation, an unplanned outage of a critical asset may halt production and lead to serious financial loss. In a Water, Electric and Gas distribution context, it could lead to customer supply issues and the associated reputational damage. If Health, Safety and Environment considerations are not fully addressed, then there may be regulatory compliance issues and the potential loss of human life.

It follows, therefore, that a well implemented Asset Management system is an essential part of the business fabric of all organizations in these industries. This paper draws on over 50 years of combined IBM Maximo® implementation experience from BPD Zenith Consultants, whom have extensive experience of the Energy and Utilities industries. The document presents 10 factors which BPD Zenith believe are critical in order to achieve a successful Asset Management system implementation.

Before exploring these Critical Success Factors, it may be useful to explain some of the terminology and references made in this paper. Firstly, the term Computerized Maintenance Management System (CMMS) is one which readers will be familiar with. It describes an IT system that manages maintenance workload (both planned and reactive) and is very operationally focussed. An Asset Management system or 'Enterprise Asset Management' (EAM) system is a term that is used for a system with broader capability than that of a traditional CMMS. Firstly, it can be used to manage multiple assets or installations, rather than a single one. Secondly, it addresses the whole of life cost of the asset rather than just its operational life. Finally, the EAM normally has broader function, coming with a complete suite of work management, asset maintenance, planning and scheduling, supply chain management and environmental, health and safety (HSE) initiatives. Having said that, there is no hard and fast definition that is completely accepted in the industry, but the definition of an Asset Management system above is the one we are using for the purposes of this paper. We also use the term Work Management System (WMS) being the part of the system that handles operations maintenance management.

This white paper is product-agnostic and is not intended to directly influence your product selection. Indeed, many of the factors discussed would be applicable to the implementation of any suitable EAM system. However, BPD Zenith's implementation experience is based almost exclusively on IBM's Maximo® Enterprise Asset Management software, with which the authors have had considerable success in the Energy and Utilities industries. BPD Zenith is a Premier IBM Business Partner, Platinum accredited for Maximo® and the only company in the world to be accredited by IBM as a Specialist Industry Solutions provider for the Chemical & Petroleum industry.

CSF 1: The Importance of Industry Knowledge

When implementing or upgrading an asset management system, it is crucial that you involve people who have a solid understanding of your organization's business processes and the ability to enhance those with industry best practice. That sounds fairly straightforward, but there is more to it than one might expect.

Your own employees are clearly the best placed to understand your own business processes and you may have benchmarked those processes against those of your competitors, but does your organization have experience of implementing them in a new asset management system? In our experience, very few organizations do. The average employee may be involved in one major asset management system implementation during the course of their career – perhaps two if you are lucky. Is that sufficient experience for you to be totally confident that you are implementing industry best practice in your chosen asset management solution? Our experience suggests that it is not. Inevitably companies need to bring in external skills to provide this knowledge and experience. Typically, this would be done by recruiting an experienced Project Manager, with a proven track record of implementing the solution in your industry - multiple times. Or it can be done by employing a consulting organization who specialise in your industry and your chosen EAM tool. Frequently, we see organizations doing both.

Why is this so important? Perhaps this is best answered by giving a real-life example from our own experience. Having implemented IBM's Maximo® Enterprise Asset Management system in the Oil & Gas industry many times, we know how to apply the optimum business processes for works management and supply chain. We often find that the client's experienced business and project staff may think that they know the correct process, having worked with other Oil & Gas operators in the past. However, the reality is that they mix and match pieces of all the operators' processes without understanding what is really effective and without building a coherent end-to-end process. Having worked with many operators, BPD Zenith has developed a complete understanding of why the WMS process works and why the SCM process is extremely effective. We worked with one client for eight years on multiple asset transition projects, refining and improving these processes. Since then we have taken that knowledge and refined it further, based on our experience with organizations of all sizes (including some of the largest Oil & Gas companies in the world). When we do our design, we recommend the use of these processes in our Maximo Oil & Gas Accelerator template, saving the client time and ensuring that they do not design an ineffective solution. We do this because we know that these processes are proven and will work. It is something that our clients benefit from greatly.

