Vlerick Leuven Gent Management School

MULTI-PROJECT RESOURCE PLANNING IN BUSINESS-ENVIRONMENT WITH LOW PREDICTABILITY

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Contents

1   Executive summary

Our Company is developing and providing processing solutions to banks and financial institutions worldwide. During last 3 years we heavily invested into increase of its presence in European region. In year 2011 the size of Delivery Department in Europe more than doubled.

This increase in size highlighted a set of major problems with resource planning. Analysis of current situation was carried out and showed that main problems of existing process concentrate in areas of process scalability, information sharing and process predictability. Based on major problems and 3-levels of goals (strategic, financial, and operational) set of requirements to resource planning process has been identified. Also, the future implementation of SAP Business One solution in year 2012 was considered. Having the increase in Department Size it was understood that the resource planning process should be improved independently of SAP Business One solution implementation.

Resource planning methodology has been developed by me with the support of Head of Delivery Department and Company CEO. Based on subjective analysis and set of interviews I have identified formal requirements to the process.

After the thorough analysis of current situation and process requirements I recommend going for following set of actions:

- Acquiring web-based software for time tracking (BeeBole software recommended)
- Establishing a process of workload and milestone planning
- Establishing a process of bi-weekly project reviews

Upon that I have prepared internal description of the process and done software selection. Due to future SAP Business One implementation process has been created lightweight and its implementation will not require major infrastructure investments. Its implementation will allow us to

- Establish a scalable process which can support current and future growth
- Make resource planning information available through centralized source
- Decrease resource planning lead time

Also, the integration with CIS Division operations and future integration with SAP Business One has been analyzed with the outcome that new process will not create any barriers for them (yet, substantial work is to be done to implement such integration). The new process will ultimately bring us to better customer satisfaction, decreased working capital required for a project and smoother internal operations.

2   Project definition

2.1   Company details

2.1.1   Company structure

This work performed for a Company which is developing and providing processing solutions to banks and financial institutions worldwide. There is an R&D centre in Saint-Petersburg, which is in control of product development. Projects (tailoring product according to customer requirement, including business-analysis, configuration, customization and custom development) are implemented by implementation teams in different locations (Saint-Petersburg, Moscow, Brussels, Hanoi, Dubai, Kuala-Lumpur). Implementation includes:

- Delivery of standard solutions
- Configuring standard solution according to customer needs
- Custom development (solutions created for particular customer)

Company has following branches structure:
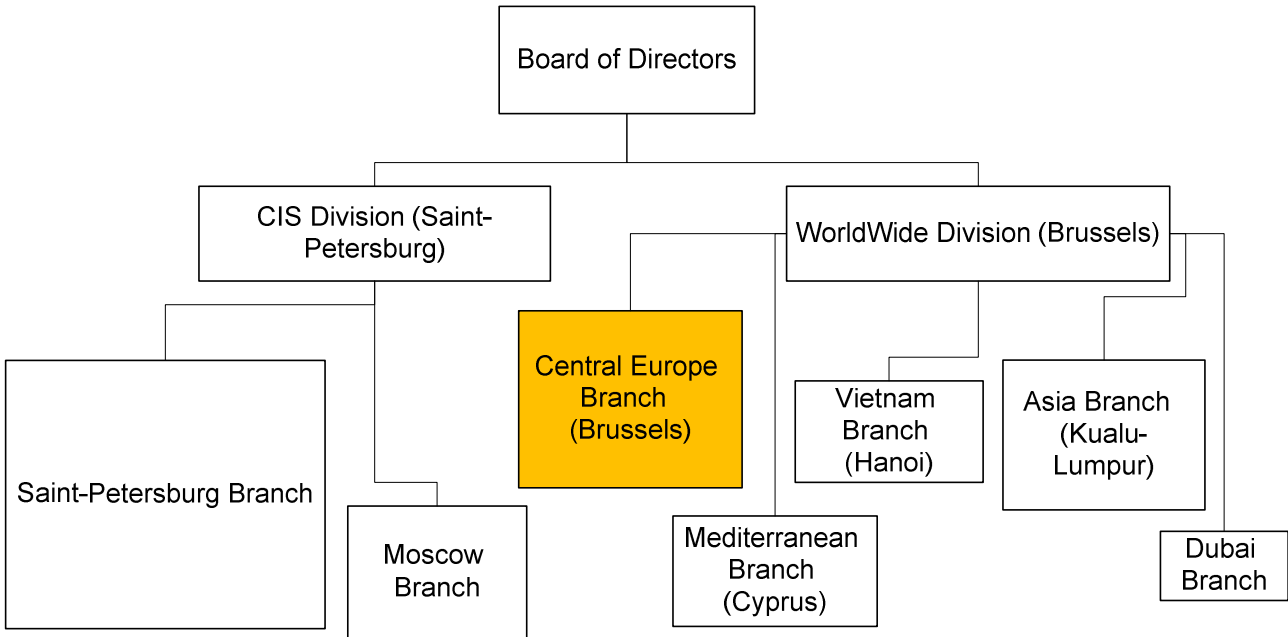
Pic. 1 Geographical structure

Boxes of Branches are sized approximately to division sizes. Links are supposed to show reporting hierarchy. Company has approximately 150 customers either using Company products or in process of implementation. Company employs about 500 people worldwide.

Company has the following functional structure
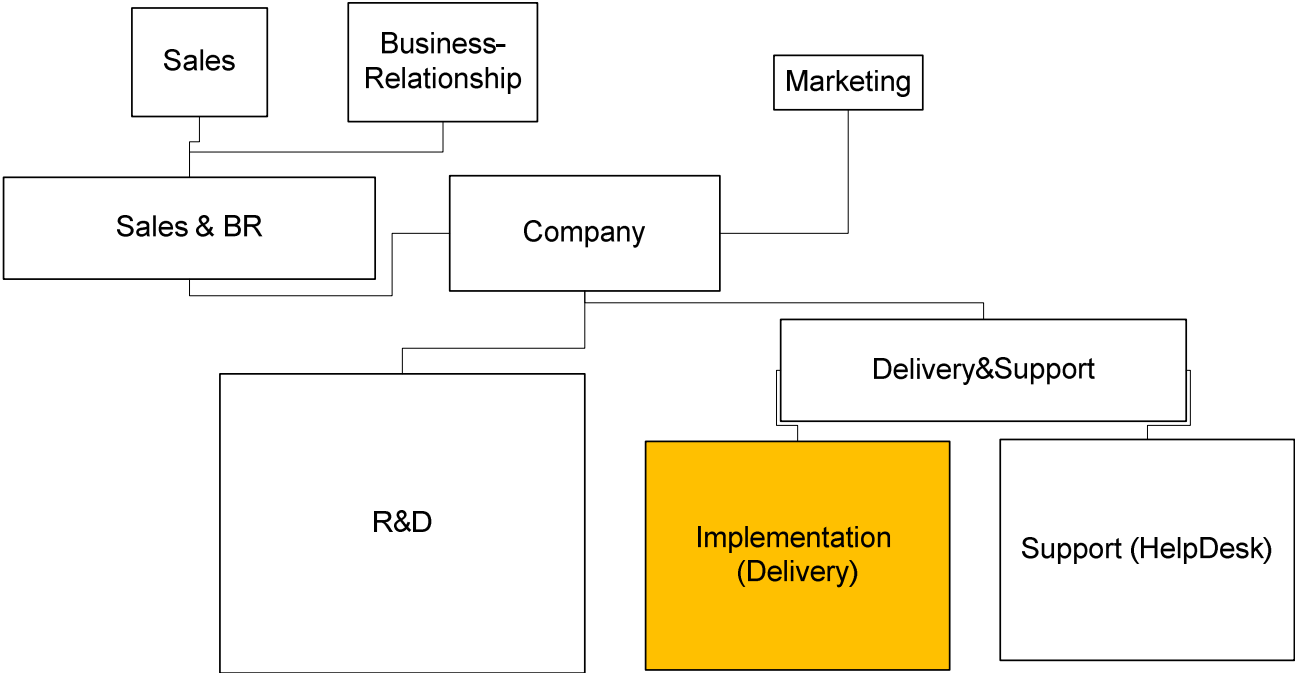
Pic. 2 Departments structure

The methodology developed in this paper is developed for Delivery Department and is to be piloted on Delivery Division Central European (Brussels) Branch first and then to be expanded to Delivery Department or World-Wide Division. This functional and structural entity is coloured yellow in both cases. I would name World-Wide Division that way, but we need to remember that it is a separate business-entity in a group of companies and has its CEO, CFO and all relevant structures (so not be confused when I refer to CEO, World-wide division).

If we map both structures, we get the overall picture of Delivery structure (includes HelpDesk as well, because Delivery teams are involved in helpdesk activities as well – it is indicated when department is performing Delivery Activities only)

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                              ┌──────────────┐
                              │   Delivery   │
                              └──────────────┘
                  ┌──────────────────┴──────────────────┐
          ┌──────────────┐                    ┌──────────────────────┐
          │ CIS Delivery │                    │  World-wide Delivery │
          └──────────────┘                    └──────────────────────┘
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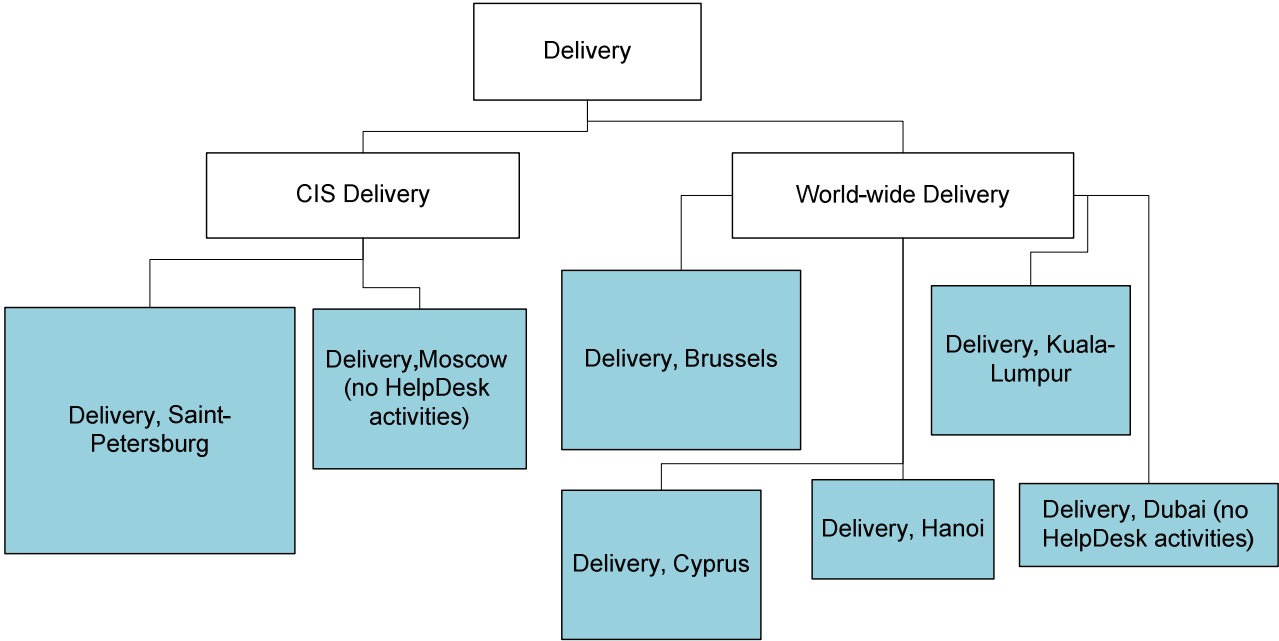
Pic. 3 Delivery department - geographical structure

2.1.2   Company business

To have an idea what problems we face when we do our projects and what trade-offs we have to make, let's describe who our typical customers are and what do they want.

There are 3 segments we split our customers to

- Processing Centers (Process several banks)

- Large Banks (Principals in payment systems, has larger volumes)

- Small Banks (Associates in payment systems, has smaller volumes)

Value assessment for segments can be found in annex 10.1 (Value for segments). What we can notice is that Service is as valuable as Product and Consultancy services are most valuable from them by 2 customer categories of 3 – which means that an improvement in Delivery Department operations (responsible for services) will be highly valuable.

Most of company customers are supposed to bring additional business to the Company (either by increased volumes or by additional licenses)

2.1.3   Strategic decisions

There are certain strategic choices made by Company which influence the decisions made in this work.

Firstly, company is investing heavily in growth in European region. During last 4 years size of Company Branches in Europe (Brussels branch, Cyprus branch) increase more than 4 times, major

area of growth is Delivery Department. During first 3 quarters of year 2011 size of Delivery in Brussels Branch more than doubled. It is planned to increase the size of department by 50% in year 2012.

Secondly, to support growth process in long-term and improve it using best-in-class software solutions company chosen SAP Business One solution as an ERP and Project Management system, and it is to be fully in place by the end of year 2012.

2.1.4   Delivery processes

This chapter is dedicated to the description of Delivery process. The critical assessment of project planning process will be done in 3.1.1 (Process in place) chapter.

Typical delivery project lifecycle can be summarized like following

Mobilisation Phase	Discovery Phase	Design and System Build Phase	Installation Phase

Pic. 4 Project phases

Source: internal methodology document. In terms of formal split, there will normally be a Discovery project covering Mobilization and Discovery phases and Delivery project covering Design & System Build phase and Installation phase (these projects have separate contracts). For small projects the Discovery phase can be an internal project.

Description of phases below is taken from internal methodology paper [1].

Mobilization phase.

On this phase project team is identified and roles assigned. High-level agenda for discovery phase is reviewed. This is normally done by Head of Delivery Department and Sales Manager.

Discovery phase.

On this phase it is analyzed what is required for particular customer and all requirements are listed in a discovery report paper. Any required enhancements are identified and negotiated. Discovery is normally held as a set of on-site meetings with customer and off-site sessions of report preparations. Discovery phase is lead by Delivery Project Manager and small project team.

Process flow:
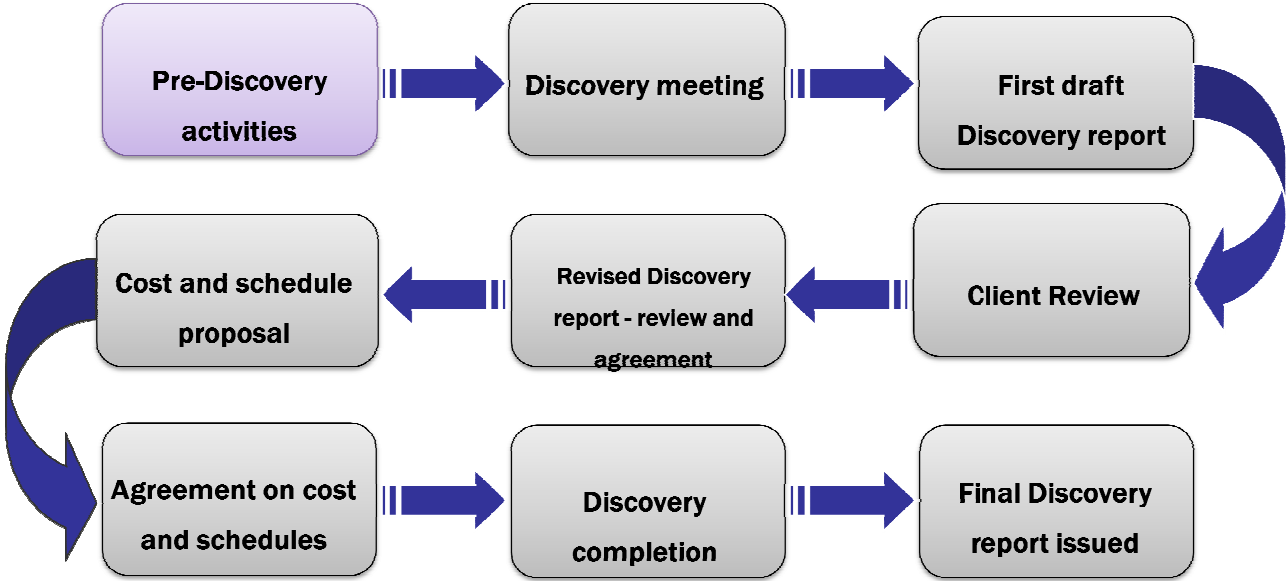
Pic. 5 Discovery flow

Design & System Build

On this phase Delivery Team, lead by Project Manager, does the configuration of the system according to identified requirements. It includes configuration and development of custom code, implementation of new features together with R&D Department (if required) and finally preparation to the installation phase.

