BENEFITS OF HIGHLY INTEGRATED WORKFORCE MANAGEMENT CONCEPTS

Oliver SAUERBACH  RWE Rhein-Ruhr Netzservice - Germany  oliver.sauerbach@rwe.com
Peter MATHIS  RWE Rhein-Ruhr Netzservice - Germany  peter.mathis@rwe.com
Dr. Joachim NILGES  RWE Rhein-Ruhr Netzservice - Germany  joachim.nilges@rwe.com

ABSTRACT
Workforce management means the assignment of appropriate resources with the required qualifications in due course at the right location. This at first glance simple definition emerges in the process of implementation of workforce management systems to be much more complex. Many companies of different industries have been facing this problem in the recent past and some of them are still looking for their solution. Integrated workforce management processes starting with the assignment, the automatic individual order-generation to the dispatching of the field engineer, the system-based assessment of the condition of the technical equipment and at least the performance-related charging and billing of the work performed lead to a permanent reduction of costs in face of rising data quality and density. This paper will give you some helpful information about a possible way of implementing a workforce management system and the ideas behind it.

INTRODUCTION
As a result of the regulatory authorities installed in Europe, network operators have come under pressure to reduce the costs of energy supply. One of the main challenges distribution companies have to face is to optimise network operations by implementing efficient integrated processes along the value chain according to the regulatory requirements.

RWE Rhein-Ruhr Netzservice\(^1\) is meeting this challenge with an area-wide implementation of an IT workforce management solution based on SAP components [1]. The first steps towards the area-wide implementation took part in 2005 with a feasibility study followed by the planning and development of a pilot project that led to a substantial test mode in 2007. The main objectives during the test mode were testing the system functions for suitability in practice, e.g. scheduling and mobility, testing the system response in terms of performance and availability in production and verifying the process optimization potential by starting from home, reducing travel time by means of route optimization, higher automation level during documentation, replacement of various existing systems and application of individual order management. The workforce management components are integrated into the target IT landscape of the RWE Energy Group.

DATA QUALITY AND DENSITY
Implementation of a highly integrated workforce management system in a unified IT landscape requires a certain quality and density of data. The required level of data for efficient provision of a service with workforce management considering the general framework for the service (state-of-the-art performance of the operations according to the predefined principles of planning and operation) is even lower than for many other processes of a grid service provider (figure 1).

Figure 1 Required data volume for relevant processes

The workforce management process requires a minimum of data available, namely:

- Technical identifier for all the equipment looked at in SAP for the automatic generation of work orders using the SAP maintenance plan,
- Detailed information about the equipment (e.g. type of equipment, coordinates, maintenance strategy and date of most recent maintenance activities).

The demand on documentation and reporting (especially towards the Federal Networks Agency and the distribution system operator) increases, so most of the data is required.

\(^1\) RWE Rhein-Ruhr Netzservice is the largest service provider in the fields of grid planning, servicing, maintenance and operation of electricity, gas and water grids in Germany.
CONCEPT OF WORKFORCE MANAGEMENT INTEGRATION

The core process of workforce management (figure 2), especially for all periodic maintenance activities, is highly dependent on the quality of the required data. Additionally, the central maintenance strategy with the framework directive, including specifications of measuring, deadlines and depth of documentation, must be implemented in the SAP/PM core system (SAP maintenance plan). The work list is generated automatically for the following activities:

- Maintenance respectively inspection of local substations,
- Medium and high voltage overhead line inspection,
- Low voltage overhead line inspection,
- Maintenance of mast switches,
- Inspection of cabinets,
- Area maintenance.

The responsibility for the implementation of the SAP maintenance plan lies with the planning division.

The next step in the core process after automatic generation of work orders is the dispatching and coordination of the work in the grid area of responsibility. The main tool for this activity for the dispatcher is the planning table in the Multi Resource Scheduling module.

Multi Resource Scheduling (MRS)

In the Multi Resource Scheduling system (figure 3) the dispatcher is supplied with a timetable giving him an overview of all work orders assigned to the available resources (field staff and technical equipment such as emergency generator or cable monitoring car). The status tracking of the work orders and the staff members, the communication with the field staff via mobile communication and the allocation of responsibility are the main features of MRS.

The field engineers are dispatched by individual work orders based upon the necessary qualifications and start work from home. The alarm list shows any conflict in dispatching, e.g. field engineer is not qualified for the work order.

