

# Server Migration: Economic Efficiency Assessment

**Red Hat® Enterprise Linux  
(RHEL AP) vs. Microsoft®  
Windows Server 2008 R2 –**

## Enterprise Case Study

For many companies with a heterogeneous infrastructure, the decision to initiate migration for their data centre is an important theme. This study introduces a concept implemented worldwide to reliably assess up front the economic efficiency of future-planned IT investments.

The company providing the basis for this case study is internationally active and has recently been faced with the decision of whether or not to replace their existing, but soon expiring, Microsoft®<sup>1</sup> Windows Server 2003. Alternatives to the existing system are available in a migration to the **Red Hat<sup>®1</sup> Linux Enterprise Server** or in a continuity solution provided through migration to the Microsoft Windows Server 2008 R2.

The final decision regarding the solution has been based on an independent business case conducted according to the WiBe 4.1 Standard Economic Efficiency Assessment System. The WiBe® Framework, first recognised in 1992 by the Ministry of the Interior of the Federal Republic of Germany, is now, in its open Standard Version 4.1 (2007), referenced by the EU and acknowledged worldwide.

## 1. The Company

The company examined in this study is situated in Germany, with over 100 subsidiary offices, international affiliation and more than 40,000 IT users.

In the company's data processing centre, the Microsoft® Windows Server 2003 functions as the infrastructure platform. The group's (Microsoft) contract<sup>2</sup> expires in 2010; a relicensing is to be explored. The new solution needs to reduce IT costs, raise efficiency and, through virtualisation, take into account the consolidation of hard and software.

**The IT decision makers were required to examine the migration between the Microsoft Windows server und Red Hat Enterprise Linux in the data processing centre in terms of economic efficiency before a decision regarding the future platform choice could be made.**

1. The **Company**
2. The **Current Situation**
3. The **Results Overview**
4. Monetary **Costs** and **Benefits**
5. **Strategic Importance**

Attachment 1: **Details** of the Economic Efficiency Calculation

Attachment 2: Chosen

**Products and Solutions**

Attachment 3: The **WiBe Framework**

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<sup>2</sup> Microsoft® EA Enterprise Agreement

## 2. The Current Situation

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Note: the following study has been exclusively concerned with workloads within the Data Processing Centre. For end users, rollout is intended with Microsoft® Windows 7.

### The Current Configuration

- **40,000 users**, 25% of them with Thin Clients and 75% with Fat Clients and/or mobile devices.
- The Microsoft® Terminal Server Farm encompasses 300 Microsoft® Windows 2003 Servers.
- 200 Microsoft® Exchange Servers are utilised as a mail and communications platform.
- Identity & Access/Directory Services, Network und Security are covered through 250 Microsoft® Windows 2003 servers.
- 300 Microsoft® Windows 2003 servers are implemented for **File & Print**.
- 50 servers are in place for System Management; **IBM®<sup>3</sup> Tivoli** is the current choice.
- A further 200 Microsoft® Windows 2003 servers are utilised as database/application and web servers.
- The company utilises **Java/JBoss®<sup>4</sup> based applications** on the Microsoft® Windows 2003 server. Client-specific applications are handled with **Oracle®<sup>5</sup> Database solutions**.

### Planning Variant: Replacing Linux Migration

The company is considering replacing their current Microsoft solution with a Linux Server in the Application Server and Systems Management sectors. The Microsoft Active Directory Service and the Microsoft Exchange mail platform are, on the other hand, well anchored. Due to the dual operation necessary, as well as the high complexity of the migration, the required paths possible for this migration have proven to be uneconomic.

Here the fundamental aspects pertaining to the Linux replacing migration alternative:

- Migration of 200 productive, highly available database / application / web servers to a RHEL AP Red Hat Enterprise Linux Advanced Platform.
- Migration of 50 System Management Servers to a RHN Red Hat Network/ Red Hat Satellite Server / RHEL Red Hat Enterprise Linux.
- The retention of 250 Microsoft Active Directory Servers, 200 Microsoft Exchange Servers as well as 300 File & Print Servers; these servers will migrate from the Microsoft Windows 2003 Server operating system to the Microsoft Windows 2008 R2 Server operating system. The Microsoft Exchange Servers and File & Print Servers are to be virtualised on the Microsoft Hyper-V Server 2008 R2.
- The Red Hat Enterprise Linux Server can be integrated into the existing Active Directory.
- The existing Oracle databases will continue to be utilised.

### Continuing Variant (continuing migration to Microsoft)

In lieu of replacing migration, the company can also complete migration of the Windows Server 2003 to the **Windows Server 2008 R2** under these aspects:

- Migration of 200 productive, highly available database / application / web servers to Windows Server 2008 R2.