Installation phase

On this phase system is being installed at customer site and customer starts testing (User Acceptance Testing, UAT) of the system. Also, depending on the type of the project Training session, Certifications in International Payment Systems (IPS) and Migration of data from existing platform can be conducted.
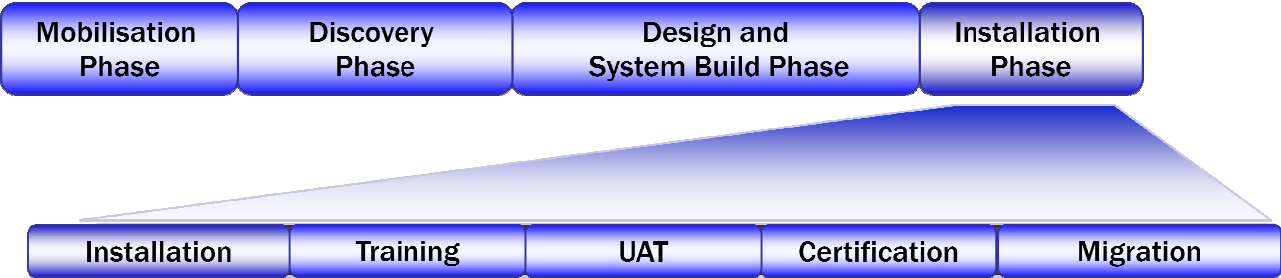
Pic. 6 Installation phase sub-steps

After certain baby-sitting period project is transferred to helpdesk department. Delivery department is involved in helpdesk activities as well, so part of time of delivery engineers / consultants is spent for helpdesk activities.

Every project has a following structure in terms of human resources
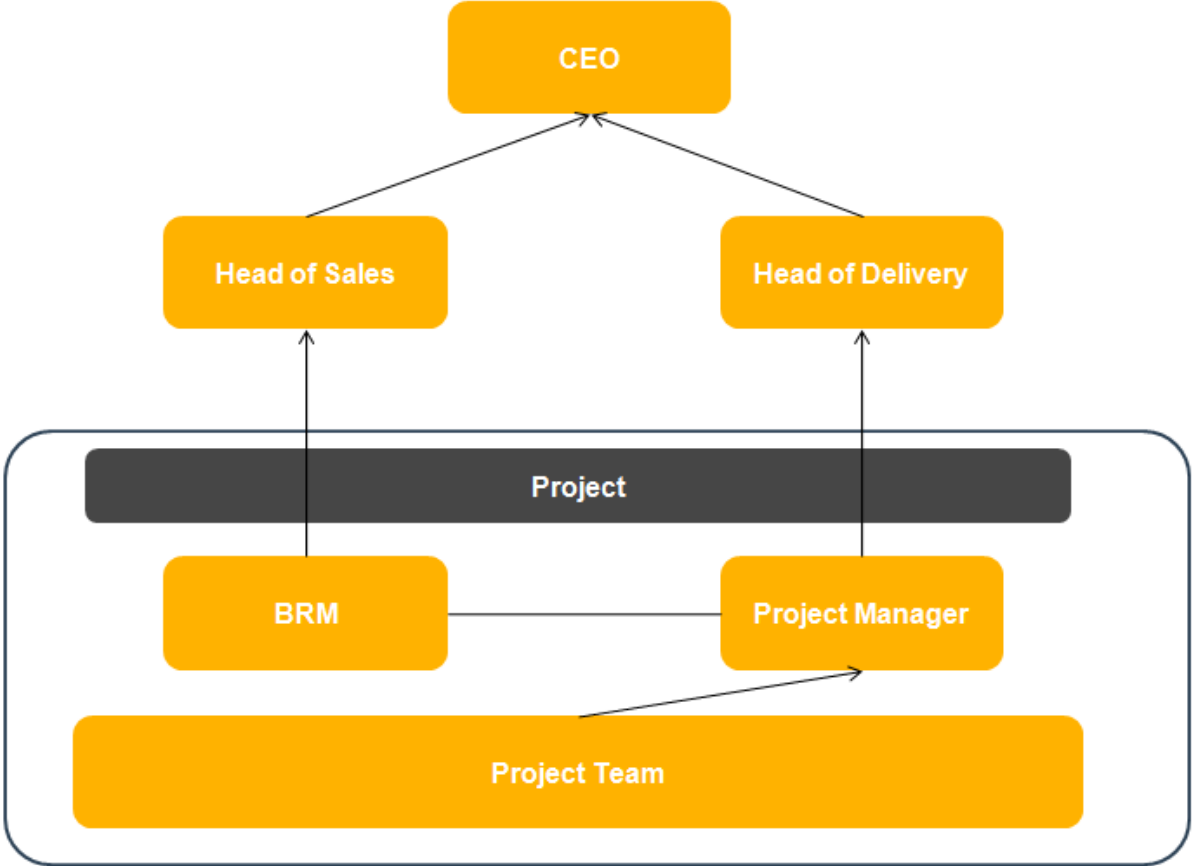
Pic. 7 Project roles

BRM (Business Relationship Management) is responsible for relationship part of negotiations. He approves all budgets of a project. He forms the license part of budget.

Project Manager is responsible for project planning and execution. He forms the service part of budget.

Head of Delivery approves the service budget & plans. He also provides resources for the project from delivery department.

Project Team is responsible for project execution and planning at the level of their individual tasks. Project Team members provides certain input/estimations for Project Manager.

So we have two types of the projects (Discovery and Delivery) but they have similar phases in terms of resource planning. The phases are shown on the next picture (so we do not need to refer to the complex set of project sub-phases and can have a simplified view on resource planning)
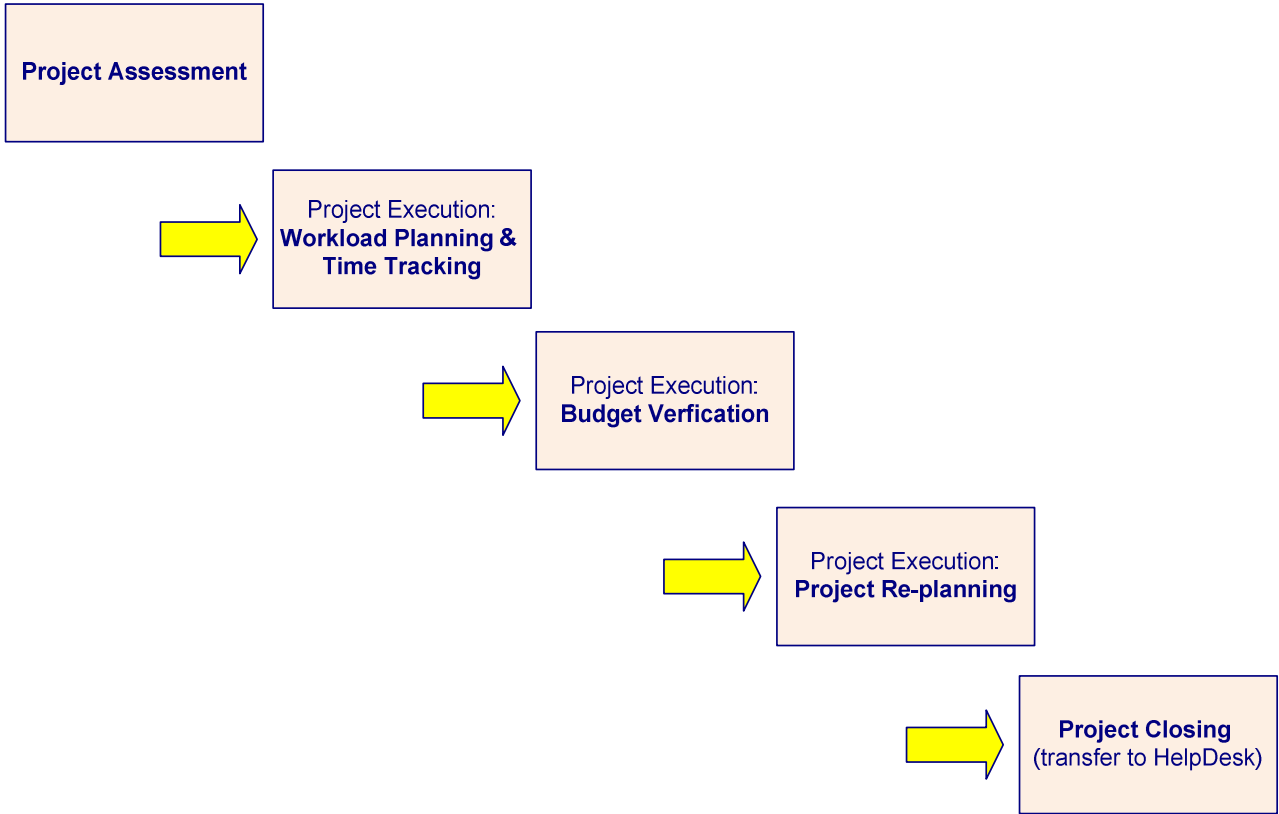
Pic. 8 Planning waterfall

On the waterfall on the picture above we have following stages/actions related to resource planning (PMBOK-based project scheduling is implemented, see [2])

Project Assessment

On this stage initial assessment of scale of the project is done and amount of resources required is estimated. Project team is identified and initial planning is executed. This stands for Mobilization phase for Discovery project, for Delivery project it is performed at the end of corresponding Discovery project.

Project Execution

Both for discovery and delivery projects there will be a project execution phase. During this phase following major actions, concerning resource planning, can be identified

Workload planning – the detailed planning of workload, so all project tasks are distributed between Delivery Team members and it is assured that project is "doable" in a given timeline

Time tracking – it is required to know how much work is performed on every project by every team member. It is also required for billing purposes sometimes.

Budget verification – budgets should be verified, so if project is over its budget or close to that Business Relationship Manager can be involved to resolve the issue and raise additional budget.

Project re-planning – in case of resource conflict (person is required for project with higher priority) or project changes (delays on other departments, on customer side or on third parties) it is required to re-plan the project

Project Closing

At this stage project budget is closed all invoices are finalized and project is transferred to Helpdesk Department. We can start a new project now.

2.2 Project objectives

The objective of this in-company project is to develop a resource planning methodology and establish a corresponding process which will enable a company (division) to:

- Distribute resources between projects

- Adjust such distribution in case of changes in projects progress

- Monitor budget consumption and be pro-active in case of budget consumption issues

- Predict delivery delays

As an ultimate outcome, performance and predictability of Delivery Department should be improved. Performance can be measured against following high-level goals:

- Strategic Goal: process should support company development in a vision of strategic objectives (growth, SAP Business One migration)

- Operational Goal: since service quality is highly valued by our target customers, re-planning process should increase this quality (better response time, more predictable behaviour of the projects, decreased lead time)

- Financial Goal: there are financial milestones (Discovery Sign-Off, Installation, UAT,Go-Life) with payments linked to them. Project planning process should be designed keeping these milestones in mind.

2.2.1 What is resource planning methodology?

To clarify the objective, I need to explain what I mean saying "resource planning methodology". Resource planning methodology unites resource planning process (the set of internal guidelines on who is planning resources in the company and how do we plan them), set of software selected to support the process and set of internal guidelines on how to use the software.

Basically, all major concepts of resource planning can be split into Risk-Based planning and Process based planning (see 3)

- Risk-Based planning

  These practices suppose the planning done on the basis of available resource and risk levels. They normally require certain level of manual intervention (or very detailed risk estimations). These practices normally consider the basic workload around 80% to achieve certain predictability (with other 20% filled by internal research).
  One of the most popular risk-based planning techniques is PERT technique (See [3]). From it we can see a clear link between risk level and resource overhead.

- Process-Based planning

  These practices suppose very detailed and stable process. These practices do suppose well-organized business which does not suppose high level of innovation. Even certain IT Management processes (e.g. Rational Unified Process, see [4]) suppose high level of predictability.

2.3 Project scope

Project scope can be described as following

- Process development

  Resource planning process should be developed. This process should enable achieving objectives listed above, and improve delivery performance in a sense of 3 main goals.

- Software selection

  As a consecutive part of process development a software selection should be made, covering all parts of planning process. The trade-offs faced in software selection should be documented.

- Process implementation plan

  Process implementation plan should be developed and feasibility of the plan should be proven. Since there is an urgent need in improvement rightaway Pilot phase of the project should concentrate on the items which can be implemented in a short-term.

- Future steps analysis

  Company is going to implement the ERP system (SAP Business One) for World-Wide division. The changes in resource planning process and possible ways of integrating it into ERP-model should be analysed.

To sum up the aim of the project is in developing resource planning process for Central European Branch and planning it implementation.

2.4 Project deliverables

Based on what is said above, we can list project deliverables, which will include:

- Resource planning process description

- List of selected software

- Resource planning methodology implementation plan

- Internal paper describing the future ERP integration

2.5 Project limitations

Project has both geographical and functional limitations:

- Project is limited to Central Europe Branch of the Company on the first step (should consider expanding to worldwide operations)

- Project is to be done in the frame of Delivery Department and should not suppose any significant changes in processes established in other Departments.

- Project should be based on concept of "reasonable change" and not to suppose dramatic changes in Delivery operations

3 Business case

3.1 Current status

First of all I will describe existing processes, which are being used in Delivery Department in Brussels office as on 01 May 2011 (before implementation of a new resource-planning process).

Delivery Department has a pool of delivery projects of different scale. Each project comes through an estimation process, which is being done by Delivery Department. The project normally includes following entities:

Budget – every project has an assigned budget

Contractual limitations – every project has a set of contractual limitations (latest possible delivery dates, delivery scope)

Financial milestones – every project has a set of financial milestones (payments linked to certain activities in the project – e.g., system installation, UAT finalization, Go-Life, etc.)

A simple snapshot of projects set can be shown like:
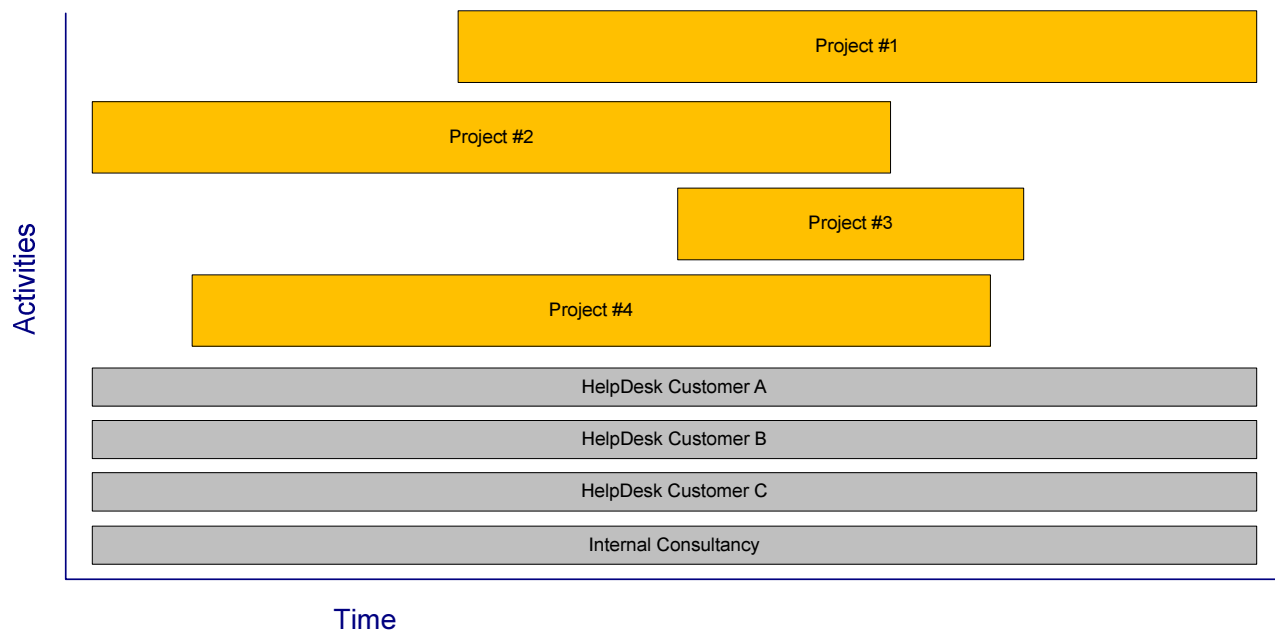
Pic. 9 Projects snapshot

Here yellow projects are projects of fixed duration (new system delivery) and grey are continuous activities with relatively stable average workload (helpdesk, internal consultancy). On the picture we see that there are multiple projects running simultaneously and started at different moments of time. On the top of that, projects can concur for same resources. The existing process of resource planning is described below.

3.1.1 Process in place

At the period of business-analysis the project plan is created (see 10.4 for typical project plan). Project plan is being created keeping in mind certain implementation team, agreed between Head of Delivery department and Project Manager.

Budget is being verified:

- Before the project starts (that project plan is not over budgeted)

- During the project budget is being verified based on the high-level estimation of resource spent (resource assigned X time passed).These results are reflected in MS Excel spreadsheet.