When designing asset management systems for these industries, it is important to understand both industry best practice and the unique requirements of the industry. For example, many Wind and Oil & Gas facilities are offshore which brings with it some important logistical and legal requirements which are not faced by other organizations. In industries like Oil & Gas (and to a lesser extent, Power Generation) it is common for assets to be sold by the largest companies to a second tier of companies in the same industry. These "Asset Transition" projects have their own unique requirements. The Special Requirements of Asset Transition projects and offshore projects are described in Appendices 1 and 2 respectively.

CSF 2: The Position of EAM in its Wider Business Context

While an EAM solution is an integrated system with a broad functional coverage, it does not operate in isolation. During implementation, careful consideration must be given to the wider business context and IT system landscape. At the very least, the EAM's Supply Chain Management (SCM) system has to interface to your organization's financial systems.

If your organization already has a strategic SCM system which is used for the procurement of services and materials beyond those needed for asset management, then design decisions have to be made about where the EAM and existing SCM system integrate. There are many options and these need to be evaluated and discussed, each with their own benefits and associated considerations (a detailed discussion of this is outside the scope of this document).

When implementing both the SCM and WMS components of an EAM solution, we are often asked which should be deployed first. It is a difficult question to answer because it depends on a client's existing system and business processes.

It is an important question because SCM and WMS rely on each other, regardless of the industry. The Maintenance focus is to keep equipment running, to generate power, pump oil out of the ground or distribute water, power or gas across the network. However they cannot do that without Supply Chain supplying materials and services in a timely manner. In a similar way, Supply are there to support operations and maintenance, but they cannot do this without sufficient detail from Work Management otherwise they will end up supplying the wrong materials or equipment.

In an ideal world, both would be implemented at the same time. With an Oil & Gas client, we upgraded both SCM and WMS together, because the business processes were designed with both in mind. Representatives of both the Supply Chain and Works Management functions were involved in planning and design meetings. Updates and enhancements continue this process by engaging both in the same meeting when reviewing and defining processes. Focusing on one or the other can result in a bias which may cause complications or difficulties for the other side later in the project.

At a client in the Power Generation industry we have implemented the SCM part of the system first. This is because a planned shutdown operation meant that engineering resource was going to be fully utilized and would not have sufficient time to be sufficiently involved in the deployment and testing of the new WMS. Nevertheless, the overall EAM system design had been done with both Supply Chain and Work Management in mind.

In addition to these core systems, any EAM also needs to integrate with the Planning function where tools such as IBM Maximo® Scheduler or Oracle's Primavera are widely used. For asset-intensive organizations, major planned shutdowns and outages for general maintenance are a fact of life. In organizations where HSE is critical, systems such as Permit to Work (PTW) are required and the EAM may need to integrate with these too. ISSOW is widely used in North Sea installations and NiSoft Eclipse in Power Generation. IBM has Permit to Work functionality in its Maximo® HSE Module and in its Maximo® for Oil & Gas industry solution.

CSF 3: Product Knowledge and Selection

As indicated in the Introduction, this paper is not intended to sell or propose any individual Enterprise Asset Management solution. However, given the complex nature and importance of high value assets in the Energy and Utilities sectors, it hardly needs to be stated that choosing a suitable and proven system is one of the most critical decisions that affect the outcome of your project. Some readers may have a great deal of experience in product selection, others may not, so we will provide a high-level view of some of the factors we believe an organization should consider:

1. Can we see evidence that this solution has been deployed widely and successfully in our industry?
2. Can we speak to organizations like ours who have had success with this product?
3. Is the vendor a stable and reliable organization with a reputation for investing in products and for providing good support?
4. Are there skilled implementers available for this product, with a proven track record in my industry?
5. What do independent industry analysts (such as Gartner) say about this product and the vendor?
6. Does the product allow you to implement your own business processes or does it force you to implement its processes?
7. What kind of return on investment have other organizations in our industry had from using this product?
8. Does it have a coherent strategy to support IoT and OT integration and APM? Has the vendor invested in innovation?