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<sup>3</sup> JBoss® is a registered trademark of Red Hat Inc

<sup>4</sup> IBM® is a registered trademark of IBM Corp

<sup>5</sup> Oracle® is a registered trademark of Oracle Corp.

- 250 Active Directory Servers, a further 200 Exchange Servers as well as 300 File & Print Servers will be retained; these Servers will migrate from Windows Server 2003 to Windows Server 2008 R2 operating system. The Microsoft Exchange Servers and File & Print Servers will be virtualised via the Microsoft Hyper-V Server 2008 R2.
- The existing Oracle databases will continue to be utilised

The following Microsoft System Center components will be applied:

- Microsoft System Center Configuration Manager SCCM
- Microsoft System Center Virtual Machine Manager (SCVMM) for the central administration of the virtualised infrastructure
- Microsoft System Center Operations Manager (SCOM)
- Microsoft System Center Data Protection Manager (DPM)

#### **Benchmark Data of the WiBe Economic Efficiency Assessment**

This assessment of economic efficiency is based on the WiBe® Framework<sup>6</sup>, according to the parameters established by the WiBe 4.1 functional concept and its standardised catalogue of criteria for migration projects.

Preliminary to the monetary assessment, all relevant cost and benefit data are captured in Dollar (USD), this achieved through the Net Present Value Method (NPV). Here, existing costs and benefits are converted into the net present value. This procedure is recognised worldwide as standard for the calculation of the economic efficiency of projects. The WiBe Framework further differentiates between costs and benefits occurring due to the project examined (so-called financially or liquidity relevant costs and benefits) and those costs and benefits which, regardless of the project at hand, have already been included in the budget (non- liquidity relevant costs and benefits).

**Aside from the monetary costs and benefits (net present value), the WiBe Framework provides indicators revealing the urgency and strategic quality, and, optionally, the external effects of the project, thus supplementing the monetary qualification. These qualitative indicators are portrayed in Benefit Value Analyses. With migration projects, a separate illustration of external effects and, often, the urgency (of the project) is not called for in actual practice. (See WiBe Framework, p. 23).**

The Economic Efficiency Assessment (dated May 2010) is based on the following benchmark data:

Base Year (beginning year of calculation)	2010
Observation Period	5 years, 2010 to 2014
Interest Rate for Net Present Value Method	11.5 % The rate of interest for discounting is in accordance with the company's guidelines for Business Case Calculation or, respectively, WiBe at the time of the study (May 2010).
Catalogue of Criteria	Catalogue of Criteria "Migration Projects" Business Edition 2010 for WiBe 4.1
Calculated WiBe Modules	WiBe KN, WiBe Q

<sup>5</sup> Recommendations on Economic Efficiency Assessments, in Particular with Regard to the use of IT Information Technology. Version 4.1 – 2007, Volume 92 of the KBSt in the German Federal Ministry of the Interior Berlin. In the "Compendium to the Measurement Framework" (see eGovernment Unit DG Information Society and Media European Commission 2006), the WiBe Framework is described in detail as the comprehensive approach to economic efficiency studies regarding IT projects within the European Union. Current research projects (compare to: Network "eGovernment Monitor Network" 2010) indicate the WiBe Framework as one of the first "measurement frameworks implemented in Europe".

### 3. The Results Overview

The results of the monetary calculation are concisely represented in the **Net Present Value WiBe KN**. These are supplemented through the qualitative evaluation **WiBe Q**:

Replacing Server Migration LINUX	
<b>Monetary Cost Effectiveness (Net Present Values WiBe KN)</b>	
Net Present Value (WiBe KN)	- \$ 2,307,537
Of this, liquidity relevant	- \$ 2,186,378
Of this, <u>not</u> liquidity relevant	- \$ 121,159
<b>Qualitative Strategic Index</b>	
WiBe Q	18

#### Interpretation of Results: Net Present Value WiBe KN<sup>7</sup>

The Migration Project “Linux Server” indicates, in direct comparison to the Microsoft variation, a **negative Net Present Value** in the amount of - \$ 2,307,537. Thus, replacing server migration, according to WiBe 4.1 assessment, is an **uneconomic alternative** for the company.