This budget verification process does not provide enough information to predict future budget statuses which leads us to prediction problem (3.2.3)

If, in any case, there is a situation in the project which requires additional resource or vice versa (which happens much less frequent but still happens) resources are reassigned manually by Department Head.

The process of resource management with its characteristics can be summarized as following

Project Assessment	Workload Planning & Time Tracking	Budget Verfication	Project Re-planning
(☺) Project Plan is prepared on paper (☺) Project Team is defined (☹) Project Team definition and resource assignment are fixed in writing	(☺) Workload is planned (☹) Workload planning results are available (☹) Time Tracking is established	(☺) Budget verification process exists (☹) Budget verification process enable proactive actions (☹) Budget verification results are available on paper	(☹) Project Re-Planning is done in formal way (☹) All input and output is easily available

Pic. 10 Features dashboard

The features dashboard (Pic. 10 Features dashboard) is the result of interviewing Head of Delivery Department, Brussels Branch, on existing issues in project planning. From unhappy faces on this dashboard we can immediately identify areas of improvement, which can be summarized as:

- No central information source for planning data, data cannot be shared in department or with other departments
- Process is informal to large extent
- Time tracking procedure is not established

I will give more structured view on existing problems in 3.2.

All projects do live in multi-project environment and resources are shared. Understanding of certain characteristics / methods is required:

Projects (except some maintenance projects) require high level of context-understanding, so it is always efficient to minimize the number of projects any person participates in (except for internal consultancy for specific areas). Basically this leads us to a fact that projects can be planned in terms of person-project assignments, not person-task assignments (with certain pros and cons, which will be discussed below)

Project environment is unstable and has certain degree of research activity, making it hard to predict the time to finish for a specific task, so two types of tasks are added, namely "Internal Consultancy" and "HelpDesk". These two tasks are characterized by less sensitivity to certain delays (e.g. – according to SLA resolution time of Class C incidents[1] is 20 working days), which basically fixes the issue of uneven workload by project task. This can be illustrated by following picture:
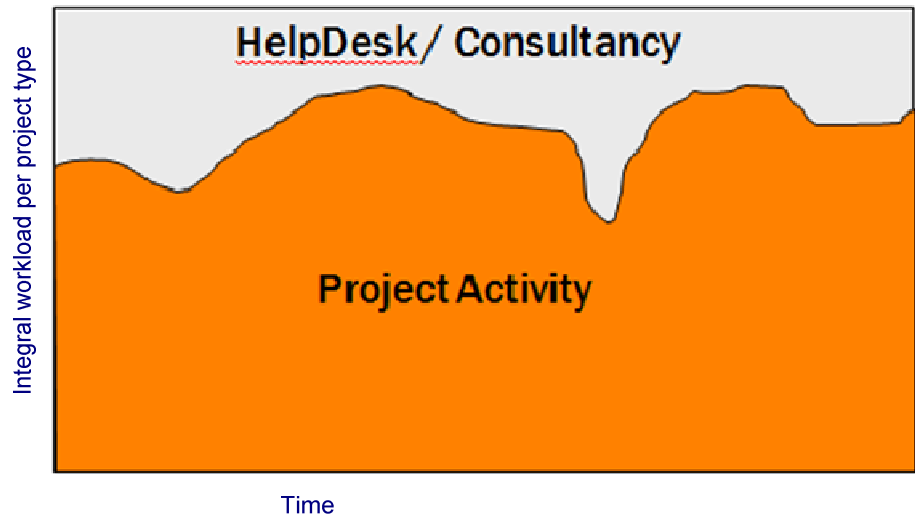
Pic. 11 Floating activities

The picture shows that in short-term even distribution of loading can be achieved by working on helpdesk/consultancy request during a time when project activity is not giving 100% load. We need to remember, that HelpDesk/Consultancy activities have only short-term float, but the average workload should be rather stable, otherwise results are jeopardized: in a month we can say that daily load does not require to be planned since every employee can work on helpdesk/consultancy requests when he is not fully loaded on project, but the same is not true in terms of monthly load, for example (because there is nearly precise amount of hours for projects and for helpdesk activities to be spent monthly, and understaffing of any activity on medium-term can possible lead to possible escalation). Basically, above means that day-to-day formal planning is not required. Typically around 20% of time of Delivery Belgium is spent for helpdesk / internal consultancy activities.

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[1] All incidents per standard SLA are split into 4 classes. Class A incident is blocking online operations, class B is blocking close of banking day, class C is disturbing normal operations or complicating them with no influence on online or close of banking day, class D is minor inconvenience. Most of (93% in years 2007-2009) incidents are Class C and D incidents. Source: Company HelpDesk procedures and internal company data.

For the long-terms changes in required workload we can hire new personnel, but it provides relevant changes to available resource not earlier than in 6 months from the decision point (because of internal study period).

Typical duration of large project of new in-house implementation is 1-1.5 years with an estimated workload from 300 person-days, typical duration of small project (new feature, enhancement, etc.) is 3 to 6 month with estimated workload less than 50 person-days. We can consider that around 60% of time is spent for "large" projects.

3.1.2 Software used

Currently following software is involved in different parts of resource planning.

- Microsoft Project

  MS Project is used for creation and management project plans. It is necessary to understand that current plans are mainly considering the timeframes of tasks, but not resources distribution. Normally resource loading is not formally reflected and resource assignment is made only at the level of internal agreements (not reflected in project plan). This means that MS Project is used for creation of timeline plan and interaction with customer, but not for resource planning. There is no central storage of project plans

- Microsoft Excel

  MS Excel is used to track available budgets and spent budgets. Spent budgets are calculated based on resource assigned X time spent, no real time tracking is used (except for contractors from "Contractors S.A."[2] – for which the timesheets are gathered and used for financial purposes)

- Microsoft Outlook

  MS Outlook emails can supposedly reflect existing agreements regarding resource planning / allocation.

3.2 Existing problems

The process described above leads us to the set of major problems.

3.2.1 Scalability

The process is not scalable because major parts of it are controlled manually by the Head of Department

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[2] Separate business-entity, fully working for The Main Company, but providing resource on contractual basis.

3.2.2 Information sharing

The agreements on resource planning for future projects are made between Head of Delivery Department and Project Manager / Sales Manager. They are not reflected anywhere except, supposedly, emails. This prevents from achieving strategic goals (scalability -> growth) and operational goals (fast and efficient re-planning in case of changes).

3.2.3 Lack of predictability

Current process does not provide stable prediction mechanisms, because the budget spend is not reflected in shared source on regular basis and the budget verification is done manually. So we can identify overbudget only when we are rather close to the end of the project, the rest of time Project Manager will normally tend to be optimistic and no suppose any overbudget.

3.3 Goals & needs

This chapter together with its 3 sub-chapters opens and describes what stands behind strategic, operational and financial goals in clear terms.

3.3.1 Strategic

Strategic Goal. Company is rapidly growing (see 2.1.3), so new process should support growth. Obviously, management will not expect process to be scalable up to extreme size without changes, but it is expected that process can suit company till the moment of SAP Business One implementation plus 3 months contingency period.

If any conflicts appear during the process of planning the company should mind long-term profitability. Besides, the type of the company business supposes that some customers could bring more business to us in future (namely, customer from segment of processing centres, for whom new features normally mean new banks on board and, finally, new volumes and more license payments to the Company).

At the current level of development of corporate governance it does not seem appropriate to introduce any automated process to support that. Thus, to achieve the strategic goal certain manual intervention / approval should be allowed.

Due to the nature of the project, I will name goals related to business-development (e.g. – company growth supporting) as strategic, since it is an essence of direct support of company strategy

3.3.2 Operational

Operational Goal.

The process should enable resource planning to support day-to-day operations. So it should basically support the resource planning steps of project lifecycle

- Project Assessment

- Workload planning & Time tracking during project implementation

- Budget review

- Re-planning procedure

In smooth manner with all required information available. Now we often encounter problems of human resource deficit and fast changes of business development plans, that's why, even if in future such situation is not desirable, it is vital to enable fast and lightweight replanning process.

Achieving of operational goal may be measured by:

- Less required involvement of Head of Delivery in day-to-day operations

- Better replaceability of Project Managers (because of more available information)

- Availability of information of resources (budget) spent

- Chances for earlier prediction of overbudget

3.3.3 Financial

Financial Goal. Milestones that exist in the project should be predicted since the payments are linked to these milestones, so milestone prediction improves our financial planning (even if invoice is paid we can acknowledge the payment only after sign-off of acceptance paper).

Achieving of financial goal may be measured by:

- Predictability of financial milestones

- Decreased deviation of financial milestones

Also, predictability improvement should decrease total Working Capital required.

3.4 Requirements: resource planning

Requirements are based on project objectives, which are

- Distribute resources between projects

- Adjust such distribution in case of changes in projects progress

- Monitor budget consumption and be pro-active in case of budget consumption issues

- Predict delivery delays

Resource planning process should consider high-level goals listed in 3.3.
Resource planning process should consider existing problems listed in 3.2.

The list of requirements below is created by me as following: initial set of requirement is created, discussed with Head of Delivery Department, Brussels Branch and CEO, World-wide Division. Final list of requirements given below is the outcome of that discussion.

So now I'm in place to create a list of requirements to recourse planning process.

To achieve strategic goals:

Rq code	Requirement	Validation procedure
Refers to: Strategic Goal		
RQ01	Process should enable manual intervention to achieve strategic goals	A manual intervention point is defined
RQ02	Process should be up-scalable for ERP integration	ERP structures are analyzed and integration concepts are introduced
RQ03	Process should be extendable from Brussels branch to worldwide operations	It is possible to use the same process for all Branches, there is a clear manual on how to implement it

To achieve operation goals:

Rq code	Requirement	Validation procedure
Refers to: Operational Goal		
RQ04	Process should enable budgets review	Budget review process is defined
RQ05	Process should support re-planning	Re-planning process should be designed, supposing a manual intervention and making resource plans available soon
RQ06	Process should be lightweigh. Due to instant deficit of resources the heavy process cannot be established	Process implementation effort should not exceed 50 m.d., daily process support overhead should not exceed 5% of implementation resource
RQ07	Process should be established for existing set of projects. Available data (MS Project plans, etc.) should be used for them	Process implementation should not require substantial reassessment of ongoing projects
RQ08	The "pilot phase" process should be available due to urgency of the task	"Simple planning" process is defined. It is extendable to full planning

To achieve financial goals:

Rq code	Requirement	Validation procedure
Refers to: Financial Goal		
RQ09	Process should enable overbudget prediction	Prediction mechanisms are defined
RQ10	Process should provide financial predictions	Milestone prediction mechanisim is defined and accepted by Sales Department

To solve scalability problem:

Rq code	Requirement	Validation procedure
Refers to: Scalability Problem		
RQ11	Process should be scalable	All day-to-day operations formally described, in is possible to establish a process on up to 50 employees in department without significant change

To solve information sharing problem:

Rq code	Requirement	Validation procedure
Refers to: Information Sharing Problem		
RQ12	Process should enable availability of resource planning information	Sources of information are listed, information on planned resource assignment is available
RQ13	Process should enable availability of resource consumption information	Data on consumed resources available

To increase predictability

Rq code	Requirement	Validation procedure
Refers to: Lack of predictability problem		
RQ14	Process should provide resource overload predictions	Resource overloads are predicted and such predictions information is available

RQ15	Process should provide delivery delay predictions	Project delivery delays are predicted and such predictions information is available

3.5 Requirements: ERP integration

The developed process and technology should integrate into the further process of Software Systems development. We are acquiring SAP Business One software solution [8] to integrate various internal processes. As a part of this solution we acquire Maringo Project Management (PM for consulting) tool [9]. The developed process should consider future integration into Maringo/SAP universe.

4 Resource planning methodology

4.1 Best practices review

Now, if we compare Risk-based planning and Process-based planning (see 2.2.1) we can see that we are searching for kind of risk-based planning (business-environment is unstable and task can be planned only with risk levels, but not with exact duration).

Considering current size of department and current status of project planning we can say that full implementation of formal techniques (e.g. PERT-based) will require too much overhead. So the current goal is in creating a semi-manual approach for resource planning, which will provide relevant data to be accessible, but at the same time will keep manual resource assignment and planning. Fully formal planning will require the level of process formalization which is non-existent for now (for example, in case of taking a new project some existing projects can be shifted and the decision is taken as the result of negotiations between Sales and Delivery – no formal "shift of dates" can be introduced).

Paper [7] suggests 3 levels of analysis for Management of Complex, which are well-correlated with our goals. The exact mechanism suggested in paper cannot be applied to Company context, but it has been used as an input. Suggested levels are:

MANAGING COMPLEX PROJECTS

Levels of analysis	Empirical problems and questions	Theoretical and methodological approach	Achieved results
Strategic level	What business decision should we make and how does this impact our strategic portfolio? ***Business decisions***	Strategic portfolio management	Design of a stretegic business portfolio Partnership and strategic alliances
Tactical level	How to transform business decisions into a proper project structure? ***Formation of projects. Management of multi project environment***	***Dependece structure matrix (DSM)*** Theory of complexity	***Design of project portfolio Managing multi-project environment***
Operational level	How to obtain integrated systems and cross-functional teams? ***Design of work brakdown structure (WBS) and work-packages (WP)***	Dependece structure matrix (DSM) Theory of complexity, Concurrent engineering, Organizational learning	Design of integrated projects. Creating collaborative work breakdown structure (WBS), and collaborative work-packages (WP)

Pic. 12 Managing complex projects (from [7])

In a scope of my work strategic level (how it is understood by authors of that paper) is not considered, the strategic goal in my work is more in support of strategic decisions. On the other hand, financial level is introduced, since predicting company financials is one of the major pain points of planning now and should be treated separately and with care.

4.2 Theoretical data model

This chapter describes the theoretical data model to which resource planning is applied to. This data model is an input for resource planning algorithms. This is logical model, meaning that certain data types are left for informational purposes only.

Data model is created in this work as a result of analysis of internal methodology (see 2.1.4 for description of processes) but is still a kind of "ideal" data model. Basically, theoretical data model is the starting point to describe resource planning algorithm. It is going to be adjusted so it better fits to realistic scenarios.
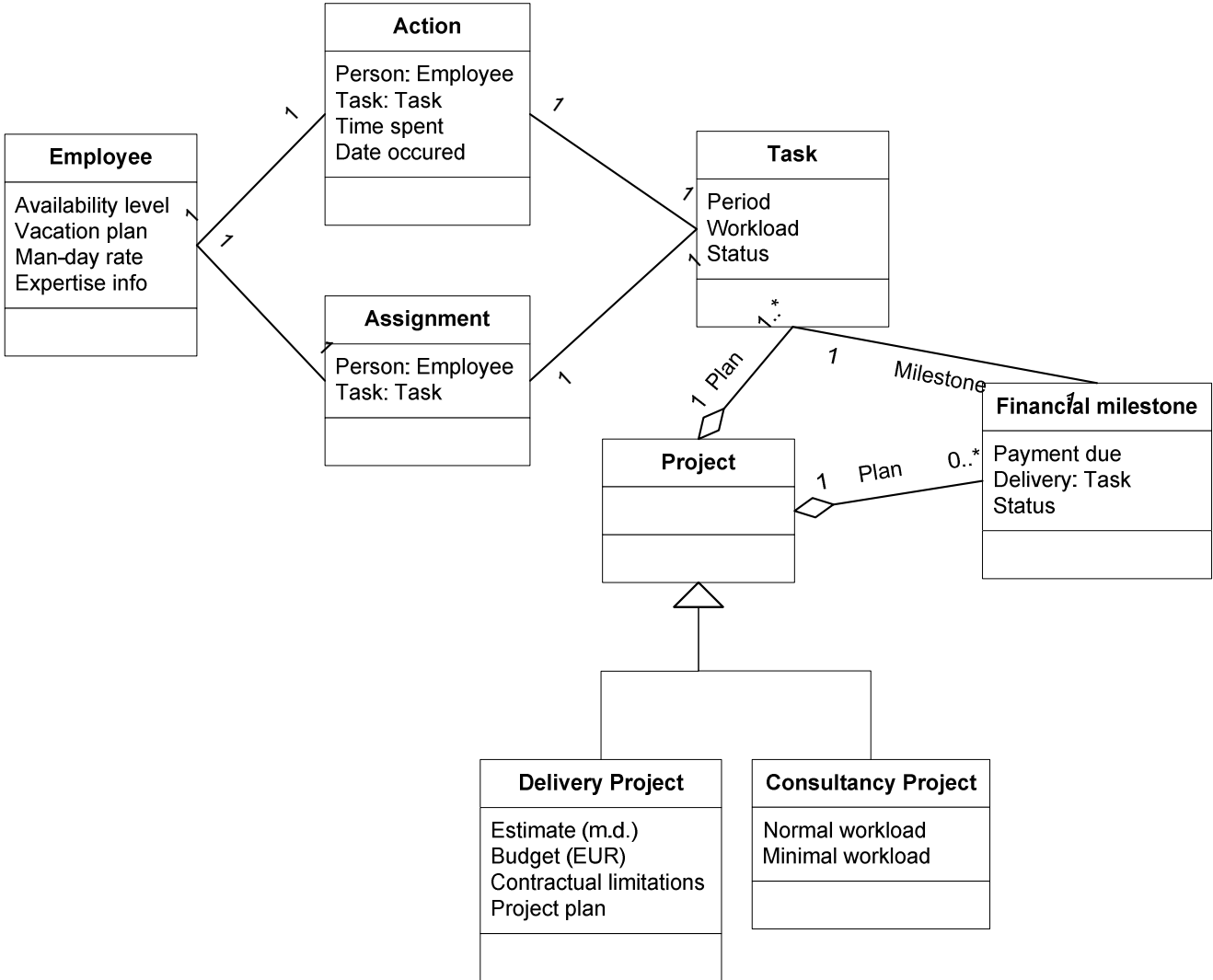
Pic. 13 Data model (initial)

Diagram is given in a notation of UML Static Structure ([6]).