Having selected the product, it is essential that your Business Analysis and Design team know what is available in the standard product and what can be achieved by configuring or customizing it. For this reason, we strongly recommend that all participants in the Design team (both business and IT) undertake basic product training at the outset. This makes the design phase much more effective and contributes towards the setting of realistic expectations (see [CSF 8](#)).

Not knowing how the ‘out of the box’ product works can be very counter-productive during design, build and testing for the project. We have even seen organizations build functionality using bespoke customizations, when the capability already existed in the standard product. Conversely, a knowledge of what can be easily achieved with configuration is also very productive. Of course, detailed product knowledge can be provided by an experienced specialist implementer of the EAM solution which you select.

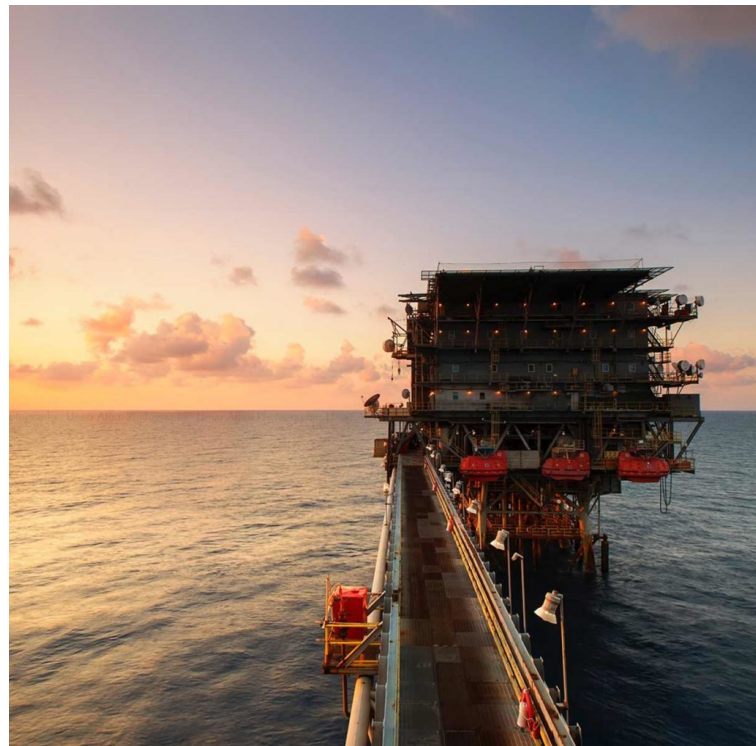
For example, BPD has clients who (when combined), use the whole of the standard Maximo® product, so we have real life experience of what has been done and why it has worked. BPD believes that the implemented system design must match the level of process that the business is ready to achieve. Future improvements can be made as the client’s experience grows, paving the way for an iterative process of continuous business improvement.

CSF 4: Management Support

Most readers will be fully aware of the need for Management and Executive support when implementing any Business Change. Suffice to say that the implementation of an Asset Management system requires an Executive Sponsor and the buy-in from Senior Management across the affected parts of the business e.g. Engineering Management, Work Management, Supply Chain and IT. In addition, it may need to dovetail into existing Enterprise Resource Planning (ERP) systems, so may have an impact on other projects already underway within the organization. These inter-locking projects may need to be represented too.

The Executive Sponsor and Senior Managers need to have an active interest in the project throughout its life, not merely at the start. This can be illustrated by the following anecdote from a project at a Utilities company, where implementation was delayed for no real reason, other than a lack of Management direction and involvement. In the weeks before 'go-live' there were many unfounded concerns: the majority being fear of the unknown and fear of change. Testing had been performed and signed off, so there was no genuine need to delay implementation. Nevertheless the project go-live was delayed because of management unease. With greater management involvement in the project, it would have been obvious that the project was well on track and could have delivered on time.

Of course, it goes without saying that any major project needs a strong and experienced Project Manager, preferably with experience of implementing the chosen solution within your industry (see [CSF 1](#)).



CSF 5: User Champions

In [CSF 4](#) above, we briefly discussed the importance of Management Support. However, the best projects have some other key players whose role is often overlooked. These are people who have a vision of what is achievable and the drive to make it happen. These are the ‘User Champions’.