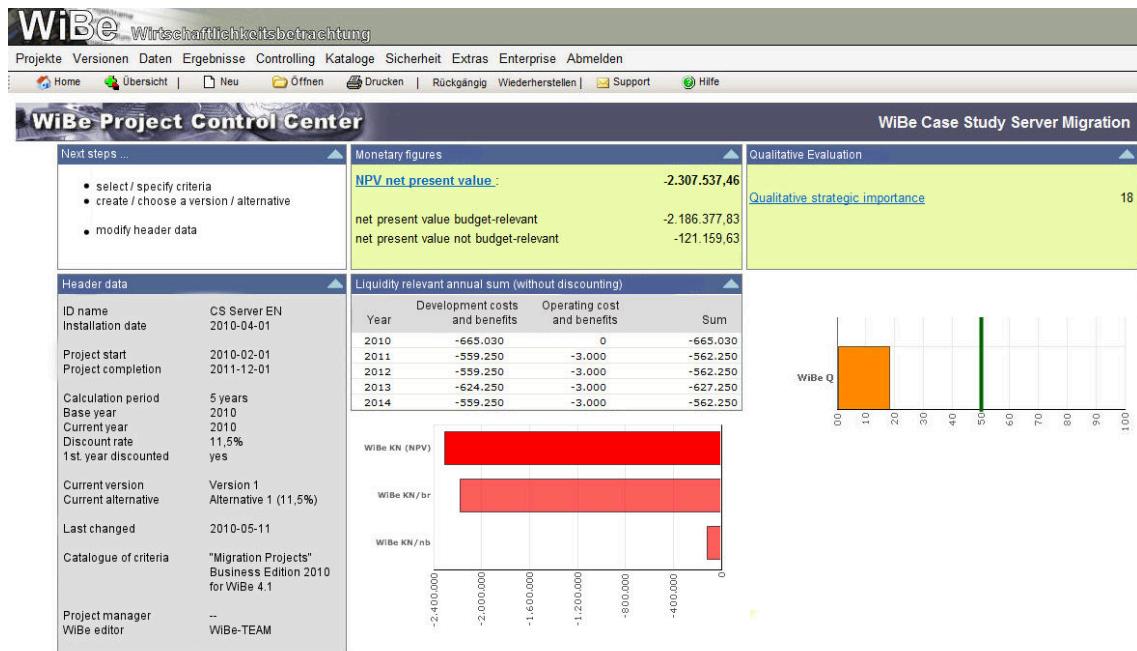
#### Interpretation of Results: Qualitative Strategic Index WiBe Q

- WiBe Q lies, with **18 points**, well under the **50 point mark**, which should be regarded as the minimum for strategically important projects.
- The criterion “**Relevance Within the IT Framework Concept**” has received a rating of **7 points out of a possible 10**. Such a rating does not support a recommendation for implementation of this IT measure, especially with regard to a negative net present value.

<sup>7</sup> The result is highly dependant on the rate of interest each company establishes according to its own controlling specifications. For this study, the basis calculation is factored at 11.5%. For comparative purposes: the Top German Federal agencies are calculating their projects in 2010 with an adequate target rate of 3.4% (the current parameter set by the German Federal Ministry of Finance, BMF). The capital value at this interest rate is a significant disadvantage for replacing migration, amounting here to - \$ 2,837,326.

The overall evaluation resulting from qualitative and monetary considerations indicates the IT Project "Server Migration to Linux" as uneconomic, in both the monetary sense and with regard to other, qualitative factors. The implementation of a migration to Linux is therefore not recommended. Alternatively, as the more economically feasible solution, continuity migration to the Microsoft Windows Server 2008 R2 should be implemented.

The monetary calculation has been converted into the net present value by means of the WiBe 2008 software. Supplemented by the qualitative strategic evaluation, the following overview has been provided (Date: May 2010):



## 4. Monetary Costs and Benefits

In the Economic Efficiency Assessment, the operating costs, as well as the project costs, have been calculated over a time span of five years, from 2010 to 2014. The overview of Costs and Benefits reveals the following picture<sup>8</sup>:

### Development Costs for Migration

All relevant (project) cost categories have been considered: the personnel costs for employees involved in the migration project, costs for external consulting, for hardware and software and their adaptation as well as the cost for implementing the system. The table consolidates the calculation for the **Linux Migration** (*all amounts are gross, without discounting*).

Red Hat Enterprise Linux AP	budget relevance	2010	2011	2012	2013	2014
<b>Planning and development costs</b>						
Personnel costs (own personnel)		103,350				
Costs of external consulting	●	33,000				
<b>System costs</b>						
Hardware costs	●	65,000			65,000	
Software costs	●	2,543,190	559,250	559,250	559,250	559,250
Modifying software and/or interfaces	○	14,900				
<b>Costs of system implementation</b>						
System and integration testing	○	44,700				
Installation, import of existing data	○	78,400				
Initial training for IT specialists	○	48,600				
<b>TOTAL</b>		<b>2,931,140</b>	<b>559,250</b>	<b>559,250</b>	<b>624,250</b>	<b>559,250</b>
<b>Planning and development costs</b>						

● = 100% budget relevant, ○ = partially budget relevant

The calculations for the **continuing Migration** to Microsoft Windows Server 2008 R2 have provided the following picture:

Microsoft Windows Server 2008 R2	budget relevance	2010	2011	2012	2013	2014
<b>Planning and development costs</b>						
Personnel costs (own personnel)		66,300				
Costs of external consulting	●	11,000				
<b>System costs</b>						
Hardware costs	●					
Software costs	●	2,077,660				
Modifying software and/or interfaces	○					
<b>Costs of system implementation</b>						
System and integration testing	○					
Installation, import of existing data	○					
Initial training for IT specialists	○					
<b>TOTAL</b>		<b>2,154,960</b>				
<b>Planning and development costs</b>						

● = 100% budget relevant, ○ = partially budget relevant

<sup>6</sup> The illustration follows the structure of the WiBe Migration Catalogue (see Attachment 1: Details of the Economic Efficiency Calculation, page 10 onward)

Comparison of the development costs of the two migration variations shows the following:

Development costs COMPARED	2010	2011	2012	2013	2014
<b>Red Hat Enterprise Linux AP</b>	<b>2,931,140</b>	<b>559,250</b>	<b>559,250</b>	<b>624,250</b>	<b>559,250</b>
<b>Microsoft Windows Server 2008 R2</b>	<b>2,154,960</b>				
	<b>776,180</b>	<b>559,250</b>	<b>559,250</b>	<b>624,250</b>	<b>559,250</b>

**Interpretation:** replacing migration of individual architectural components to Linux server-side will create financially relevant higher costs annually. Compared to a continuing migration to Windows Server 2008 R2, the additional costs for the company would amount to more than half a million Dollars annually.

### Operating Costs and Operating Benefits

The project team assumed that, in favour of the Linux Migration variation, operating costs for the Linux and the Microsoft solutions will produce equally high personnel costs in their administration. Also, running expenditures for materials would not differ substantially between the continuing (Microsoft) and replacing (Linux) server migration solutions. However, higher on-going expenditures for training are anticipated with the Linux solution due to the company's continued utilisation of the Microsoft Active Directory und Microsoft Exchange systems.

Furthermore, differing operating costs with regard to maintenance and the updating of software remain relevant – these have already been listed as “software costs” within the development cost calculation. (See section “Development Costs for Migration”).

Operating costs and benefits	budget relevance	2010	2011	2012	2013	2014
Operating material costs and savings		Assumption:	Δ between replacing and continuing migration = 0			
Operating personnel costs and savings		Assumption:	Δ between replacing and continuing migration = 0			
Ongoing training / qualification						
Operating costs replacing migration	○		-21.150	-21.150	-21.150	-21.150
Operating costs continuing migration	○		10.350	10.350	10.350	10.350
Software maintenance / update		Note: licensing costs for software are part of development costs				
<b>Operating costs COMPARED</b>			-10.800	-10.800	-10.800	-10.800

● = 100% budget relevant, ○ = partially budget relevant

**Interpretation:** both migration options (the replacing option with Linux, the continuing option with Microsoft) indicate relatively comparable operating costs. Therefore, a recommendation based on the analysis of the various operating costs is not possible.

## 5. Qualitative Strategic Importance

Supplementary to the monetary analysis of the migration alternatives, the WiBe Framework calculates the **Index for Qualitative Strategic Importance**. The evaluation is conducted as a Benefit Value Analysis using established, predefined evaluation criteria and a ranking scale from 0 to 10.

The project team began their evaluation in April 2010 (see table). Annotations are available in Attachment 1 from page 17 onward. The project team has assumed that, although the strategic relevance of the two migration variations is to be evaluated differently, the effects on the business processes and personnel will not differ appreciably from one another.

Qualitative and strategic criteria			Scenario	
			1 RHEL	2 MS WS 2
			Weight	
<b>1 Priority of the IT migration proposal</b>				
1.1	Relevance within the IT framework concept	5	7	4
1.2	Integration into the IT landscape of the corporation	5	4	8
1.3	Follow-up effects for communication partners	5	2	2
1.4	Pilot project nature of the IT investment project	10	2	0
1.5	Use of existing technologies by other organizations	5	5	9
1.6	Platform / manufacturer independence	10	0	0
<b>2 Increase in quality of dedicated tasks</b>				
2.1	Improved job performance	15	2	2
2.2	Acceleration of work procedures and processes	10	2	2
2.3	Standardised and uniform work	10	2	4
2.4	Increased comprehensibility and reproducibility	10	0	0
2.5	Image improvement	5	0	0
<b>3 Staff related effects</b>				
3.1	Attractiveness of working conditions	5	0	0
3.2	Ensuring/expanding qualifications	5	0	0
			100	18      20

A qualitative strategic index above 50 points is interpreted as a strong signal in favour of the alternative under examination and suggests realisation even with negative net present value. It has been shown that both migration alternatives lie – almost equally – significantly below these goals. The decision must then be predominantly supported by the monetary evaluation of the two migration alternatives.