Shortly, each box stands for the data entity with its attributes or data it is containing

Pic. 14 Object box

Means that object "Action" has following attributes:

- Person (of type "Employee")

- Task (of type "Task")
- Time spent
- Date occurred

Since we are not doing a software development to implement any model operations, primitive data types (e.g. for time spent and date occurred) will be considered to be described by names.

Links have following types and notations

Aggregation:
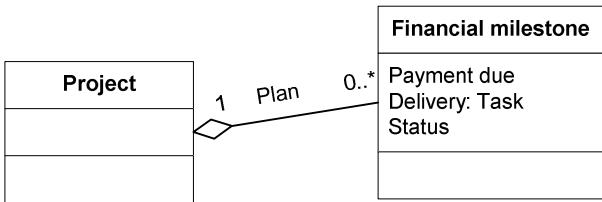
Pic. 15 Aggregation link

Means that project aggregates (contains) set of milestones, number or range at the end of the line shows how many milestones can be included (0..* - any number, 1..* - at least one). For example, project must contain at least one task but can contain no financial milestones (internal project) and financial milestone is always linked to a project.

Generalization:
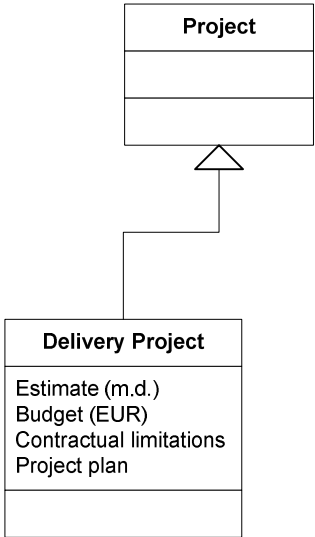
Pic. 16 Generalization link

Means that Delivery Project is a specific type for project with special data / characteristics.

Association:

```
                    ┌──────────────────────┐
                    │       Action         │
                    ├──────────────────────┤
                    │ Person: Employee     │
                    │ Task: Task           │
                    │ Time spent           │
                    │ Date occured         │
  ┌──────────────┐  ├──────────────────────┤
  │   Employee   │  │                      │
  ├──────────────┤  └──────────────────────┘
  │ Availability level │
  │ Vacation plan │
  │ Man-day rate │
  │ Expertise info │
  ├──────────────┤
  │              │
  └──────────────┘
```
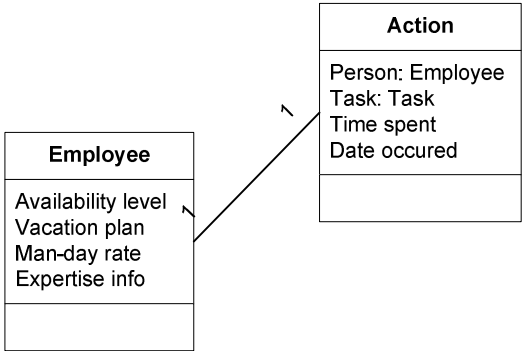
Pic. 17 Association link

Means that employee is associated to action (number stand for number of objects which can be associated, for example one project assignment is associated to only one employee and only one task)

Data entities description:

Employee

- Availability level

- Vacation plan (can be set as a project)

- Default person-day rate

- Expertise

Project

Project type: **Consultancy**

Consultancy project parameters:

- Normal workload

- Critical minimal workload (1 month)

Project type: **Delivery**

Note: Delivery project might be a pre-Project which has internal budget but is not finally confirmed

Delivery project parameters

- Estimated person-days

- Budget (EUR)

- Contractual limitations (including financial milestones)

- Project plan (in a form of mpp file)

Project plan can be treated as a set of tasks with

Task

- Planned period

- Required workload (for simplification reason will consider this constant)

Note: for simplicity reason we can say that consultancy project consists of one task.

Financial milestone (linked to project – for project type - delivery, linked to task in mpp plan)

- Payment due

- Required delivery

- Status (open/closed)

Atomic action (linked to employee, linked to task), referred as action

- Time spent

- Date occurred (to occur)

Note: atomic action stands for tracked task execution info

Assignment (linked to task, linked to employee). Since it is theoretical model, I do not use a concept of person-project assignment discussed in 3.1.1.

4.3 Logical approach

Logical approach describes what operations should be performed on the data model as a process of resource planning. Mathematically, resource planning is an algorithm applied to the snapshot of data structure (model defined above). The process developed around the algorithm should be semi-automatic and support manual intervention. I do define logical approach (planning algorithm) before the detailed methodology, because detailed methodology assumes certain software used and can be shifted/limited due to SW capabilities. I would like logical approach to be as irrelevant to software selection as possible.

Model requirements are the outcome of the set of requirements listed in chapter 3.4.

MX stands for "Model Item" X

- M1: For any given moment of time it is known what resource is linked to which project (assignment exists)

- M2: There is a set of assignments for all open tasks (including pre-Projects) which is optimized for earliest completion within known constraints (contractual milestones)

- M3: In case if resources are reassigned it is possible to know what will be new optimal assignment plan in relatively short time

- M4: For any given moment of time it is known for every project how much resources have been used already

- M5: For any moment of time it is possible to get historical information on time of completion of past tasks

- M6: It is possible to get a spent budget as a function of time

- M7: All information on assignments, assignment plans and budgets is available from contract source

One can track the requirements and easily see that those formalized description covers all requirements except limitations (al requirements except RQ02,RQ06-RQ08). One can also see that none of these model items can be removed still keeping all requirements fulfilled. So I can say that it is a formal planning model. On the other hand, such kind of planning is virtually unreachable. We can estimate overheads at 50% because of logging of every action and detailed calculations and re-calculations for resource plans.

I have designed set of adjustments, which make this model feasible. Set of adjustments in designed based on common sense and experience in the Company.

RX stands for "Real Item" X

- M1: For any given moment of time it is known what resource is linked to which project (assignment exists)
  R1: The information of time spending given be employees is available at the end of the week. Time spent information has the precision of 1 hour or less (to enable financials if billed on hour basis).

- M2: There is a set of assignments for all open projects (including pre-Projects) which is optimized according to earliest completion within known constraints (contractual milestones)
  R2: There is a set of assignments for all open tasks for 3-months period which is manually optimized
  Manual optimization is justified, because from the history we see that planning over 3-months horizon is unfeasible and automated optimization not required on

such scale (keeping in mind also the possibility to do project-person assignments instead of task-person assignments)

- M3: In case if resources are reassigned it is possible to know what will be new optimal assignment plan in relatively short time
R3: In case if resources are reassigned the manual replanning can be executed

- M4: For any given moment of time it is known for every project how much resources have been used already
R4: For any given moment of time it is known for every project how much resources have been used by end of last week with precision of R1 and with certain deviation (e.g. during business-trips information might get available later)

- M5: For any moment of time it is possible to get historical information on time of completion of past tasks
R5: For any moment of time it is possible to get historical information on time of completion of financial or project milestones
It is not required to track any task from project plan but the tasks should be grouped to sub-projects (project milestones) to enable a level of monitoring.

- M6: It is possible to get a spent budget as a function of time
R6: It is possible to get a spent budget as a function of time (with precision of one month)

- M7: All information on assignments, assignment plans and budgets is available from central source
R7: Stands.

4.4 Adjusted data model

Following entities should be included into our data model, which will support the process based on R1..R7:

Project **Milestone** (extends financial milestone):

- Budget due (used instead of payment due as more general concept)

Project assignment (note: this removes normal assignment, based on 3.1.1 we said that it is enough to plan resources in person-project assignment)

- Basic load

- Time interval

Assignment plan:

- Set of assignments

Action:

- Might not be linked to specific task in a project plan (simplifies tracking), but linked to a task group. That's why Action-Task link has cardinality changed (so now action can be linked to several tasks)

Milestones:

- Project must contain at least one milestone (might be non-financial), so the cardinality on Project-Milestone link has been changed
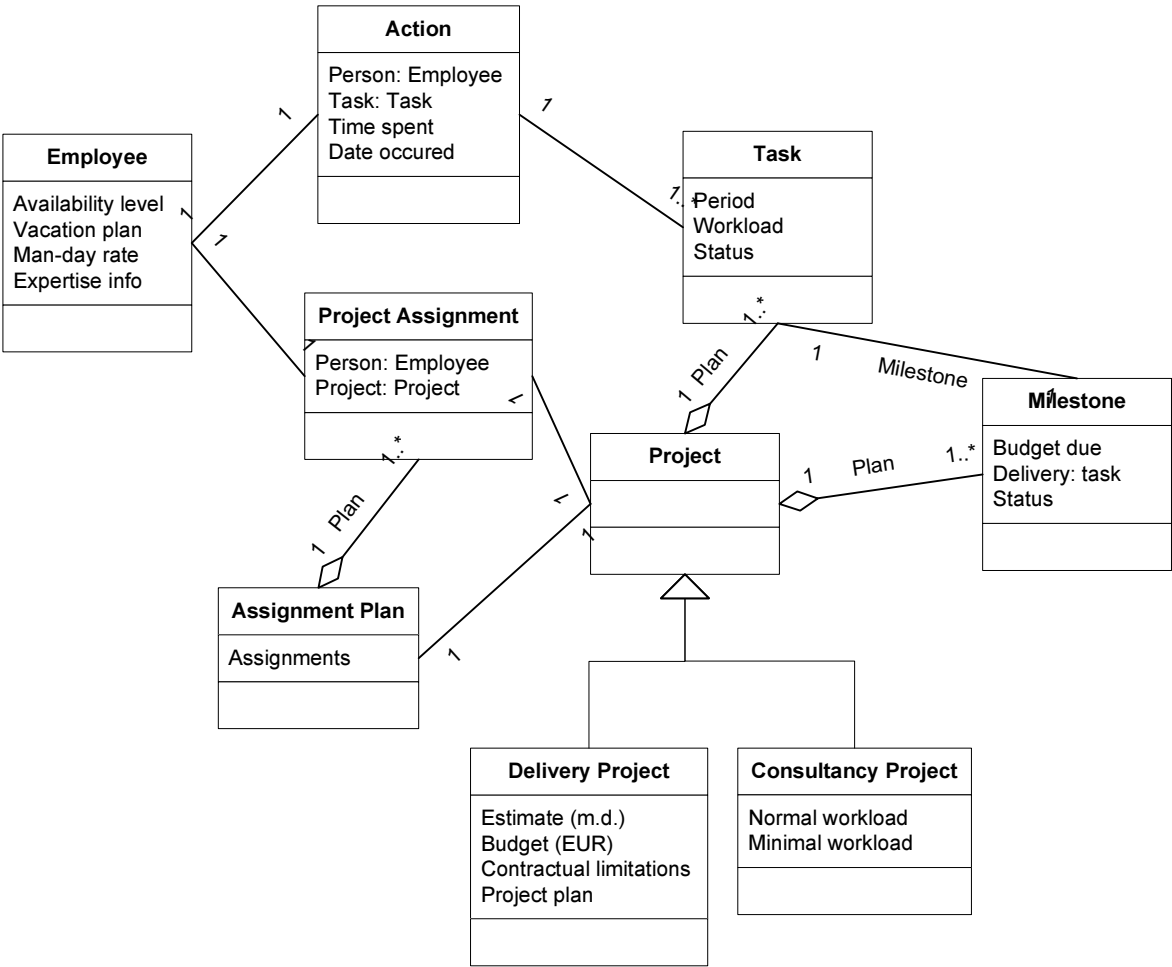
Pic. 18 Data model (final)

4.5 Software selection

Here the software is selected basing on data model and generic approach described above. It is identified:

- What software will store which data

- What software will be used to support planning process

This selection can lead to certain adjustments of algorithm

4.5.1 Time tracking

Time tracking software should cover the needs of R1 and R4. Following software has been evaluated:

- Harvester (Web-Based)

- BeeBole (Web-Based)

- Microsoft Project Server (Client-Server)

- Internal Time Tracking software Delivery SPB (Client-Server)

- Excel timesheets (Client-Based)

Following dimensions have been analysed (up to 5 points per item)

- Information sharing: how easy it is to share information (including remote locations) with the application
- Web-access: the ease of access through web (with no special software installed and not need to use Remote Desktop to Server or any other specific tools)
- Cost of implementation: both financial and human-resource cost to acquire and configure the software
- Ease of use: subjective parameter evaluating how easy it will be for a new employee to use the software

	Information sharing	Web-access	Cost of implementation	Ease of use	Total
Harvester	5	5	4	3	15,5
Beebole	5	5	4	4	16
Microsoft Project Server	5	3	2	3	11,5
In-house developed time tracking	5	1	5	4	13
Excel sreadsheets	1	1	5	5	9,5

Ease of use has a weight of 50% compared to other parameters. So usage of Client-Server (non web-based) or Client-Based (with manual distribution) timesheets has been declined, mainly, because of limitations to R1 (information sharing, web-access). Between BeeBole and Harvester

tools the BeeBole tool ([10]) was selected because of better flexibility of screen configuration (irrelevant in terms of major requirements, but still convenient).

Time Sheet screen allows tracking of atomic actions:
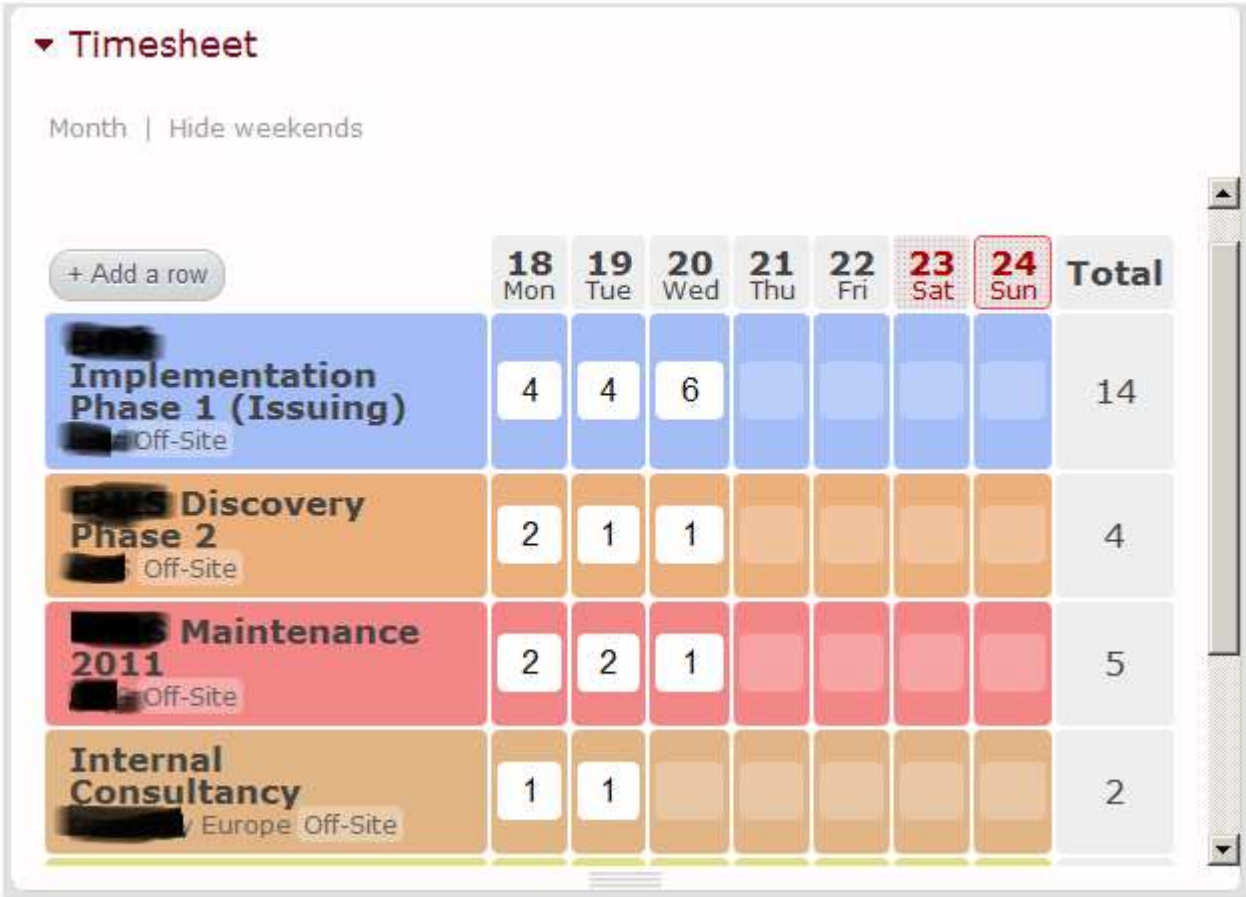
Pic. 19 Timesheet example

BeeBole brings a limitation of time tracking with precision of ½ hour.