Without these people a project struggles. You need believers who will take the product to the business and make them use it. Often people shirk this responsibility within their organization, for a number of reasons: sometimes political, sometimes out of fear. When they shirk responsibility, the project may not fail, but it certainly does not thrive. Without them the continuous improvement is slower and the projects less successful.

The User Champions need to have the ear of their Senior Managers. If they have management backing, then it all works much better than if they do not.



CSF 6: Building the Right Team

As stated earlier in this white paper, it is essential that all areas affected by the new system are represented in the Project team. We recommend that ‘Subject Matter Experts’ (SMEs) from each functional area participate. These are normally drawn from the user community and should be experts in their field and highly respected by their peers and colleagues. They inevitably become the Super Users and also the ‘User Champions’ too. BPD encourages the SMEs to share the information they are party to and to keep a healthy interest in the project among their colleagues.

The SMEs are often used to provide specific business knowledge and take ownership of the system and processes. In one Oil & Gas industry project we utilized key business users in maintenance, planning and data administration to focus on Work Management processes. Within a Utilities industry client, we had key users from all affected business areas take ownership of the system and processes.

The SMEs should also be heavily used in the testing phases and they should sign-off the system. This helps to ensure user-acceptance of the delivered system (see [CSF 8](#) for further details). It is important to get user buy-in ahead of go-live, so they should be involved in developing test plans and scenarios. When users take ownership at this stage, it helps to identify anomalies ahead of going live, saves rework, prevents dissatisfied users and reduces their resistance to change.

In the paragraphs above we have discussed roles and responsibilities. Even more important than this is having good quality team members with a commitment to the project. Far too often we see projects where people talk very confidently as ‘experts’, but they do not have the real knowledge and experience to back it up. These people want to contribute but can have a serious impact on project schedules if they do not deliver. They are unable to complete the tasks assigned to them, so someone else has to do it or it simply does not get done. This can be calamitous to any project where timescales are critical.

In addition to the Executive Sponsor, the Project Manager and the Project team itself, it is vital that the organization has access to in-depth product knowledge, in-depth implementation experience and industry best practice knowledge. While some of this can be attained through product education and the recruitment of experienced Project staff, it is highly unlikely that any organization could be completely self-sufficient during initial implementation of a major Asset Management system. Recruiting a Project Manager who has done it before is certainly a wise decision, but most organizations would choose to use the services of an experienced implementation partner.

CSF 7: Project Management

We have touched on many aspects of ‘Project Management’ under earlier Critical Success Factor headings. A complete discussion of Project Management techniques and organization is outside the scope of this document. However, there are a few basic principles and concepts which it is worth listing:

- The presence and active interest of an Executive Sponsor (see CSF 4)
- The leadership of an experienced and strong Project Manager
- A defined Project Governance structure
- Clearly defined and communicated goals
- An agreed set of deliverables
- Clear definition of the Project Scope and Robust Change Control (to control ‘scope creep’)
- A Risk Management process – to predict potential risks to the project, categorization and mitigation of risks etc.
- An Issue Management process – a defined way of handling any issues or disagreements that may arise during the project
- A project communications plan (see [CSF 8](#) below)



CSF 8: Gaining User Acceptance of Change

For the new system to be fully embraced, users need to accept the associated change to their working life, business processes and systems. BPD believes that this can only be achieved by the following:

Ensuring that users know that their views and requirements have been represented on the Project team, by having their colleagues' (the SMEs) full involvement in the project from system design through to user testing and go-live planning. This was discussed at length in CSFs [5](#) and [6](#).

Having their expectations clearly set about the need for change. When implementing a new EAM solution, it needs to be made clear from the start that the systems will be different and that acceptance of some level of change will be necessary. For example, while IBM's Maximo® system is very flexible and configurable, it does not make sense to make it work just like the system it is replacing. If it merely mimics the functions and business processes of existing systems, then why implement it in the first place? We have seen clients in the Oil & Gas industry who have implemented Maximo® to mirror the Work Management functions of a major ERP system, but this resulted in a lot of rework to 'unpick' unworkable processes.