## Legal Disclaimer

Readers should be aware that:

- The study has been created by WiBe-TEAM PR, which maintains editorial control over the study and its results. Modifications of content and calculations are not authorized. Microsoft has authorized the calculation of product specifications necessary to this study.
- WiBe-TEAM PR makes no general statement about the economic efficiency concerning the migration alternatives in question. We strongly advise using your own estimates within the WiBe framework provided in this case study to calculate your own specific economic efficiency assessment.
- The contents of the case study have been compiled with great care and all calculations checked for their accuracy. We assume no responsibility, however, for the correctness, completeness or timeliness of (foreign) content. We hereby certify that the procedure specified for economic evaluation has been adhered to within the WiBe Framework 4.1.
- The case study makes no comparative evaluations between competitive products. All prices represented are those openly published and/or distributed by the manufacturers at the time of the study (May 2010).

## Attachment 1: Details of the Economic Efficiency Assessment

Attachment 1 provides details of the Economic Efficiency Assessment:

- Catalogue of evaluation criteria ("Catalogue of Migration Criteria")
- Individual views of the monetary calculations
- Commentary on the qualitative evaluations

### Catalogue of Migration Criteria

The Economic Efficiency Assessment of the Migration Project at hand has been conducted on the basis of a standardised catalogue of criteria, compiled and used for the evaluation of the particular project gender, ensuring the comparability of numerous like projects. For this project, the standard "Catalogue of Migration Criteria<sup>1</sup>" has been used. The catalogue and those criteria rated relevant for this project are shown in the illustrations.



#### Catalogue of criteria for ICT migration

<b>1</b>	<b>Development costs and development benefits</b>
1.1	Development costs of the new IT measure
1.1.1	Planning and development costs
<b>1.1.1.1</b>	<b>Personnel costs (own personnel)</b>
<b>1.1.1.2</b>	<b>Costs of external advisors</b>
1.1.1.3	Costs of the development environment
1.1.1.4	Other costs of physical resources / auxiliary resources
1.1.1.5	Travel costs (own personnel)
1.1.2	System costs
1.1.2.1	Hardware costs
<b>1.1.2.1.1</b>	<b>Host server, network operation</b>
1.1.2.1.2	Workstation computers
1.1.2.2	Software costs
<b>1.1.2.2.1</b>	<b>Costs of the development and/or acquisition of software</b>
<b>1.1.2.2.2</b>	<b>Costs of the modification of software and/or interfaces</b>
1.1.2.2.3	Costs of the evaluation, certification and quality assurance of software
1.1.3	Costs of system implementation
<b>1.1.3.1</b>	<b>System and integration testing</b>
<b>1.1.3.2</b>	<b>Costs of system installation</b>
<b>1.1.3.3</b>	<b>Import of existing data</b>
<b>1.1.3.4</b>	<b>Initial training for users and IT specialists</b>
1.1.3.5	Familiarization costs of users and IT specialists
1.1.3.6	Other costs of adaptation/change
1.2	Development benefits due to replacement of the old process
<b>1.2.1</b>	<b>Once-off cost savings</b> (avoidance of maintenance/upgrading costs of the old system)
1.2.2	Once-off revenue (from the disposal of the old system)

<sup>1</sup> The Catalogue of Migration Criteria is documented in the WiBe Framework 4.1 (German version, Federal Republic of Germany Ministry of the Interior, WiBe 4.1 – Recommendation for Conducting Economic Efficiency Assessments, KBSt Publication Vol.92, 2007, Download: [http://www.wibe.de/konzept/wibe\\_v41/wibe\\_v41.html](http://www.wibe.de/konzept/wibe_v41/wibe_v41.html)). At [http://www.eu.wibe.de/wibe\\_framework/recommendation40/recommendation40.html](http://www.eu.wibe.de/wibe_framework/recommendation40/recommendation40.html) the English version of the WiBe 4.0 framework can be downloaded.