Budget status allows review of spent budgets

Pic. 20 Budget status example

Also we should keep in mind future SAP Business One implementation (2.1.3), so the BeeBole will be most probably replaced in Y 2012, that's why there is much more sense in selecting the lightweight and low-cost (2.99 euro per user per month for BeeBole) solution.

4.5.2   Project planning

Project planning software should cover R2, R3.

For the project planning software we can consider that for reflection of atomic tasks and creation of project plans there is no need to replace Microsoft Project software by anything else.

Nevertheless existing way of usage for Microsoft Project will not support multi-project environment. This should be extended by one of

- Microsoft Project Server

- Project Management in MS Project with data reflection in excel spreadsheets

- Project Management in MS Project with data with data reflection in database

Here following factors have been considered:

- Future ERP implementation

- Assignment done in person-project manner

- Spreadsheets easily loadable to database in future

They lead us to option "Project Management in MS Project with data reflection in excel spreadsheets" at the current stage. So, as the improvement of project planning:

- All plans should be stored in centralized document storage (SVN, already in place, see 4.5.3)
- High-level planning results should be reflected in excel spreadsheet

4.5.3   Plans storage

Plans storage covers R7.

Centralized access to results can be provided by tools themselves (web-based, client-server) or via loading of files into SVN files storage (for client-side files). No replacement of existing SVN file storage is supposed

4.5.4   Plans tracking and verification

Plans tracking and verification software should cover R5 and R6.

The information about milestone budgets and statuses can be covered either by

- Time tracking software

- Project management software

- Separate software (manual storage of data)

The budget spent history can be computed from the database of time tracking software.

4.6 Detailed methodology

Resource planning process is developed basing on decisions described above.

4.6.1 Project data preparation

Following actions should be executed at the very moment of project initiation

- Identification of project milestones

- Budget assignment to project milestones

- Pre-planning: involved persons identifications

It is required to have a milestones not exceeding 100 m.d.[3]

4.6.2 Workload planning

Creation of **assignment plan** for the project. Assignment plan can look like following

Customer	Project	Person	Project type	May	June	July
Bank A	Phase 1	John Doe	Delivery	14	14	14
Internal	Internal consultancy	John Doe	Consultancy	0.3	0.3	0.3
Bank A	Maintenance	Joe Doe	Consultancy	0.1	0.1	0.1
Bank B	Phase 1	Jane Doe	Delivery	18	18	8
Internal	Vacations	Jane Doe	Delivery	-	-	10

Where for the type "Delivery" the amount of person-days and for type "Consultancy" the required average load is given.

Budget plan shows a simplified view on planned budget spending

	April	May	June	July
Mega-Bank implementation budgeted (m.d.)	10	10	10	10
Milestone indication			System build, Budget = 30 days	

This data is tracked in excel spreadsheets

- Individually – by every Project Manager

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[3] Decision taken for Year 2012, can be adjusted

- On Department level – after gathering consolidated information

4.6.3 Time tracking

Regular tracking of spent time is performed through Beebole website. It is vital to track time on weekly basis. It is preferable to track time on daily basis.

Every individual task from project plan completed should be reported to Project Manager.

With implementation of ERP software individual task completion can be tracked (critical note: this is still to be assessed).

4.6.4 Project status review

Project status review is done on the regular (bi-weekly) meetings between Head of Delivery and Project Managers.

The intermediate meeting (3-rd week of month, planned for 1 hour) is for pre-check of all statuses and final meeting (1-st week of month, planned for 2 hours) is for detailed analysis of month results.

As the input for these meeting

- Assignment plans are actualized by Project Managers

- Information from BeeBole is exported and converted to a form, symmetric to the assignment plan, but reflecting real data (time spent per person/project, budget spent)

At the verification step following actions are performed:

- Actual budget spending (taken from BeeBole data) is compared to budget plan. Differences are analyzed on individual basis.

- Assignment plan is reviewed. Any overloads and underloads are analyzed on individual basis. Final loading plan is approved

- The time spent in previous month for every person is compared to the plan (split between customers / projects / activities). The plans for forthcoming months can be reviewed basing on results.

Individual meetings might be planned to resolve the issues identified on verification step. As a result, adjustments are put to the official plan.

4.6.5 Plans adjustment

In case of new project to be put on the plan results should be adjusted manually.

5 Implementation plan

5.1 Pilot implementation

The first implementation is limited to:

- Time tracking system implementation (from 4.6.3)

- Including project budgets into time tracking (no split to non-financial milestones, see 4.6.2)

- Loading plans creation and review (from 4.6.4)

- Regular PM Meeting for budget and loading status review (from 4.6.4)

5.2 Full implementation

The high-level plan of implementation can be given as following:

Task Name	Duration	Start	Finish	Workload (m.d.)	Predec	Responsible	Approves
⊟ **Resource Planning Implementation**	**!40 days?**	**02.05.11**	**13.04.12**				
⊟ **Preparation Stage**	**65 days**	**02.05.11**	**29.07.11**				
Process - Stage 1	20 days	02.05.11	27.05.11	5		RP Program Manager; Delivery Head	Delivery Head;CEO
Software Selection - Stage 1	5 days	30.05.11	03.06.11	2	3	RP Program Manager; Delivery Head	Delivery Head;CEO
Process - Stage 2	10 days	06.06.11	17.06.11	3	4	RP Program Manager; Delivery Head	Delivery Head;CEO
Software Selection - Stage 2	5 days	20.06.11	24.06.11	2	5	RP Program Manager; Delivery Head	Delivery Head;CEO
Process - Stage 3	15 days	27.06.11	15.07.11	3	6	RP Program Manager; Delivery Head	Delivery Head;CEO
Integration model - Stage 4	10 days	18.07.11	29.07.11	3	7	RP Program Manager; Delivery Head	Delivery Head;CEO
⊟ **Stage 1: OWB Partial Implementation**	**110 days**	**06.06.11**	**18.11.11**		**4**		
Time Tracking software implementation	5 days	06.06.11	10.06.11	3		RP Program Manager;Delivery Head	Delivery Head
Budgets Input	10 days	13.06.11	24.06.11	3	10	OWB PMs;Delivery Head	Delivery Head
Initial monitoring process (budgets, BeeBole)	20 days	27.06.11	22.07.11	2	11	RP Program Manager;Delivery Head	Delivery Head
Verification process internal paper	10 days	25.07.11	19.08.11	2	12	RP Program Manager	Delivery Head
Process implementation: pilot phase	20 days	22.08.11	16.09.11	2	11;13	RP Program Manager	Delivery Head
Workload input for existing projects	5 days	19.09.11	23.09.11	3	14	OWB PMs	Delivery Head
Process Implementation: all OWB projects	20 days	26.09.11	21.10.11	3	15	RP Program Manager;OWB PMs	Delivery Head
Results assessment	20 days	24.10.11	18.11.11	1	16	RP Program Manager;Delivery Head	CEO
⊟ **Stage 2: OWB Full Implementation**	**15 days**	**21.11.11**	**09.12.11**		**6;9**		
Process description paper preparation	5 days	21.11.11	25.11.11	3		RP Program Manager	Delivery Head
Non-financial milestones assessment	10 days	28.11.11	09.12.11	5	19	OWB PMs;Delivery Head	CEO
Task completion tracking implementation	10 days	28.11.11	09.12.11	3	19	RP Program Manager	Delivery Head
Converter from BeeBole csv to .xks	15 days	21.11.11	09.12.11	5		Software Developer	RP Program Manager
⊟ **Stage 3: OWI Implementation**	**60 days**	**12.12.11**	**02.03.12**		**18**		
Agreement on process	20 days	12.12.11	06.01.12	5		Management Committee / to be defined	CEO
Process implementation	40 days	09.01.12	02.03.12	5	24	Management Committee / to be defined	CEO
Stage 4: ERP integration - tentative	30 days?	05.03.12	13.04.12	??	8;23	Management Committee / to be defined	CEO

Pic. 21 Implementation plan

Some information on roles mentioned:

RP Program Manager – Resource Planning Program Manager (and, at the same time, author of this paper)

PMs – Project Managers, Delivery Department

Delivery Head – Head of Delivery, Central Europe

CEO – CEO, World-Wide Division

6 Results analysis

Here I will analyze and critically review the results of resource planning implementation project.

6.1 Results analysis

Now we can analyze major results of process implementation in details. Analysis will be done in a concept of [5]. For each result achieved following things are challenged:

- Whether the benefit be clearly observed

- Whether the benefit is measurable

- Whether the benefit is quantifiable

- Whether a financial value can be assigned to a benefit

6.1.1 Increased visibility of budgets status

The first major outcome of the project is in visibility of budgets spending. Now all information on current budget status is available in centralized manner. This is the major change in Department processes. We cannot exactly measure the value of this increase visibility, but it hardly can be overestimated.

Better visibility of budget status influences:

- Decision making in customer relationship
- Decision making in project relationship
- Decision making in resource planning
- Decision making in financial planning

Rough assessment: in terms of capital we can assess that we end up in 3% shorter projects[4]. We do not decrease the number of person-days spent for the project, but we make average project shorter.

If we assume that department is doing X projects a year and will do exactly same number of projects, but will finish each of them 3% earlier, then we see that:

- Cost structure remains the same
- Revenue is acknowledged 3% earlier (3% of duration of average project)
- So the difference in NPV can be estimated[5] as

---

[4] Source: expert estimation by Head of Department. See also "Improve process lead-time" chapter, 6.1.4

[5] This is not exact calculation, due to the fact that we cannot really use average project, hence it is quite close to it

(Revenue of the project discounted for 100% duration) – (Revenue of the project discounted for 97% duration) summed for all projects.

From company financial data we can estimate that additional financial profit is 54 000 EUR annually.

6.1.2 Better process scalability

Next goes the better scalability of the project. It can be observed and measured at the level of estimate. From the experience that we have, we can say that the new project is scalable up to a department management structure of Department Head and 7 Project Managers, which can mean up to ~56 employees in the department. The process existing previously hardly sustained the department of 10 employees. The number "7" for Project Managers is taken because larger increase of size will lead us to multi-layered or split structure, since PM meetings will become not efficient. It is unlikely to assess this financially; nevertheless scalability is vital for company growth.

6.1.3 Better information availability

The great outcome of the project is in making information on

- Budget status
- Time tracking
- Resource loading ex ante (planned)
- Resource loading ex post (observed)
- Milestones plan

is available from central source (either BeeBole or SVN). The result of such availability can hardly be measured (because before this process implementation information has not been available from any central source) but is very valuable for company. It basically enables better operations in absence of Head of Department or in absence of any Project Manager. It will decrease the time spent for planning discussion over the phone (e.g. from business-trips). Better information availability has a good influence on daily operations, with direct outcomes:

- Operations easier handled in absence of Head of Department
- Operations easier handled in absence of Project Manager
- Replacability of Project Manager improved
- Less urgent calls for Head of Department and PMs devoted to project planning (especially valuable on vacations and business trips)

Note: budgets visibility is linked to this outcome but is separated for purpose – it is substantial to stand for separate result.

Also, available information on budget statuses and plans provides a mean for better project assessment to Business Relationship Managers and Sales Managers.

6.1.4 Improve process lead-time

This outcome is linked with better information availability, but represents a separate outcome. Having process in place we improved process expected lead-time. We can do following estimates, based on current department structure and following assumptions

- 4 Project Managers
- 30% average time travelling for Project Managers and Head of Department
- Trips not correlated
- Average trip length: 1 week

Different re-planning requests coming from Business Relationship Managers, Project Managers and Sales Team are coming to Head of Department. We can easily see that there is 83.2% probability (supposed that trips are not correlate and their length is evenly distributed) that at least one of PMs or Head of Department is travelling, which will mean that normally all re-plannings will require urgent calls, which are not convenient. From past experience we can say that the re-planning lead-time is 1.5+ month in current process (except from cases when substantial overhead is put to replanning – urgent request, source – expert estimate made by Head of Department). The process decreases this lead-time to 1 month for regular planning and 2 weeks for replanning.

This is elaborated below on the financial impact of this on working capital, but we should not underestimate psychological impact on workforce because of less urgent discussions and more stable process.

As for financial impact of shorter replanning time we can say that decreasing it 2 up to 3 times on average will end up in following formula (for large projects, which are our main concern in replanning):

6 large projects a year on average (current size of department)

0.5 major replanning per project

End up in 3 major replannings. It means that we decrease projects duration by 3 months total, or 2 weeks per large project (note: this decreased in duration is fully separate from 3% decrease I estimated in 6.1.1). We should keep in mind that we do not decrease the effort; we just become capable of doing project faster, nevertheless shorter and better-organized projects normally do require less resource. Decrease of average project duration brings us additional financial profit of 68 000 EUR yearly (calculated in a same way as 6.1.1).

6.1.5 Less working capital because of better predictability

Speculations given in previous chapters can also be financially defined as decrease of company working capital required for particular project. On average company will need approximately 5% less working capital to execute a project. Working capital of the company is mainly used to pay salaries before project payment can be acknowledged.

We should note that any financial improvements based on decreased working capital are driven by the same source as financials in 6.1.1 and 6.1.4 (basically, having working capital decreased, or having more financial profit because of earlier acknowledgement of payments are two different views on the same effect – decreased project duration), so we do not need to treat this an additional financial effect and sum it up to previous two. Also, view of previous chapters is easier to catch, that we basically do not suppose that company can do more projects with same number of people. On Pic. 22 red boxes show the decreased duration of project, for which we do not need to have working capital any more.
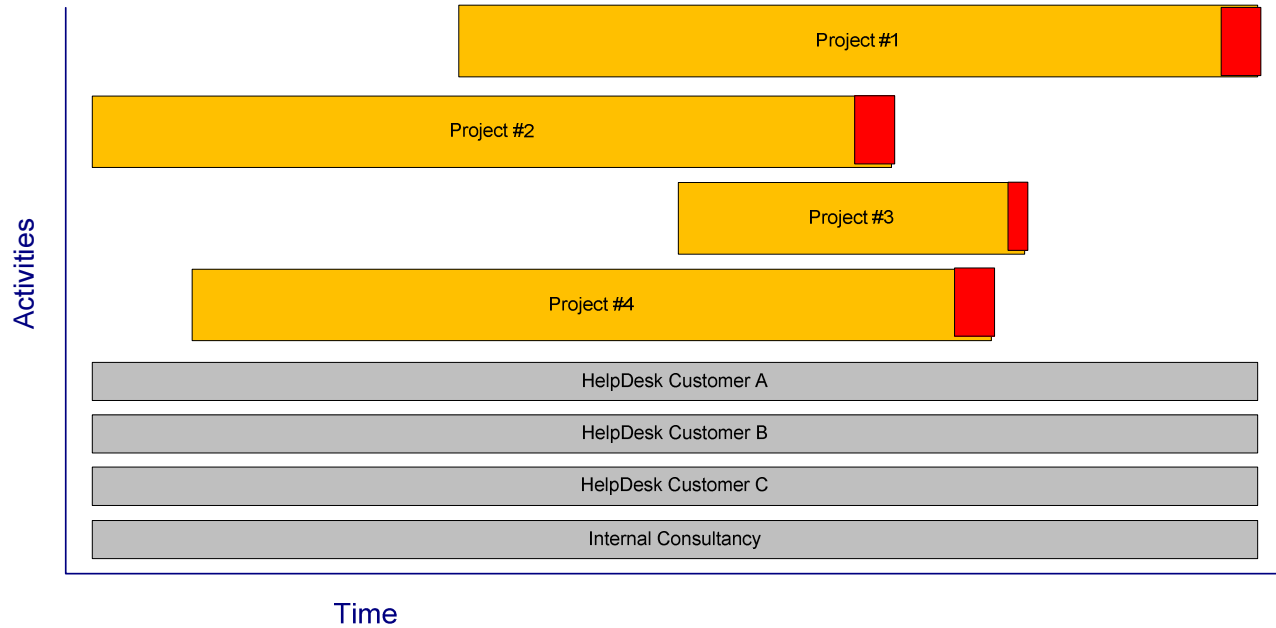
Pic. 22. Decreased duration

This does not include positive impact on customer satisfaction, which will be discussed below.