Having expectations set that there will be issues along the way. No matter how good the initial analysis and design and no matter how much testing has been performed, there will be 'bugs' at go-live. This is for a range of different reasons. However, it is important to bear in mind that business processes and procedures are always being reviewed and improved. Over the lifecycle of a major project, processes can change considerably and so what the project was designed for originally may not be exactly where the client is now.

Having a constant and updated series of Project Communications. BPD believes that excellent Communications are an essential part of any project which involves change to systems and, inevitably, peoples' working practices. We recommend that our clients provide space in internal publications and their intranet for progress reports, milestones reached and the project goals. Regular meetings and "show and tells" to give progress updates and detail forthcoming work should be held with staff. This not only keeps people involved but also ensures that key users have notification of when their participation is required. For example, at one Utilities company we implemented a project go-live countdown on the main intranet site. This was seen by all users every time they opened their Internet browsers and acted as a reminder that the go-live was coming.

An excellent end-user training programme does a great deal to enhance user-acceptance of the new system and is discussed more fully in [CSF 10](#) below.

CSF 9: Testing

Testing has been referred to in other sections of this white paper, but its importance merits a CSF heading in its own right. A significant part of any Asset Management system implementation project needs to be set aside for testing. Testing not only identifies system ‘bugs’, but also those nitty-gritty functional or process details that the users had not fully appreciated the implication of, until they see them in the working system. Even with the best upfront analysis and design, our experience shows that there are always last-minute change requests. Many of these can and should be delayed until after implementation, but some are so significant that they need to be implemented at this late stage. A robust change management process will ensure that only the most essential are addressed during testing and that the risks of those changes are fully understood and mitigated against.

At the beginning of this document, we described the critical role that the Asset Management system plays in asset-intensive industries like Energy and Utilities. In [CSF 2](#) we outlined the position that the EAM system has in relation to other important business systems such as Financial Accounting, HSE and Planning. Therefore, it is so important that the end-to-end business processes are fully tested and that the integration points between related systems are fully exercised and checked. Before go-live it is essential that the users themselves are fully involved in User Acceptance Testing (UAT) and that they sign off the system to confirm that it is ready for production use (obviously in conjunction with the IT colleagues).

Before leaving Testing, we would like to discuss an additional opportunity that testing offers forward-thinking organizations. While an EAM system like Maximo® provides a co-ordinated process from Work Request, through to the raising of a job, the allocation of labour, the requisition of associated materials, the procurement and payment for materials, any individual user usually sees just a small part of that process and has little or no knowledge of what goes on before or after. It can be very educational and helpful to hold ‘Group Testing’ sessions where each person carries out their role on the same record. Showing how the work flows through between job roles helps people understand how their work effects other departments and how everything fits together. We have done this with clients in the Oil & Gas and Utilities industry with great success. It helps users to work together more and take ownership of processes.

CSF 10: Training

BPD recommends that Training is undertaken at two key stages of an asset management implementation project. The first training should be undertaken shortly after the formation of the Project team. We strongly recommend that all team members (the SMEs at a minimum) are all fully educated in the product as it is delivered ‘out of the box’. This allows them to make informed decisions during the analysis and design phase on what product capabilities can be exploited and where additional configurations (or customizations) may be required. The training materials at this stage are standard product information delivered by an accredited trainer.

The major training work, however, comes later in the project. An EAM implementation will typically require the training of at least 100 users and often significantly more. Most of our larger Utilities and Energy clients have between 500 and 1000 users, some well in excess of that. Training that number of users requires a training programme of the highest quality.

At this stage, it is inappropriate to give end-users standard product training. In fact, the best end-user training programmes that we have seen are not about product at all: they are about business process. The EAM system is just a mechanism that is used to implement and support a set of business processes. This is one of the most important recommendations in this white paper. It has a huge impact on project outcomes and the users’ acceptance of change.

Furthermore, it is likely that the EAM system will have been configured or customized to support the organization’s business processes, so customized training materials should always be developed. Different training plans need to be developed depending on job role e.g. for WMS or SCM users and whether users are in a Team Leader/Management capacity, Super-Users or standard users. There are also different user-training deployment models that can be used: e.g. having a specialist training company involved in training all users, or having a training company develop the course materials and run Train the Trainer (TTT) sessions so that course delivery can be done in-house.