## **2 Operating costs and operating benefits**

- 2.1 Operating costs / savings of operating costs
  - 2.1.1 (Pro-rata) host, server and network costs
  - 2.1.1.1 Operating costs of new IT measure
  - 2.1.1.2 Operating benefits from discontinuation of old IT measure
  - 2.1.2 (Pro-rata) costs of workstation computers
  - 2.1.2.1 Operating costs of new IT measure
  - 2.1.2.2 Operating benefits from discontinuation of old IT measure
  - 2.1.3 Energy and space costs
  - 2.1.3.1 Operating costs of new IT measure
  - 2.1.3.2 Operating benefits from discontinuation of old IT measure
  - 2.2 Operating personnel costs / savings of personnel costs
    - 2.2.1 Personnel costs related to system use
    - 2.2.1.1 Operating costs of new IT measure
    - 2.2.1.2 Operating benefits from discontinuation of old IT measure
    - 2.2.2 System management and administration
      - 2.2.2.1 Operating costs of new IT measure
      - 2.2.2.2 Operating benefits from discontinuation of old IT measure
  - 2.2.3 **Ongoing training / qualification**
  - 2.2.3.1 **Operating costs of new IT measure**
  - 2.2.3.2 **Operating benefits from discontinuation of old IT measure**
    - 2.3 Operating costs / savings for maintenance / system service
      - 2.3.1 Hardware maintenance/service
        - 2.3.1.1 Operating costs of new IT measure
        - 2.3.1.2 Operating benefits from discontinuation of old IT measure
        - 2.3.2 Software maintenance/update
          - 2.3.2.1 Operating costs of new IT measure
          - 2.3.2.2 Operating benefits from discontinuation of old IT measure
        - 2.3.3 Replacement/supplementing costs
          - 2.3.3.1 Operating costs of new IT measure
          - 2.3.3.2 Operating benefits from discontinuation of old IT measure
      - 2.4 Other operating costs and savings
        - 2.4.1 Operating costs of new IT measure
        - 2.4.2 Operating benefits from discontinuation of old IT measure

## **3 Urgency criteria**

- 3.1 Urgency to replace the old system
- 3.1.1 Support continuity for the old system
- 3.1.2 Stability of the old system
  - 3.1.2.1 Bugs, errors and downtime
  - 3.1.2.2 Service problems, personnel bottlenecks
- 3.1.3 Flexibility of the old system
  - 3.1.3.1 Limits of expansion / upgrading
  - 3.1.3.2 Interoperability, present/future interface problems
  - 3.1.3.3 Operability and ergonomics
- 3.2 Compliance with group-wide regulations and laws
  - 3.2.1 Compliance with laws
  - 3.2.2 Fulfilment of data protection/security requirements
  - 3.2.3 Correct procedures and work processes
  - 3.2.4 Compliance with other requirements and recommendations

## **4 Qualitative and strategic criteria**

- 4.1 Priority of the IT measure**
- 4.1.1 Relevance within the IT framework concept**
- 4.1.2 Integration into the group-wide IT landscape**
- 4.1.3 Follow-up effects for communication partners**
- 4.1.4 Pilot project nature of the IT investment project**
- 4.1.5 Use of existing technologies by other organizations**
- 4.1.6 Platform / manufacturer independence**
- 4.2 Increase in quality of dedicated tasks**
  - 4.2.1 Improved job performance**
  - 4.2.2 Acceleration of work procedures and processes**
  - 4.2.3 Group-wide standardised and uniform work**
  - 4.2.4 Increasing understandability and reproducibility**
  - 4.2.5 Image improvement**
- 4.3 Staff-related effects**
  - 4.3.1 Attractiveness of working conditions**
  - 4.3.2 Ensuring/expanding qualifications**

**Note:** **Bold type** identifies the criteria that have been taken into consideration by the Project team for the Economic Efficiency Assessment.

## Individual views of the Monetary Calculations

The following directives apply to all monetary calculations included in this case study:

- The amounts shown are net sums, and do not include VAT (value added tax)
- Calculation results have been rounded-off to whole dollars
- Licence costs incurred during the time span between 2010 and 2014 are collectively documented in Section "1.1, Development and Implementation Costs", as a segmentation of these costs into separate categories for development and operation appeared less meaningful
- Future sums noted reflect no price changes with regard to today's rates. Allowance for potential price changes is, rather, provided in the nominal interest rate used in calculating net present value
- Information regarding licence costs is based on the company's current IT architecture as well as current information from the providers.
- *Please note: 'fin' or 'not fin' stand for 'financially relevant' or 'not financially relevant'.*

### 1.1.1.1 Personnel costs (own staff)

The migration is to be performed as a project by staff personnel. This criterion contains the personnel costs in terms of man-days factored for the migration project to Red Hat (these costs are not financially relevant):

1111		2010	2011	2012	2013	2014
not fin	1	103350				

A man-day (MD) has been calculated at \$ 390 per day (FTE, without financial relevance); the Project team resource management calculated at 265 man-days for the year 2010 (including concept, deployment, configuration, test, implementing Migration System Center, etc.).

### 1.1.1.2 Costs of external advisors

Attending external consultants have been factored for 30 consulting days at \$ 1,100 per day (net, excluding VAT), payable in 2010.

1112		2010	2011	2012	2013	2014
fin	1	33000				

### 1.1.2.1.1 Host server, network operation

Costs for the purchase of hardware for the planning variation in 2010, resp. 2013: for Linux Systems Management, a total of 10 additional servers are necessary.

11211		2010	2011	2012	2013	2014
fin	1	65000			65000	

Necessary hardware expenditures for the dedicated Linux Systems Management additionally required. The price per piece is \$ 6,500.00. Replacing purchases after a three-year usage period follow in 2013.