6.1.6 Increased customer satisfaction because of better predictability

As the final outcome we can say that customer satisfaction is increased through described process. The main reasons for that are

- Customer can rely more on process lead-time
- Customer can get any "urgent re-planning" information in advance

- New projects are planned in more predictable manner

We are currently not doing any formal and/or financial measurement of customer satisfaction level, so we can do only a post-analysis based on average number of escalations.

6.1.7 Summary

Results to be assessed are summarized in a table below

	Observable	Measurable	Quantifiable	Financially measurable
Increased visibility of budgets status	Y	N	N	N
Better process scalability	Y	Y	Y	N
Better information availability	Y	N	N	N
Improved process lead time	Y	Y	Y	Estimate
Less working capital because of better predictability	Y	Y	Y	Estimate
Increased customer satisfaction because of better predictability	Y	Y	N	N

For the results which are not measurable financially I will try to give certain method to assess the financial result. We should not underestimate indirect impact which is also described below but hardly can be measured.

6.2 Results verification

Now we can verify that all requirements has been satisfied.

Strategic / business-development goals achieved:

Rq code	Requirement	Validation procedure	Validated
Refers to: Strategic Goal			
RQ01	Process should enable manual intervention to achieve strategic goals	A manual intervention point is defined	Process enables manual intervention in regular (bi-weekly) review.
RQ02	Process should be up-scalable for ERP integration	ERP structures are analyzed and integration concepts are introduced	SAP Business One integration is possible (see ch. 7.1)

RQ03	Process should be extendable from World-Wide Division	It is possible to use the same process for all Branches, there is a clear manual on how to implement it	Process is extendable, keeping the concept of separate project offices which currently is in place. Integration between project offices is on of scope.

Operational goals achieved:

Rq code	Requirement	Validation procedure	Validated
Refers to: Operational Goal			
RQ04	Process should enable budgets review	Budget review process is defined	Process of regular budget reviews prepared.
RQ05	Process should support re-planning	Re-planning process should be designed, supposing a manual intervention, but making resource plans available soon	Re-planning supported in bi-weekly meetings
RQ06	Process should be lightweight. Due to instant deficit of resources the heavy process cannot be established	Process implementation effort should not exceed 50 m.d., process support effort should not exceed 5% of implementation resource	Requirement met for initial implementation process (preparation + Stage 1) and for total process overhead. Further stages implementation effort is over the initial estimate. Additional software acquired on phase 1 costs approx. 700 EUR/year for the whole Department.
RQ07	Process should be established for existing set of projects. Available data (MS Project plans, etc.) should be used for them	Process implementation does not require substantial reassessment of ongoing projects	Implementation plan includes effort for input of all open projects data

RQ08	The "pilot phase" process should be available due to urgency of the task	"Simple planning" process is defined. It is extendable to full planning	"Quick Wins" process provided and implementation partially done.

Financial goals achieved:

Rq code	Requirement	Validation procedure	Validated
Refers to: Financial Goal			
RQ09	Process should enable overbudget prediction	Prediction mechanisms are defined	Prediction is enabled through: available information in BeeBole, non-financial milestones, regular budget reviews
RQ10	Process should provide financial predictions	Milestone prediction mechanism is defined and accepted by Sales Department	Prediction is enabled through: available information in BeeBole, non-financial milestones, regular budget reviews

Scalability problem solved:

Rq code	Requirement	Validation procedure	Validated
Refers to: Scalability Problem			
RQ11	Process should be scalable	All day-to-day operations formally described, in is possible to establish a process on up to 50 empoyees in department without significant change	Process is scalable for reasonable growth (unless the PM meetings get unefficient)

Information sharing problem solved:

Rq code	Requirement	Validation procedure	Validated
Refers to: Information Sharing Problem			

RQ12	Process should enable availability of resource planning information	Sources of information are listed, information on planned resource assignment is available	All information available from local SVN
RQ13	Process should enable availability of resource consumption information	Data on consumed resources available	Data on consumed resources available from BeeBole reports in realtime

Predictability increased:

Rq code	Requirement	Validation procedure	Validated
Refers to: Lack of predictability problem			
RQ14	Process should provide resource overload predictions	Resource overloads are predicted and such predictions information is available	Resource overload clearly tracked in resource plan
RQ15	Process should provide delivery delay predictions	Project delivery delays are predicted and such predictions information is available	Prediction is enabled through: available information in BeeBole, non-financial milestones, regular budget reviews

So we can see that all requirements are met. Process implementation effort is underestimated, but the first stage of implementation fits into desired estimate, after that the detailed assessment of results will allow deciding on further development of the process.

7   Future steps

7.1   ERP integration

As I said in the requirements chapter, we are now in process of internal business-analysis for SAP and Maringo PM for Consulting implementation, the decision to proceed with such software has already been taken. Let's see what changes will be implemented and how they will impact the process of resource planning.

- Project Plans will be created in Maringo PM for new projects. Project Plans for running projects will have a high-level reflection in Maringo PM.
  This will not have any impact on the data model and resource planning process.

- Maringo PM supports pool-based resource planning. This will replace the spreadsheet with assignment plans (see 4.6.2, assignment plan). Maringo PM will provide the visual interface which will be more convenient then MS Excel and will provide automatic calculation of "over-planned" and "free" resources. Due to the fact that nearly any significant work in Delivery Projects requires much knowledge of project context, all consultants/engineers will normally have their individual pools.

See picture from Maringo PM Brochure below:

Pic. 23 Pool planning (Maringo)

- Entering of Time Sheets will be migrated from BeeBole to Maringo PM Time Sheets. This will provide interface similar to one in BeeBole
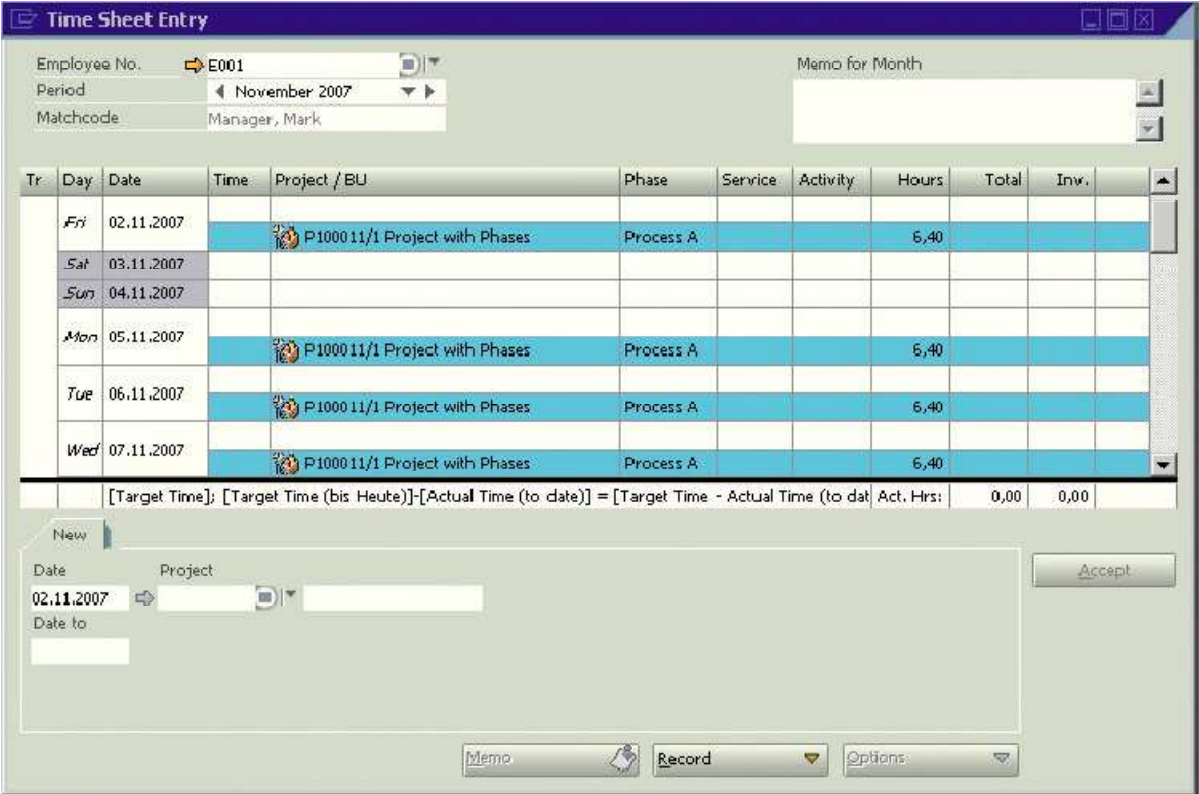
Pic. 24 Timesheet entry (Maringo)

All time sheet records from BeeBole can be exported to CSV files and imported to Maringo PM if required (or can be input as totals). Maringo PM will provide capabilities on Web-Based entry of data as well. It is still an open issue if we need to track time on task level or project (milestone) level, so we will start from project (milestone) level.

- The milestone planning will be implemented in Maringo PM as split of project to sub-projects.

- Plans will be available through Maringo Server, so the storage of project data in SVN will not be required.

- Review process will remain the same, but will take Maringo PM data as an input.

So we can see that process is well-prepared for future usage of Maring PM as project management tool.

7.2 CIS Division intercommunication

The last but not the least is the question of future (logical) integration with CIS Division. CIS Division uses in-house developed system for project management and planning (together with MS

Project). The integration should be discussed, covering the mapping of concepts. This should simplify the case of transferring project from. CIS Division to World-wide Division and vice versa. For now migration of CIS Division to SAP Business One is not considered.

CRM tool (in-house developed PM and Planning system) includes tools for project management and time tracking. Below goes the description on how data model entities of described process can be mapped to data model entities existing in CRM. Such mapping can be applied in a case if project is being moved from CIS Division to World-wide division and vice versa (also, if some people of one division keep involved in project of another division after project is moved).

- **Employee:** mapped on 1-1 basis

- **Project**

- Project type: **Consultancy**

Consultancy projects normally do not have much value of history, so can be transferred from point of transfer with current available budget.

- Project type: **Delivery**

Delivery projects can be transferred as a set of Tasks and Milestones, as described below.

- **Task**

Tasks are normally tracked in Microsoft Project in both processes. So the Microsoft Project file can be transferred.

- Project **Milestone** (can extend financial milestone)

Project milestones can be translated to CRM Projects, CRM Milestones and CRM Tasks of CRM based project on decision of CIS Project Manager. Reverse conversion can be done as well.

- **Project assignment**

CIS Division uses project assignment on a basis of high-level tasks (task groups). So the process of conversion of project assignments to task group assignments will require manual intervention. Normally the number of task is limited (they are not the reflection of MS Project Tasks, but provide higher grouping). The reverse process can be executed relatively easy as well.

- **Assignment plan**

Assignment plan has no need to be transferred manually and keyed into the system used.

- **Action**

Since the project is always on responsibility of particular project office there is no need in 1-1 mapping of action tracking. In case of need for reflection the cumulative total (e.g. monthly total) can be put into the system of another Division

8   Conclusion

Concluding, I can say that in my work I have identified the set of requirements, basing both on understanding the strategic and tactical objectives of the company and set of interviews with company managements.

Based on the set of requirements and company methodology I have developed resource planning process which has been approved internally. From process analysis above we can conclude that the developed process

- Satisfies all identified requirements
- Brings substantial benefits to the company
- Provides a platform for future growth
- Can be integrated into processes established in other Divisions
- In future can be converted into processes based on usage of Maringo PM solution

Software has been critically reviewed, selected and acquired.

Implementation of following items

- BeeBole time tracking implementation (for all Delivery within Brussels office)
- BeeBole budget tracking implementation (for subset of projects)
- Workload planning (for a Delivery sub-team within Brussels office)

Have already been done successfully and gave positive impact on department operations.

Implementation of the rest of the items has been planned (project plan prepared).

These changes allowed us to support department growth and increase company daily operations.

The effort made and results of the work have been highly valued by Company Management.

9   Bibliography

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     http://www.maringo.de

10   BeeBole time tracking http://beebole.com

10 Annexes

10.1 Value for segments

Value matrix per feature per segment is given below (source: internal Marketing Analysis):

		Company (max 5 points)	Value for segments					
			Large Banks (Principals)		Small Banks (Associates)		Processing Centers	
Product	IPS Standard Support	5		5%		5%		5%
	Performance	3		10%		10%		10%
	Flexibility	5		15%		5%		13%
	Short downtime	4		5%		3%		10%
	Single platform	5		7%		17%		0%
	Cost of servers	2	40%	3%	50%	10%	40%	2%
Service	Professional consultancy	4		15%		20%		10%
	Professional helpdesk	4		10%		10%		15%
	Low response time	3		5%		5%		10%
	Quick resolution time	3	40%	10%	40%	5%	50%	15%
Brand	Established	3		15%		3%		10%
	Innovative	5	20%	5%	10%	7%	20%	10%

10.2 Notes & comments

All financials in paper are given as an example, since real financial data is confidential.

10.3 Internal summary

The internal paper, draft 1: developed in August 2011 (pilot implementation), not including internal BeeBole usage guidelines

1.1 Process targets

With the increasing number of projects there is a need to have a structured approach to monitoring of project budgets, statuses and persons loading level. The aim of this document is to describe such structured approach. Reading this document one should consider that this is temporary solution to be in-place before implementation of ERP system.

1.2 Process summary

Basically, approach can be described as following. Each Project Manager (PM) should track the information on:

•   persons involved in his projects (with level of their involvement)

•   split of time planned for every persons between tasks (clearly planned activities) and average workload for activities (continuous activities – e.g. maintenance and consultancy)

•   budgets of his projects (and plans to use these budgets)

Every two weeks all project managers meet with Head of Delivery to review information listed above and reflect it in the excel spreadsheet.

The actual spending information is obtained from BeeBole and updated.

1.3 Process details

Step 1. Project budgeting

Every project has its budget fixed in person-days and euros. It is supposed to track both person-day and euro budget, which is especially useful when remote offices participate in the project. Taking the budget in person-days and project plan PM creates a monthly spending plan for his project. This plan should be created for the whole length of the project (can be adjusted and reviewed).

Step 2. Project budget review

On the regular meeting the budget plan is assessed against actual budget spent. High over-spending is an indication that project might be overbudgeted. High under-spending is an indication that project might be lagging behind the plan. Also, the review might show that replanning is required.

Finally, project budget plan looks like the following:

	April	May	June	July
Mega-Bank implementation budgeted (m.d.)	10	10	10	10
Mega-Bank implementation actual (m.d.)	9	11		
Mega-Bank implementation actual (EUR, total)	7650	17000		

Note, that the last line is sub-total line and previous two show the actual spending in the month. For the projects with high involvement of remote-office and if travelling is not covered by customer the budget in euro can be tracked as well.

This plan is always available for the whole length of the project. Certain risk budget should always be planned, depending on risk nature of the project (normally 10% for large standard projects and up to 30% for pilot projects)

Step 3. Workload planning

Every person, participating in the project has his planned load. This planned load can be related to particular tasks in the project (task-plan) can be pre-allocated for maintenance / consultancy. The difference between such two types of activities is that tasks are planned as number of person-days and activities are planned as percentages of full-load.

Few examples,

John Doe – internal consultancy is planned as 0.3 workload for year 2011

Jane Doe – "Bank B" maintenance is planned as 0.1 workload for Q2 2011

John Doe – "Bank A" project, is planned as 14 person-days in May 2011

Every PM should have a short-term (normally 3 month) plan for activities in his project split by people. Longer plans are feasible if certain critical resource is pre-allocated and are agreed with Head of Delivery.

The example of prepared loading plan is given below

Customer	Project	Person	Activity type	May	June	July
"Bank A"	Phase 1	John Doe	Task	14	14	14

Internal	Internal consultancy	John Doe	Activity	0.3	0.3	0.3
"Bank B"	Maintenance	Joe Doe	Activity	0.1	0.1	0.1
"Bank C"	Phase 1	Joe Doe	Task	18	18	8
Internal	Vacations	Jane Doe	Task	-	-	10

Financial milestones monitoring process is still to be developed.

Step 4. Submission

Two days before the analysis all data (as 2 excel spreadsheets) is to be submitted to the person, responsible for preparation of the report. Following reports are calculated:

- Budget spent to budget plan (per project)
- Time posted to time planned (per personal task in the project)
- Planned load for next month (per person)

Step 5. Verification

The meetings with participation of all PMs and Head of Delivery are to be held on by-weekly basis. The intermediate meeting (3-rd week of month, planned for 1 hour) is for pre-check of all statuses and final meeting (1-st week of month, planned for 2 hours) is for detailed analysis of month results.

