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April 2016 Conference Report

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### Can Excel Database Forms satisfy Ship Management Reporting Needs

In order to follow trends in the incidents that happen across a fleet, ship managers need smart forms. Most software vendors do not have a platform that allows clients to configure data forms with tools for statistical analysis, instead vendors have opted for a generic solution developing applications that manage preconfigured forms. One such example are Excel Forms. In their attempt to support client expectations to modify the look and feel of their forms, vendors have kept the application's design and database structure rigid and used Excel as a configurable user interface. It is the ship managers' IT departments that are responsible for designing these forms that require developer skills from the company. This discussion aims to present the difficulties in designing a form that uses a rigid database schema while using Excel as a front end.

**Read the full article below**

**Go to...**

**Excel smart forms and how they work**

**How rich are the data validations. Do Excel smart forms understand the domain?**

**User interface restrictions of Excel in the design of the Excel Database Forms**

**Navigating the software to find the form**

**Does your Document Management system allow linking of forms to other forms and to ERP systems?**

**Upgrading the software and keeping the customizations made to your Excel Database Forms**

**Why workflow is needed in a DM system**

**Further Complications facing the Shipping Domain**

## **Excel smart forms and how they work**

Excel based forms are smart forms that analyze the data they contain and draw statistics from it. Using the data fields in a database, the vendor predefines the form data structures. In other words, for each type of form, such as incident forms, the vendor develops a set of database fields relevant to the specific incident management process. Because most users in a ship management company will be familiar with Excel, these forms have the advantage of looking like the paper based forms the company is used to.

In order for the Excel form to fulfill its purpose, the client developer who is designing, for example, an incident form must map or bind the Excel form cells to the existing fields in the database. Company information requirements are criteria for this mapping of data fields, the other being how to gather the appropriate data increments through the workflow, workflow design being an essential part of the reporting process. However facilities available to the client developer to design the Excel form to match company-specific data needs are limited to data rendering, for example the order in which cells appear. Consequently more serious concerns such as data fields which the client needs but are not included in the database schema, will require additional database customization by the vendor. Moreover, designing an Excel smart form requires the developer to comply with the code constraints and rules that come with the application, namely the database schema. So the form is perhaps a little bit more familiar looking for an end user but it fails to create a tailored workflow and form design, which is precisely what the company wants.

Essentially, using the preconfigured database and Excel form design methodology, one links the fields of the excel form to fields in the database and if all necessary fields were considered by the vendor in the initial design of the database form, only then will it meet the client's process needs. If they do not, then the client is up against the time/cost of customizations.

## **How rich are the data validations. Do Excel smart forms understand the domain?**

Validations for the data the designer enters into the excel forms is limited to attributes such as filing folder, user and a predefined set of tables for each form. To validate data entry properly there is a) a need to know how users react to the request to enter data and what they understand the request to be, and b) if the client finds that new fields are needed, then there will be a need to apply data entry validations. Even the preconfigured data base and workflows will need to have appropriate validation. Calculation fields like the ones used for assessing risk levels will be very restricted as designers are only using the database fields provided to them by the application vendor without the freedom of a specific tool designed for this process. Whereas with a proper platform used to build and manage data forms there are many facilities to ensure proper validation.

## **User interface restrictions of Excel in the design of the Excel Database Forms**

Microsoft, having understood the problem of binding fields to databases, the lack of scalability incurred by hard coded fields in forms, the need for repeated fields in reporting and for tabular forms, has a plethora of other tools to be used instead. Excel was designed to manage spreadsheets and to crunch numbers. It was never designed as a user interface for data forms. For example, Excel has limited facilities for managing repeating rows and managing repeating tables, something you need for all the forms that are tabular but whose number of rows cannot be predefined. Examples are lists of observations, watch keeping records, crew lists, ullage reports etc.

## **Navigating the software to find the form**

Usability problems that traditionally designed software has with respect to finding the form, sending the form, filing the form and linking it to the ERP information like Planned Maintenance and Purchasing are not addressed by Excel forms.

Can a database form, being a standalone application, and not a platform managed form provide a good overall interface and a good navigation experience? It is important to be able to find form instances easily. If you can't, there is a limitation being placed on data analysis. For example at different workflow stages the form might not be available to certain process owners onboard or ashore. Let's assume however that it is. Why will it still be hard to find the form? Because inevitably there will be form revisions. Finding the right form version will be a challenge. A modified database form means that the modified form is the new version and the previous version will no longer be readable unless very special migration is programmed into the system. This may be even more critical in the shipping industry where regulatory and business requirement change necessitates frequent changes in form design. Using a proper form platform when upgrading your forms to newer versions the system will be able to view the old as well as new versions filed in the office and on ship and draw continuous statistics. Therefore finding the Excel form to analyze the data which is a major excel feature is not plain sailing.