**NOTE:** Hardware replacement purchases are indicated as equal sums for both the replacing (Linux) and the continuing (Microsoft) variations. The net effect (Delta) is zero, which is why there is no depictive table regarding these effects from hardware.

#### 1.1.2.2.1 Costs of the development and/or acquisition of software

Note: The licensing for Microsoft has been based on the current **Select L conditions** from May 2010; the information regarding Red Hat Linux has been taken from the current **Red Hat Subscription Options**, standard and premium.

11221		2010	2011	2012	2013	2014
fin	1	399800	399800	399800	399800	399800
fin	2	159450	159450	159450	159450	159450
fin	3	1891416				
fin	4	92524				

Remarks:

- 1 Licences are required for 200 Databases / Applications / Web Servers; the product RHEL AP, Red Hat Enterprise, Linux Advanced Platform has been selected:

- 100 'standard subscription' licences at \$1,499.00 each
- 100 'premium subscription' licences at \$ 2.499.00 each

In total, these costs amount to \$ 399,800.00 in the years 2010 to 2014.

- 2 Systems Management under the Red Hat System requires:

- 4 RHN Satellite Servers at \$ 13,500.00 each = 54,000.00
- 4 RH GFS Global File Systems (with RH Cluster Suite) \$ 2,200.00 each = 8,800.00
- 100 RHN Red Hat Management Modules at \$ 96.00 each = 9,600.00
- 100 RHN Red Hat Provisioning Modules at \$ 96.00 each = 9,600.00
- 10 RH Proxy Servers at \$ 2,500.00 = 25,000.00
- 25 RHEL "standard subscriptions" at \$ 799.00 = 19,975.00
- 25 RHEL "premium subscriptions" at \$ 1.299.00 = 32,475.00

In total, these costs amount to \$ 159,450.00 per year for the period from 2010 to 2014.

- 3 A migration of the Windows Server 2003 to the Microsoft Windows Server Standard 2008 R2 is technically and financially mandatory to assure the further utilisation of the remaining Windows server. This affects a total of 1,100 servers (300 Terminal Servers, 250 Microsoft Active Directory Servers, 300 File & Print Servers, 200 Exchange Servers as well as 50 Systems Management Servers). Of these, the following individual positions also take into account the consolidation of hardware and software.

- 500 Servers (300 File & Print and 200 Exchange) are to be virtualised at a consolidation ratio of 1:10 on 50 actual physical servers with 4 CPUs. The one-time cost for 200 Windows Server Datacenter 2008 R2 licences has been calculated at \$ 1,553.28 per licence = 310,656.00
- For the remaining 600 servers, the one-time cost for Microsoft Windows Server Standard 2008 R2 licences have been calculated at \$ 468.60 per server = 281,160.00
- Furthermore, 10,000 Thin Clients require the "Windows Remote Desktop Service CAL 2008" at \$ 54.60 per station = 546,000.00
- 40,000 user licences for Windows Server CAL 2008 are required at \$ 18,84 per user = 753,600.00

These costs require a total one-time investment of \$ 1,891,416.00 in 2010.

- 4 For the monitoring of the Microsoft Server landscape, the following licences are required:

- 2 Microsoft SCOM System Center Operations Manager 2007 R2 Server licences at \$ 375.12 each = \$ 750.24
- 2 Microsoft SCCM System Configuration Manager 2007 R2 Server licences at \$ 374.04 each = \$ 748.08
- 2 Microsoft DPM Data Protection Manager 2007 Server licences at \$ 374.88 each = \$ 749.76
- 100 Server Management Suite Enterprise licences (these encompassing: SC OpsMgr Enterprise Server ML, SC ConfigMgr Enterprise Server ML, SC DPM Enterprise Server ML, SC VMM Enterprise Server ML) at \$ 902.76 each, total cost \$ 90,276.00
- For Microsoft VMM Virtual Machine Manager 2008 R2 there are no costs, as this is included in the SMSE and VMM Enterprise Server ML

These costs require a total one-time investment of \$ 92,524.08 in 2010.

NOTICE: the licensing costs for the Microsoft Windows Server Standard 2008 R2 have been calculated according to the Select L conditions applicable in 2010. A new licensing in three years is regarded as unnecessary, because the Microsoft Support Lifecycle Guidelines provide mainstream support for five years, including product and safety updates as well as hot fixes for all products. This consideration is based on information from the manufacturer, see: <http://support.microsoft.com/?LN=en-us&pr=lifecycle&scid=gp%3B%5Bln%5D%3Blifecycle&x=7&y=12>.

#### **1.1.2.2.2 Cost of the modification of software and/or interfaces**

The Project team has estimated the costs for appropriate system adjustments (for example, Snapshots, SSO Integration, PKI, Security, SAP ERP and others) at 20 man-days: 10 internal and 10 external.