At the verification step following actions are performed:

- Actual budget spending (taken from BeeBole data) is compared to budget plan. Differences are analyzed on individual basis.
- People loading plan is reviewed. Any overloads and underloads are analyzed on individual basis
- The time spent in previous month for every person is compared to the plan (split between customers / projects / activities). The plans for forthcoming months can be reviewed basing on results.

Individual meetings might be planned to resolve the issues identified on verification step. Certain adjustments made are put to the official plan.

10.4 Typical project plan

ID	Task Name	Duration	Start	Finish	Predecessors	Resource Names
1	**WAY4 Implementation**	**412 days**	**Wed 01.09.10**	**Tue 08.05.12**		
2	**Initiation**	**30 days**	**Wed 01.09.10**	**Tue 12.10.10**		
3	Contract sign-off	1 day	Wed 01.09.10	Wed 01.09.10		BANK
4	Mileston: 30% payment after contract signed off	0 days	Wed 01.09.10	Wed 01.09.10	3	
5	Discovery Sign-off	1 day	Wed 01.09.10	Wed 01.09.10		BANK
6	Project kick-off meeting	3 days	Thu 02.09.10	Mon 06.09.10	3;5	BANK[200%];OW-PM;OW-C
7	**IPS Projects**	**30 days**	**Wed 01.09.10**	**Tue 12.10.10**		
8	VISA Project Open	30 days	Wed 01.09.10	Tue 12.10.10		BANK[5%]
9	MC Project Open	30 days	Wed 01.09.10	Tue 12.10.10		BANK[5%]
10	AMEX Project Open	30 days	Wed 01.09.10	Tue 12.10.10		BANK[5%]
11	JCB Project Open	30 days	Wed 01.09.10	Tue 12.10.10		BANK[5%]
12	3-rd party agreements	30 days	Wed 01.09.10	Tue 12.10.10		BANK[5%]
13	**Basic Consultancy**	**20 days**	**Tue 07.09.10**	**Mon 04.10.10**	**6**	
14	Advanced Application Interface consultancy	20 days	Tue 07.09.10	Mon 04.10.10		[10%];OW-C[50%];BANK-DEV[50%]
15	IC Documents Interface consultancy	20 days	Tue 07.09.10	Mon 04.10.10		[10%];OW-C[50%];BANK-DEV[50%]
16	OpenWay ISO Dialects consultancy	20 days	Tue 07.09.10	Mon 04.10.10		[10%];OW-C[50%];BANK-DEV[50%]
17	**HW&SW Acquiring**	**90 days**	**Tue 07.09.10**	**Tue 25.01.11**	**6**	
18	Test HW&SW - Main part	40 days	Tue 07.09.10	Mon 01.11.10		BANK[5%]
19	Test HW&SW - Acquiring only	60 days	Tue 07.09.10	Tue 30.11.10		BANK[5%]
20	Production HW&SW - Main part	70 days	Tue 07.09.10	Tue 14.12.10		BANK[5%]
21	Production HW&SW - Acquiring only	90 days	Tue 07.09.10	Tue 25.01.11		BANK[5%]
22	**Platform Preparation: Test System**	**15 days**	**Tue 02.11.10**	**Tue 23.11.10**	**18**	
23	Infrastructural preparations	10 days	Tue 02.11.10	Tue 16.11.10		BANK;OW-T[25%]
24	Test system checklist filled	5 days	Wed 17.11.10	Tue 23.11.10	23	BANK[50%]
25	Test DB QeServer filled	5 days	Wed 17.11.10	Tue 23.11.10	23	BANK[50%]
26	**Platform Preparation: Production System**	**35 days**	**Wed 15.12.10**	**Tue 15.02.11**	**20**	
27	Infrastructural preparations	25 days	Wed 15.12.10	Tue 01.02.11		BANK;OW-T[30%]
28	Load Balancing preparations	10 days	Wed 02.02.11	Tue 15.02.11	27	BANK;OW-T[10%]
29	Production system checklist filled	5 days	Wed 02.02.11	Tue 08.02.11	27	BANK[50%]
30	Production DB QeServer filled	5 days	Wed 02.02.11	Tue 08.02.11	27	BANK[50%]
31	**Infrastructure preparation**	**10 days**	**Wed 24.11.10**	**Tue 07.12.10**	**22**	
32	ICC models selection	10 days	Wed 24.11.10	Tue 07.12.10		BANK[5%]
33	**System Build**	**191 days**	**Thu 02.09.10**	**Thu 16.06.11**	**3;5**	

ID	Task Name	Duration	Start	Finish	Predecessors	Resource Names
34	Resource allocation	15 days	Thu 02.09.10	Wed 22.09.10		OW-PM[5%]
35	**Issuing: basic & interfaces package (Build v1)**	**35 days**	**Thu 23.09.10**	**Thu 11.11.10**	**34;6**	
36	SPb Development Infrastructure creation	3 days	Thu 23.09.10	Mon 27.09.10		OW-T
37	SPb QA Infrastructure creation	2 days	Tue 28.09.10	Wed 29.09.10	36	OW-T
38	Standard System Installation	2 days	Thu 30.09.10	Fri 01.10.10	37	OW-T
39	Basic Back-Office Setup	7 days	Mon 04.10.10	Tue 12.10.10	38	OW-T
40	Customer support screen customization	5 days	Wed 13.10.10	Tue 19.10.10	39	OW-T
41	Advanced Applications Interfaces configuration	3 days	Wed 20.10.10	Fri 22.10.10	40	OW-T
42	IC Documents Interfaces configuration	3 days	Mon 25.10.10	Wed 27.10.10	41	OW-T
43	Basic Debit Product configuration (testing purposes only)	5 days	Thu 28.10.10	Wed 03.11.10	42	OW-T
44	Card Production Setup	5 days	Sun 07.11.10	Thu 11.11.10	43	OW-T
45	**Issuing: advanced package (Build v2)**	**63 days**	**Fri 12.11.10**	**Tue 22.02.11**	**35**	
46	Credit Product Configuration	15 days	Fri 12.11.10	Thu 02.12.10		OW-T
47	Loyalty Configuration	10 days	Fri 03.12.10	Thu 16.12.10	46	OW-T
48	Gift Product Configuration	5 days	Fri 17.12.10	Thu 30.12.10	47	OW-T
49	Virtual Cards setup	5 days	Fri 17.12.10	Thu 30.12.10	47	OW-T
50	Insurance Product Configuration	5 days	Fri 17.12.10	Thu 30.12.10	47	OW-T
51	Tariffs Configuration	5 days	Fri 31.12.10	Thu 13.01.11	50;46;47;48;49	OW-T
52	GL Configuration	3 days	Fri 14.01.11	Tue 18.01.11	51	OW-T
53	BASE24 H2H Interface Development	10 days	Fri 12.11.10	Thu 25.11.10		OW-T
54	Risk Management setup	10 days	Wed 19.01.11	Tue 01.02.11	52	OW-T
55	SMS Notifications setup	10 days	Wed 02.02.11	Tue 15.02.11	54	OW-T
56	Basic (non-dispute) letters support	15 days	Fri 12.11.10	Thu 02.12.10		OW-T
57	PROFITS accounts on cards	5 days	Wed 16.02.11	Tue 22.02.11	55;53	OW-T
58	**Issuing: delivery finalization (Build - add deliveries)**	**28 days**	**Wed 23.02.11**	**Mon 04.04.11**	**45**	
59	Remote Access module	3 days	Wed 23.02.11	Fri 25.02.11		OW-T
60	Customized Issuing reporting	10 days	Mon 28.02.11	Mon 14.03.11	59	OW-T
61	Job Scheduler configuration	10 days	Tue 15.03.11	Mon 28.03.11	60	OW-T
62	Dispute Assistant setup	5 days	Tue 29.03.11	Mon 04.04.11	61	OW-T
63	DWH Interface development	20 days	Wed 23.02.11	Wed 23.03.11		OW-T
64	**Acquiring: basic package (Build - v1 - acq)**	**30 days**	**Tue 05.04.11**	**Wed 18.05.11**	**58**	
65	Basic acquiring settings	10 days	Tue 05.04.11	Mon 18.04.11		OW-T
66	ATM Configuration Development	20 days	Tue 05.04.11	Tue 03.05.11		OW-T

ID	Task Name	Duration	Start	Finish	Predecessors	Resource Names
67	ATM Interface configuration	5 days	Wed 04.05.11	Wed 11.05.11	66;65	OW-T
68	POS Interface configuration	5 days	Tue 19.04.11	Mon 25.04.11	65	OW-T
69	WAY4 MPI Interface configuration	10 days	Tue 26.04.11	Wed 11.05.11	68	OW-T
70	PROFITS accounts on devices	5 days	Thu 12.05.11	Wed 18.05.11	69	OW-T
71	**Acquiring: advanced package (Build - v2 - acq)**	**20 days**	**Thu 19.05.11**	**Thu 16.06.11**	**64**	
72	Billing Gateway configuration	5 days	Thu 19.05.11	Wed 25.05.11		OW-T
73	Customized acquiring reporting	10 days	Thu 26.05.11	Wed 08.06.11	72	OW-T
74	ATM Alerting	5 days	Thu 19.05.11	Wed 25.05.11		OW-T
75	Merchant Products configuration	10 days	Thu 26.05.11	Wed 08.06.11	74	OW-T
76	Interchange Fee Prediction	5 days	Thu 09.06.11	Thu 16.06.11	75	OW-T
77	**Test System Installation & Delivery**	**135 days**	**Wed 24.11.10**	**Mon 20.06.11**	**22;35**	
78	Installation day-by-day plan agreed	5 days	Wed 24.11.10	Tue 30.11.10		BANK;OW-PM
79	Installation script development	2 days	Wed 01.12.10	Thu 02.12.10	78	OW-T
80	**System installation - off-site**	**7 days**	**Fri 03.12.10**	**Mon 13.12.10**	**79**	
81	DB instance creation	2 days	Fri 03.12.10	Mon 06.12.10		BANK;OW-C[50%]
82	WAY4 Default settings installation	2 days	Tue 07.12.10	Wed 08.12.10	81	BANK;OW-C[50%]
83	NS Packages installation	1 day	Thu 09.12.10	Thu 09.12.10	82	BANK;OW-C[50%]
84	Billing Gateway installation	1 day	Fri 10.12.10	Fri 10.12.10	83	BANK;OW-C[50%]
85	WAY4 Application Server installation	1 day	Mon 13.12.10	Mon 13.12.10	84	BANK;OW-C[50%]
86	**System installation - on-site**	**5 days**	**Tue 14.12.10**	**Mon 27.12.10**	**80**	
87	Configuration import	1 day	Tue 14.12.10	Tue 14.12.10		OW-C;BANK
88	SOA Application Installation	2 days	Wed 15.12.10	Thu 16.12.10	87	OW-C;BANK
89	Mobile Banking Application installation	1 day	Fri 17.12.10	Fri 17.12.10	88	OW-C;BANK
90	Interfaces links provided	1 day	Mon 27.12.10	Mon 27.12.10	89	OW-C;BANK
91	**System installation - on-site, acquiring modules**	**6 days**	**Thu 19.05.11**	**Thu 26.05.11**	**64;19;86**	
92	Test ATM Connection	2 days	Thu 19.05.11	Fri 20.05.11		OW-C;BANK
93	Test POS Connection	2 days	Mon 23.05.11	Tue 24.05.11	92	OW-C;BANK
94	Test E-Commerce GW Connection	2 days	Wed 25.05.11	Thu 26.05.11	93	OW-C;BANK
95	Delivery & TOI - basic issuing	3 days	Tue 28.12.10	Thu 30.12.10	86;35	OW-C;BANK
96	Delivery & TOI - advanced issuing	2 days	Wed 23.02.11	Thu 24.02.11	86;45	OW-C;BANK
97	Delivery & TOI - issuing, finalization	2 days	Tue 05.04.11	Wed 06.04.11	86;58	OW-C;BANK
98	Delivery & TOI - basic acquiring	3 days	Fri 27.05.11	Tue 31.05.11	91;64	OW-C;BANK
99	Delivery & TOI - advanced acquiring	2 days	Fri 17.06.11	Mon 20.06.11	91;71	OW-C;BANK

ID	Task Name	Duration	Start	Finish	Predecessors	Resource Names
100	**Production System Installation**	54 days	Tue 05.04.11	Wed 22.06.11	26;31;58	
101	Installation day-by-day plan agreed	5 days	Tue 05.04.11	Mon 11.04.11		BANK;OW-PM
102	Installation script development	15 days	Tue 12.04.11	Tue 03.05.11	101	OW-T[50%]
103	System installation - off-site	7 days	Wed 04.05.11	Fri 13.05.11	102	
104	DB instance creation	2 days	Wed 04.05.11	Thu 05.05.11		BANK;OW-C[50%]
105	WAY4 Default settings installation	2 days	Fri 06.05.11	Tue 10.05.11	104	BANK;OW-C[50%]
106	NS Packages installation	1 day	Wed 11.05.11	Wed 11.05.11	105	BANK;OW-C[50%]
107	Billing Gateway installation	1 day	Thu 12.05.11	Thu 12.05.11	106	BANK;OW-C[50%]
108	WAY4 Application Server installation	1 day	Fri 13.05.11	Fri 13.05.11	107	BANK;OW-C[50%]
109	System installation - on-site	5 days	Mon 16.05.11	Fri 20.05.11	103	
110	Configuration import	1 day	Mon 16.05.11	Mon 16.05.11		OW-C;BANK
111	SOA Application Installation	2 days	Tue 17.05.11	Wed 18.05.11	110	OW-C;BANK
112	Mobile Banking Application installation	1 day	Thu 19.05.11	Thu 19.05.11	111	OW-C;BANK
113	Interfaces links provided	1 day	Fri 20.05.11	Fri 20.05.11	112	OW-C;BANK
114	System installation - on-site, acquiring modules	4 days	Fri 17.06.11	Wed 22.06.11	71;21;109	
115	PMS Installation	2 days	Fri 17.06.11	Mon 20.06.11		OW-C;BANK
116	Configuration upgrade	2 days	Tue 21.06.11	Wed 22.06.11	115	OW-C;BANK
117	Milestone: installation finished	0 days	Wed 22.06.11	Wed 22.06.11	109;114	BANK;OW-PM
118	Milestone: payment, 25%	0 days	Wed 22.06.11	Wed 22.06.11	117	
119	**OpenWay formats support (includes TOI)**	70 days	Wed 13.10.10	Wed 02.02.11	6;12	
120	**Interfaces - XML**	70 days	Wed 13.10.10	Wed 02.02.11		
121	**Advanced Applications**	70 days	Wed 13.10.10	Wed 02.02.11	14	
122	PROFITS	70 days	Wed 13.10.10	Wed 02.02.11		BANK-DEV[30%];OW-C[10%]
123	APS	60 days	Wed 13.10.10	Wed 19.01.11		BANK-DEV[30%];OW-C[10%]
124	IXARIS	60 days	Wed 13.10.10	Wed 19.01.11		BANK-DEV[30%];OW-C[10%]
125	**IC Documents**	55 days	Wed 13.10.10	Wed 12.01.11	15	
126	Web-Banking (Online)	55 days	Wed 13.10.10	Wed 12.01.11		BANK-DEV[30%];OW-C[10%]
127	PROFITS (Online)	55 days	Wed 13.10.10	Wed 12.01.11		BANK-DEV[30%];OW-C[10%]
128	Batch (other systems)	55 days	Wed 13.10.10	Wed 12.01.11		BANK-DEV[30%];OW-C[10%]
129	H2H Clearing	55 days	Wed 13.10.10	Wed 12.01.11		BANK-DEV[30%];OW-C[10%]
130	WAY4 MPI	55 days	Wed 13.10.10	Wed 12.01.11		BANK-DEV[30%];OW-C[10%]
131	**Interfaces - ISO**	50 days	Wed 13.10.10	Wed 29.12.10	16	
132	OW POS ISO - BOVAccept	50 days	Wed 13.10.10	Wed 29.12.10		BANK-DEV[30%];OW-C[10%]