If training is done correctly it has a significant impact on user acceptance of the system and on the overall project’s chance of success.

Appendix 1: Special Considerations for Asset Transitions

When Oil & Gas or Power Generation companies acquire an asset from another organization, it comes with specific obligations. For an Oil & Gas company they become Duty Holder of the asset and responsible for all Health and Safety issues and procedures. To be able to undertake that role, the organization needs to have full control of maintenance processes by a specific date. This poses some additional considerations for Asset Transition projects which can be summarised as follows:

- For Asset Transitions, the go-live date is usually set in stone and cannot be changed, regardless of whether IT systems are ready or not.
- Therefore it is imperative that the Asset Management system is available and ready (as much as possible) for Asset Transition.
- Initially, the first step is to understand what you are receiving. Business process are key to understanding the data received and how this 'maps' to existing processes.
- It is also important that data is reviewed and processed into a test environment as early as possible. Reviewing lists of data attributes and mapping key data via spreadsheets is important. However, it is often difficult for users to fully visualize the data until they see it within the system.
- Business Buy-In is crucial and having access to business users who are able to make decisions on process and data is of key importance. Regular updates and meetings with these and other key users keep people updated and the project moving.
- Due to time restraints, it is important not to overstretch what work can be effectively completed in the time available. Therefore having 'Required for Transition', 'Required after Transition' and 'Nice to Have' groups for work makes documentation and organizing of work easier.
- Testing is even more important ahead of the transition. The greater the number of bugs that can be resolved ahead of transition gives more time to spend with new users clarifying new processes etc.
- Even with the tight timescales, performing dry runs of the migration helps understand the timescales for transition and where time can potentially be saved. It also identifies any bugs with the data migration and allows time for resolution.

Appendix 2: Special Considerations for Offshore

In conventional Power Generation and most Utility companies, all maintenance activity is carried out onshore: often within close proximity to suppliers. This may allow deliveries to be received the same day as a Purchase Order is submitted. In the North Sea Oil & Gas industry, platforms and vessels are far offshore, where it can take many days to receive vendor deliveries. The same is true to a lesser extent for offshore wind farms, although they tend to be closer to the mainland.

To reduce the time to get materials and services offshore, the optimum process relies on having the majority of purchase items on pre-approved contracts, to remove onshore based procurement services when raising requisitions. In this approach, offshore personnel raise a requisition and it is financially approved by someone who has the appropriate budget authority. On approval, if all the items on the requisition exist on approved contracts, call off orders from those contracts are automatically created and faxed or emailed to the vendor, giving near instantaneous production of Purchase Orders for approved items. One Oil & Gas client of BPD takes 5 hours on average to get all requisitions from approval onto orders and to the vendor. Where an item is not on contract, quotations need to be raised, which has a significant impact on the time it takes to procure and deliver the item. Quotes take time and so the average is not instantaneous, even for this client. The real pay back comes from the volume of contracts that they have put in place. Another client who used to send everything out for quotation, including stock items, took on average 27 days to turn requisitions into Purchase Orders. A simple difference in process can have a huge impact for those working offshore.

An additional requirement for offshore maintenance is that any materials or tools need to be shipped. It is a legal requirement in the UK that any cargo on a boat needs to be on the ship's manifest, so this is an additional consideration for offshore Oil & Gas and Wind. BPD Zenith has a Logistics for Maximo® product which provides an integrated Manifesting Solution for companies which use IBM Maximo® in an offshore environment.

What We Do

BPD Zenith was founded to help businesses maximize the benefits of their software solutions over the lifecycle of their physical assets.

About BPD Zenith

BPD Zenith is a leading IBM Maximo® Enterprise Asset Management partner for asset intensive organizations worldwide.

As one of the few Maximo partners providing Enterprise Asset Management (EAM) and Asset Performance Management (APM) expertise across North America, Europe and Asia Pacific, we combine a local presence with global expertise to deliver tailored asset management solutions and trusted partnerships wherever you are on your maintenance and IoT journey.



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