Mobile Asset Management (MAM)

The Mobile Asset Management application is the mobile IT tool for field engineers. The initial page (figure 4) provides an overview of all work orders to be done by the field engineer on the same day. Further main functions are for example the possibility to set the engineers state (e.g. available) and to start the synchronisation with the SAP Core System. Other functions can be placed by customizing. The field engineers cover the condition of the technical equipment in the field offline with MAM by using uniform checklists overall [2]. These checklists and the deficiencies identified are synchronised via mobile telecommunication to the SAP core system. All data can be evaluated and asset management decisions can be made immediately, further assignments necessary because of relevant deficiencies can be generated automatically. All individual work performed is documented.
The implementation of the MAM application replaced various Excel and database applications for inspection and maintenance activities. That is why the advantages of the new checklists are obvious:

- Object-specific structure
- Easy handling
- Readings are stored automatically
- Deficiencies generate a notification immediately

**Mobile Equipment**
The requirements for the mobile equipment for the field engineers are quite manifold.

The most important criteria are the legibility of the screen, touch screen terminal, protection category IP54, shock resistance MIL-STD 810F and a maximum weight of 2.5 kg. Compared to other grid service providers RWE Rhein-Ruhr Netzservice is focused on mobile equipment with a screen size minimum of 10.4 inch and a resolution minimum of 1024x768 pixel [3]. The processor performance (at least 1 GHz), the memory size (RAM at least 1 GB and hard disk at least 50 GB) and the interfaces for LAN, USB, UMTS and GPS are standard features of mobile equipments, e.g. ruggedized laptop and tablet PC. Further criteria like battery longevity (minimum 3.5 h), audio output and a docking station are necessary but less important than the others listed before. Any conflict of goals arising can be resolved by a demand-oriented distribution of different mobile equipment, e.g. tablet PC for overhead line inspections.

**Integration of billing and charging**
In addition to all planning and operating activities, the highly integrated process defines the performance-related billing and charging of the grid activities to the distribution grid system operator. The defined and dispatched activities match the service and price specifications agreed between RWE Rhein-Ruhr Netzservice and its clients. The automatic order generation therefore already consists of (partial) services, which are related to a price list. After technical order completion, activities are billed automatically [4].

**Workforce management implementation**
The implementation of the workforce management concept at RWE Rhein-Ruhr Netzservice effectively fits into the present IT landscape based on SAP, which is quite important in terms of receiving, generating and providing all necessary information, e.g. allocation of grid information and documentation of all work performed. In more than 50% of the operating zone of RWE Rhein-Ruhr Netzservice, the workforce management system (PM, MRS and MAM) has been implemented and the field engineers have been provided with mobile equipment. At the end of 2009, the workforce management system will be in use in all operating zones.

**INTERCONNECTION BETWEEN SAP AND GIS**
Supported by a simple but efficient interconnection between the geographical information system and the mobile SAP Mobile Asset Management (MAM), the field engineers cover the condition of the technical equipment offline in the field (figure 5). The interconnection between the geographical information system and SAP MAM provides the opportunity to capture, adjust and verify even more information than simply the condition of technical equipment, e.g. all technical and geographical data. The initial capture of grid information can simply take place alongside the standard process of condition assessment or maintenance. After synchronisation, these essential pieces of information are available for all further processes in the company.

![Figure 5 Core process of workforce management with GIS](image)

**Figure 5** Core process of workforce management with GIS

The implemented interconnection provides the possibility to start the maintenance processes in the geographical system, but also provides the opportunity to visualize all identified deficiencies in GIS (figure 6). The further processes can therefore be initialised efficiently and comprehensibly.

![Figure 6 Display of identified deficiencies in GIS](image)

**Figure 6** Display of identified deficiencies in GIS
FUTURE PROSPECTS AND BENEFITS

Consistent use of the highly integrated workforce management system leads to a sustainable improvement in job processing throughout the portfolio of a grid service provider. The first results show a significant efficiency increase of 7 percent merely through reduced travelling times and route optimization. By implementing the processes described and supporting IT systems, an efficiency increase of up to 20 percent is expected. The comparative benefit in central and local processes increased to the same degree (figure 7).

CONCLUSIONS

The paper presents an efficient and seminal method to implement a workforce management system based on SAP components. The accompanying standardisation of all planning, servicing, maintenance and operation processes is an important precondition to adapt to the market requirements caused by the regulatory environment.

The increase of efficiency can be reached as described above by standardisation of processes, unified IT systems, optimized assignment of the resources (reduction of travelling times and route optimization) and structured and unified documentation of all work done, including the initialisation of subsequent processes. This as a whole will lead to maximum transparency, which is an essential requirement for an efficient grid service provider.

RWE Rhein-Ruhr Netzservice managed to map the assignment structure in the SAP core system in detail; the system will automatically initialize the maintenance planning for all necessary technical equipment.

REFERENCES