ID	Task Name	Duration	Start	Finish	Predecessors	Resource Names
133	**W4H2H**	45 days	Wed 13.10.10	Wed 15.12.10		
134	HSBC	45 days	Wed 13.10.10	Wed 15.12.10		BANK-DEV[30%];OW-C[10%]
135	PROFITS	45 days	Wed 13.10.10	Wed 15.12.10		BANK-DEV[30%];OW-C[10%]
136	IPS	45 days	Wed 13.10.10	Wed 15.12.10		BANK-DEV[30%];OW-C[10%]
137	**Intefaces - Plain Files**	15 days	Thu 16.12.10	Wed 19.01.11		
138	BaseII-like clearing	15 days	Thu 16.12.10	Wed 19.01.11	134	BANK-DEV[30%];OW-C[10%]
139	Milestone: issuing interfaces supported	0 days	Wed 02.02.11	Wed 02.02.11	121;125;133;13	BANK;OW-PM
140	Milestone: acquiring interfaces supported	0 days	Wed 02.02.11	Wed 02.02.11	120;131;137	BANK;OW-PM
141	**Interfaces TOI & Generic Tests**	55 days	Thu 03.02.11	Thu 21.04.11	119;86	
142	Origination	15 days	Thu 03.02.11	Wed 23.02.11		[50%];OW-C[50%];BANK-DEV[50%]
143	Issuing authorization workflows	10 days	Thu 24.02.11	Thu 10.03.11	142	[50%];OW-C[50%];BANK-DEV[50%]
144	Issuing financial workflows	10 days	Fri 11.03.11	Thu 24.03.11	143	[50%];OW-C[50%];BANK-DEV[50%]
145	Acquiring authorization workflows	10 days	Fri 25.03.11	Thu 07.04.11	144	[50%];OW-C[50%];BANK-DEV[50%]
146	Acquiring financial workflows	10 days	Fri 08.04.11	Thu 21.04.11	145	[50%];OW-C[50%];BANK-DEV[50%]
147	**Modules TOI & Generic Tests**	144 days	Tue 28.12.10	Thu 28.07.11	86	
148	**Pre-requisites**	25 days	Tue 28.12.10	Mon 07.02.11		
149	Visa IPK generated and Signed	10 days	Tue 28.12.10	Mon 17.01.11	86	BANK[25%]
150	VPA Profile ready	25 days	Tue 28.12.10	Mon 07.02.11	32	BANK[15%]
151	**Basic Modules**	30 days	Tue 08.02.11	Tue 22.03.11	148	
152	WAY4 Core	10 days	Tue 08.02.11	Mon 21.02.11		BANK;OW-C[30%]
153	Forms Development	5 days	Tue 08.02.11	Mon 14.02.11		BANK;OW-C[30%]
154	Localization Package	5 days	Tue 22.02.11	Mon 28.02.11	152;153	BANK;OW-C[30%]
155	Job Scheduler	10 days	Tue 22.02.11	Mon 07.03.11	152	BANK;OW-C[30%]
156	DWH Interface	10 days	Tue 01.03.11	Tue 15.03.11	152;153;154	BANK;OW-C[30%]
157	Remote Access	15 days	Tue 01.03.11	Tue 22.03.11	152;153;154	BANK;OW-C[30%]
158	**Issuing Modules**	40 days	Wed 23.03.11	Thu 19.05.11	151	
159	Card Production	20 days	Wed 23.03.11	Tue 19.04.11		BANK;OW-C[30%]
160	Credit Products	10 days	Wed 23.03.11	Tue 05.04.11		BANK;OW-C[30%]
161	Tariffs	15 days	Wed 06.04.11	Tue 26.04.11	160	BANK;OW-C[30%]
162	SMS Notiff	5 days	Wed 27.04.11	Wed 04.05.11	160;161	BANK;OW-C[30%]
163	Issuing exports	10 days	Thu 05.05.11	Thu 19.05.11	159;160;161;16	BANK;OW-C[30%]
164	**Main Approaches**	13 days	Fri 20.05.11	Tue 07.06.11	158	
165	Fast Track Upgrades	3 days	Fri 20.05.11	Tue 24.05.11		BANK;OW-C[30%]

ID	Task Name	Duration	Start	Finish	Predecessors	Resource Names
166	LMK Migration	5 days	Wed 25.05.11	Tue 31.05.11	165	BANK;OW-C[30%]
167	Configurations Migration	3 days	Wed 01.06.11	Fri 03.06.11	166	BANK;OW-C[30%]
168	Load Balancing	10 days	Fri 20.05.11	Thu 02.06.11		BANK;OW-C[30%]
169	Problems resolution	2 days	Mon 06.06.11	Tue 07.06.11	165;166;167;16	BANK;OW-C[30%]
170	**Acquiring Modules**	**50 days**	**Thu 19.05.11**	**Thu 28.07.11**	**151;64**	
171	Basic Acquiring	10 days	Thu 19.05.11	Wed 01.06.11		BANK;OW-C[30%]
172	Acquiring Products	10 days	Thu 02.06.11	Thu 16.06.11	171	BANK;OW-C[30%]
173	ATM Configuration Development TOI	15 days	Fri 17.06.11	Thu 07.07.11	172	BANK;OW-C[30%]
174	Billing Gateway	5 days	Fri 08.07.11	Thu 14.07.11	173	BANK;OW-C[30%]
175	3-D Secure	5 days	Fri 17.06.11	Thu 23.06.11	172	BANK;OW-C[30%]
176	ATM Alerting	5 days	Fri 24.06.11	Thu 30.06.11	175	BANK;OW-C[30%]
177	Acquiring exports	10 days	Fri 15.07.11	Thu 28.07.11	171;172;173;17	BANK;OW-C[30%]
178	**Training**	**66 days**	**Mon 23.05.11**	**Tue 23.08.11**	**3;5**	
179	Key users training - 1	5 days	Mon 23.05.11	Fri 27.05.11	109	BANK[500%];OW-A
180	Key users training - 2	5 days	Mon 30.05.11	Fri 03.06.11	109;179	BANK[500%];OW-A
181	Experts training - 1	5 days	Fri 29.07.11	Wed 10.08.11	147;180	BANK[500%];OW-A
182	Experts training -2	5 days	Thu 11.08.11	Tue 23.08.11	147;181	BANK[500%];OW-A
183	**Additional Deliveries**	**128 days**	**Tue 21.06.11**	**Fri 16.12.11**	**6**	
184	Additional Consultancy & Enhancements	100 days	Tue 21.06.11	Tue 08.11.11	77	OW-C[50%]
185	**Enhancments**	**100 days**	**Thu 28.07.11**	**Fri 16.12.11**	**147**	
186	Requirements gathered	0 days	Thu 28.07.11	Thu 28.07.11		BANK
187	Deliveries provided	100 days	Fri 29.07.11	Fri 16.12.11		OW-T[50%]
188	**UAT**	**248 days**	**Tue 07.09.10**	**Thu 08.09.11**		
189	UAT Exaple Submission	45 days	Tue 07.09.10	Tue 09.11.10	6	OW-C[15%]
190	UAT Plan Preparation	45 days	Wed 10.11.10	Tue 25.01.11	189	BANK[15%]
191	**Issuing modules acceptance**	**30 days**	**Wed 08.06.11**	**Wed 20.07.11**	**151;158;164;58**	
192	Back-Office Basics UAT	10 days	Wed 08.06.11	Wed 22.06.11		BANK;OW-C;OW-PM[50%]
193	Interfaces UAT	10 days	Thu 23.06.11	Wed 06.07.11	192	BANK;OW-C;OW-PM[50%]
194	Card Production UAT	10 days	Thu 07.07.11	Wed 20.07.11	193	BANK;OW-C;OW-PM[50%]
195	**Acquiring modules acceptance**	**30 days**	**Fri 29.07.11**	**Thu 08.09.11**	**170;71;114;191**	
196	Back-Office Basics UAT	10 days	Fri 29.07.11	Thu 11.08.11		BANK;OW-C;OW-PM[50%]
197	Interfaces UAT	10 days	Fri 12.08.11	Thu 25.08.11	196	BANK;OW-C;OW-PM[50%]
198	Device Operations UAT	10 days	Fri 26.08.11	Thu 08.09.11	197	BANK;OW-C;OW-PM[50%]

ID	Task Name	Duration	Start	Finish	Predecessors	Resource Names
199	Milestone: UAT Passed	0 days	Thu 08.09.11	Thu 08.09.11	191;195	BANK;OW-PM
200	Milestone: Payment 35%	0 days	Thu 08.09.11	Thu 08.09.11	199	
201	**Internal Certifications**	**30 days**	**Thu 30.12.10**	**Wed 16.02.11**	**3;5**	
202	OW POS ISO Support by BOVAccept & Certification	30 days	Thu 30.12.10	Wed 16.02.11	132	BANK[30%];OW-CERT[30%]
203	**IPS Certifications**	**135 days**	**Fri 20.05.11**	**Mon 28.11.11**		
204	**VISA Issuing EMV Certification**	**70 days**	**Fri 20.05.11**	**Fri 26.08.11**	**158;8**	
205	Certification plans agreed with visa	5 days	Fri 20.05.11	Thu 26.05.11		BANK[10%]
206	Cards to be sent to visa	15 days	Fri 27.05.11	Fri 17.06.11	205	BANK[25%]
207	Card tests	30 days	Mon 20.06.11	Fri 29.07.11	206	VISA
208	Online certification preparation	8 days	Mon 01.08.11	Wed 10.08.11	207	BANK[20%];OW-C[20%]
209	Online certification	2 days	Thu 11.08.11	Fri 12.08.11	208	BANK;OW-C
210	Offline certification	10 days	Mon 15.08.11	Fri 26.08.11	209	BANK[20%];OW-C[20%]
211	**MC Issuing MagStripe Certification**	**82 days**	**Fri 20.05.11**	**Tue 13.09.11**	**158;9**	
212	Certification plans agreed with mc	5 days	Fri 20.05.11	Thu 26.05.11		BANK[10%]
213	Cards to be sent to mc	15 days	Fri 27.05.11	Fri 17.06.11	212	BANK[15%]
214	Card tests	30 days	Mon 20.06.11	Fri 29.07.11	213	MC
215	Pre-certification	30 days	Fri 27.05.11	Fri 08.07.11	212	BANK[30%];OW-T[30%]
216	Online certification preparation	8 days	Mon 11.07.11	Wed 20.07.11	215	BANK[20%];OW-C[20%]
217	Online certification	2 days	Mon 29.08.11	Tue 30.08.11	214;216;204	BANK;OW-C
218	Offline certification	10 days	Wed 31.08.11	Tue 13.09.11	217	BANK[20%];OW-C[20%]
219	**VISA Acq EMV Certification**	**50 days**	**Fri 29.07.11**	**Thu 06.10.11**	**170;8**	
220	Certification plans agreed with visa	5 days	Fri 29.07.11	Thu 04.08.11		BANK[10%]
221	ADVT Performed	25 days	Fri 05.08.11	Thu 08.09.11	220	BANK[25%];VISA
222	Online certification preparation	8 days	Fri 09.09.11	Tue 20.09.11	221	BANK[20%];OW-C[20%]
223	Online certification	2 days	Wed 21.09.11	Thu 22.09.11	222	BANK;OW-C
224	Offline certification	10 days	Fri 23.09.11	Thu 06.10.11	223	BANK[20%];OW-C[20%]
225	**MC Acq EMV Certification**	**62 days**	**Fri 29.07.11**	**Mon 24.10.11**	**170;9**	
226	Certification plans agreed with mc	5 days	Fri 29.07.11	Thu 04.08.11		BANK[10%]
227	ADVT Performed	25 days	Fri 05.08.11	Thu 08.09.11	226	BANK[25%];MC
228	Pre-certification	30 days	Fri 05.08.11	Thu 15.09.11	226	BANK[30%];OW-T[30%]
229	Online certification preparation	8 days	Fri 16.09.11	Tue 27.09.11	228	BANK[20%];OW-C[20%]
230	Online certification	2 days	Fri 07.10.11	Mon 10.10.11	227;229;219	BANK;OW-C
231	Offline certification	10 days	Tue 11.10.11	Mon 24.10.11	230	BANK[20%];OW-C[20%]

ID	Task Name	Duration	Start	Finish	Predecessors	Resource Names
232	**AMEX ACq EMV Certification**	**74 days**	**Fri 29.07.11**	**Thu 10.11.11**	**170;10**	
233	Certification plans agreed with anex	5 days	Fri 29.07.11	Thu 04.08.11		BANK[10%]
234	Online certification preparation	8 days	Fri 05.08.11	Tue 16.08.11	233	BANK[20%];OW-C[20%]
235	Online certification	2 days	Tue 25.10.11	Wed 26.10.11	234;225	BANK;OW-C
236	Offline certification	10 days	Thu 27.10.11	Thu 10.11.11	235	BANK[20%];OW-C[20%]
237	**JCB Acq MagStripe Certifications**	**86 days**	**Fri 29.07.11**	**Mon 28.11.11**	**170;11**	
238	Certification plans agreed with jcb	5 days	Fri 29.07.11	Thu 04.08.11		BANK[10%]
239	Online certification preparation	8 days	Fri 05.08.11	Tue 16.08.11	238	BANK[20%];OW-C[20%]
240	Online certification	2 days	Fri 11.11.11	Mon 14.11.11	239;232	BANK;OW-C
241	Offline certification	10 days	Tue 15.11.11	Mon 28.11.11	240	BANK[20%];OW-C[20%]
242	**Verified by Visa Acq Certification**	**25 days**	**Fri 29.07.11**	**Thu 01.09.11**	**170;8**	
243	Certification plans agreed with visa	5 days	Fri 29.07.11	Thu 04.08.11		BANK[10%]
244	Online certification preparation	8 days	Fri 05.08.11	Tue 16.08.11	243	BANK[20%];OW-C[20%]
245	Online certification	2 days	Wed 17.08.11	Thu 18.08.11	244	BANK;OW-C
246	Offline certification	10 days	Fri 19.08.11	Thu 01.09.11	245	BANK[20%];OW-C[20%]
247	**MC SecureCode Acq Certification**	**37 days**	**Fri 29.07.11**	**Mon 19.09.11**	**170;9**	
248	Certification plans agreed with mc	5 days	Fri 29.07.11	Thu 04.08.11		BANK[10%]
249	Online certification preparation	8 days	Fri 05.08.11	Tue 16.08.11	248	BANK[20%];OW-C[20%]
250	Online certification	2 days	Fri 02.09.11	Mon 05.09.11	249;242	BANK;OW-C
251	Offline certification	10 days	Tue 06.09.11	Mon 19.09.11	250	BANK[20%];OW-C[20%]
252	Milestone: all issuing certified	0 days	Tue 13.09.11	Tue 13.09.11	204;211	BANK;OW-PM
253	Milestone: all acquiring certified	0 days	Mon 28.11.11	Mon 28.11.11	219;225;232;23	BANK;OW-PM
254	**Issuing Migration**	**303 days**	**Tue 07.09.10**	**Fri 25.11.11**	**6**	
255	Migration procedures development	40 days	Tue 07.09.10	Mon 01.11.10		ANK[10%];OW-PM[5%];OW-C[10%]
256	Verification procedures development	10 days	Tue 02.11.10	Tue 16.11.10	255	ANK[10%];OW-PM[5%];OW-C[10%]
257	Risk measurment approch and decision making agreed	10 days	Wed 17.11.10	Tue 30.11.10	256	ANK[10%];OW-PM[5%];OW-C[10%]
258	IPS Release Migration	2 days	Mon 17.10.11	Tue 18.10.11		BANK
259	**Test migrations**	**20 days**	**Wed 19.10.11**	**Wed 16.11.11**	**158;258**	
260	Remote Test migration	20 days	Wed 19.10.11	Wed 16.11.11		BANK[50%];OW-C[50%]
261	On-site test migration	5 days	Wed 19.10.11	Tue 25.10.11		BANK;OW-C
262	**Production migration**	**27 days**	**Wed 19.10.11**	**Fri 25.11.11**	**191;252;258**	
263	First BIN	4 days	Wed 19.10.11	Mon 24.10.11		BANK;OW-C;OW-PM
264	BIN-by-BIN	20 days	Tue 25.10.11	Tue 22.11.11	263	BANK;OW-C[50%]

ID	Task Name	Duration	Start	Finish	Predecessors	Resource Names
265	Debit cards	3 days	Wed 23.11.11	Fri 25.11.11	264	BANK;OW-C
266	**Acquiring Migration**	**307 days**	**Wed 01.12.10**	**Fri 09.03.12**	**6**	
267	Migration procedures development	40 days	Wed 01.12.10	Tue 08.02.11	257	ANK[10%];OW-PM[5%];OW-C[10%]
268	Test migrations	20 days	Fri 29.07.11	Thu 01.09.11	170;267	BANK[50%];OW-C[50%]
269	**Production migration**	**63 days**	**Tue 29.11.11**	**Fri 09.03.12**	**195;268;253**	
270	ATM Migration	30 days	Tue 29.11.11	Mon 23.01.12		BANK;OW-C[30%]
271	POS Migration	3 days	Tue 24.01.12	Thu 26.01.12	270	BANK;OW-C
272	E-Commerce Migration	30 days	Fri 27.01.12	Fri 09.03.12	271	BANK;OW-C[30%]
273	Go Live	1 day	Mon 12.03.12	Mon 12.03.12	254;266	BANK;OW-C;OW-PM
274	Post Migration	40 days	Tue 13.03.12	Tue 08.05.12	273	OW-C;OW-PM[25%];BANK
275	Milestone: 10% payment	0 days	Tue 08.05.12	Tue 08.05.12	274	