## **Does your Document Management system allow linking of forms to other forms and to ERP systems?**

As a rule relating forms to your ERP system is a software platform feature of your Document Management software. If this part of the software does not work well and there are no facilities to link forms to information in the ERP system where it's pertinent, then you

are reduced to information silos that don't help you coordinate your information and your users. For example, if you have an equipment breakdown; you should be able to link it to the resulting Non Compliance, Risk Assessment, and Purchase Order.

Not only the software needs to handle form data and allow the user to relate data in one form to data in another, for example a Non Compliance to a Vetting report, it should also allow the different forms and ERP objects to follow their own workflow and approval process and not be forced to follow the workflow of the ERP object as an attachment. For example, an unscheduled maintenance completion report has a one stage workflow but the risk assessment needed to allow you to implement the repair might involve, in ad-hoc fashion, many people and departments. All these essential features are very difficult to manage if the software is not designed to handle them from the start

### **Upgrading the software and keeping the customizations made to your Excel Database Forms**

As the form structure is locked to the fields available by the software manufacturer, any enrichment to the database model will mean you have hardcoded custom database models. Maintaining these customizations across the fleet is difficult

If you have multiple database forms, upgrading the software due to customizations becomes an increasingly complex coordination exercise, especially if you include the business requirements of ships being audited and forms that need to be implemented for operational reasons that simply cannot wait for the IT department to coordinate with the software provider Yet the common process of implementing a change to a form necessitates that before making any change you must first upgrade the data structure in the office at which time you need to ask the ships not to send any more forms while you also upgrade the database structures across your fleet. This requires good coordination and can take days or weeks to implement meaning you will not be able to complete forms during this period and thus will need to plan changes to your forms in a lot more care and detail over a longer time frame

### **Why workflow is needed in a DM system**

When designing forms not only do you need to design an electronic form that looks printable but you also need to design the intricacies of how people handled the paper form and map that process to an electronic system as the form workflow.

A Non Compliance form is a good example of why you need workflow. It starts on the ship where it passes by the master before it comes to the office. There, several managers need to see it, make comments and suggest corrective actions. Then the DPA draws up an action plan and sends it to the ship. Once the ship has performed the corrective actions the office will then need to verify that the Non Compliance has been addressed.

Sometimes, in order to close a Non Compliance case, the loop between ship and office needs to be repeated. Reporting mistakes can also be a cause of repeated dispatches between ship and office.

As many tasks and actions do not always follow the predetermined process steps as expected, the workflow engine needs to be able to handle workflow stage repetitions and be flexible enough to accommodate human error while still guiding the user through the process of addressing an incident.

Workflow is essential in forms otherwise highly paid users will need to apply extraordinary attention to the status of each form. Especially if some degree of audit is later applied by third

parties. Managing workflow is an essential and complex part of data form management. A rudimentary preconfigured form system without workflow is very restrictive to the client.

### Further Complications facing the Shipping Domain

Shipping is a domain with often changing regulatory requirements and complex operations where non-clerical staff need to handle data onboard. This creates the need for software solutions that offer maximum flexibility and understand the domain. Managing data forms properly provides flexibility and independence for the client to design data capture and workflow to processes that differ from client to client. However the informal nature of data forms design requires many times the effort from the Vendors side to make the system workable. Some of the features requirements are not obvious until it's too late. Furthermore usability problems, failure to link to other forms and to ERP objects while maintaining autonomous workflows and difficult upgrades greatly reduce the advantage Excel forms have in data analysis and statistical representation of data.



Since 1996, Ulysses Systems has provided management solutions to ship-owners and ship managers. Its award winning software, Task Assistant® enables both office and seagoing personnel to work intuitively, efficiently and effectively. Task Assistant® is designed to require minimal training. Managers should expect a fast return on total software lifecycle cost from reliable and mature process optimization and minimization of information gaps. Ulysses has offices in the UK, Greece, India



CITIS Award for Innovation in Maritime IT, 2000  
WINNER: Task Assistant® - the innovative IT product which has made the most significant contribution to improving ship operation

Seatrade Award for Innovation 2000  
WINNER: Task Assistant® - an innovative project which will significantly improve the efficiency of ship operations

Lloyd's List-SMM Awards  
Runner up in the in the category of Communi-cations & IT

Digital Ship Award for contribution to Shipping Security, 2003  
2nd WINNER: Task Assistant®-the IT product which has made the most significant contribution to shipping security

Lloyd's List - Greek Shipping Awards 2005  
WINNER: Technical Innovation Award



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