11222		<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
not fin	1	3900				
fin	2	11000				

#### **1.1.3.1 System and integration testing**

Here the costs are calculated for the implementation of integration tests (not system tests), for which costs are accrued for both personnel and consultants. Internal staff costs are calculated at 30 man-days in 2010; external consultancy fees are calculated at 30 days at \$ 1,100.00 per day.

1131		<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
not fin	1	11700				
fin	2	33000				

#### **1.1.3.2 Costs of system installation**

Costs for deployment, adaptation of the file system, etc. The internal staff costs are calculated at 40 man-days in 2010. The external consulting fees for the server and framework installation are estimated at 40 days at \$ 1,100 per day, or a total of \$ 44,000.00 in 2010.

1132		<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
not fin	1	15600				
fin	2	44000				

#### **1.1.3.3 Import of existing data**

Costs for configuration, images and applications are estimated together as internal staff costs at 20 man-days at \$ 390 per day as well as external consulting costs at 10 days at \$ 1,100 per day.

1133		<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
not fin	1	7800				
fin	2	11000				

#### **1.1.3.4 Initial training of IT specialists**

1134		<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
not fin	1	23400				
fin	2	9000				
not fin	3	11700				
fin	4	4500				

Remarks:

- 1 Initial (internal) training for IT personnel on 250 Linux servers: 20 participants for three days = 60 man-days at \$ 390 each as internal staff costs \$ 23,400.00
- 2 External training on six days at \$ 1,500 per day (2 groups for three days each)
- 3 Initial training Microsoft Windows Server Standard 2008 R2: 30 participants for one day = 30 man-days at \$ 390.00 per day
- 4 External training Microsoft Windows Server: three days at \$ 1,500 per day (\$ 4,500.00 for three groups)

### 1.2.1

#### One-time savings in costs

One-time savings in costs arise as “non-occurring migration costs” that only occur when the company implements the **continuing variation** (continuing migration to the Microsoft Windows Server Standard 2008 R2) rather than the replacing variation. These costs represent savings in favour of the replacing variation. They can be quasi offset and amount to:

121		2010	2011	2012	2013	2014
not fin	1	66300				
fin	2	1985136				
fin	3	92524				
fin	4	11000				

- 1 Savings in personnel costs for the Project Team:  
compared to the resource estimates made for the replacing migration alternative (the company has estimated 265 man-days here), estimates for the continuing migration solution see 170 man-days at \$ 390 each as adequate. This is because a great portion of the migration planning in the RHEL / RHEL AP und RHSS areas becomes unnecessary.
- 2 Savings on licence fees with continuing migration:  
migration of the Windows Server 2003 to the Microsoft Windows Server Standard 2008 R2 affects a total of 1,300 servers (300 terminal servers, 250 Microsoft Active Directory servers, 300 File & Print servers, 200 Exchange servers, 50 Systems Management servers as well as 200 Databases / Applications / Web Servers. Derived from these, the following single positions also take into account the consolidation of the hardware and software.
  - 500 servers (300 File & Print and 200 Exchange) will be virtualised with a consolidation ration of 1:10 on 50 actual physical servers with four CPUs. Calculated as one-time costs are the 200 licences for the Windows Server Dataserver 2008 R2 at \$ 1,553.28, or a total of \$ 310,656.00
  - There remain 800 servers with one-time licence fees for the Microsoft Windows Server Standard 2008 R2 at \$ 468.60 each, for a total of \$ 374,880.00
  - Further, 10,000 Thin Clients “Windows Remote Desktop Service CAL 2008” are required at \$ 54.60 each, for a one-time total cost of \$ 546,000.00
  - 40,000 users need to be licensed for Windows Server CAL 2008 at \$ 18.84 per licence, or a total one-time cost of \$ 753,600.00
 In total, the one-time savings in 2010 amount to \$ 1,985,136.00
- 3 Savings on licence fees for the monitoring of the Microsoft Server landscape in the continuing migration:
  - 2 Microsoft SCOM System Center Operations Manager 2007 R2 Server licences at \$ 375.12 each = \$ 750.24
  - 2 Microsoft SCCM System Configuration Manager 2007 R2 Server licences at \$ 374.04 each = \$ 748.08
  - 2 Microsoft DPM Data Protection Manager 2007 Server licences at \$ 374.88 each = \$ 749.76
  - 100 Server Management Suite Enterprise licences (these encompassing: SC OpsMgr Enterprise Server ML, SC ConfigMgr Enterprise Server ML, SC DPM Enterprise Server ML, SC VMM Enterprise Server ML) at \$ 902.76 each, total cost \$ 90,276.00
 No costs are registered for the Microsoft VMM Virtual Machine Manager 2008 R2, as these are included in the SMSE und VMM Enterprise Server ML.  
 These costs require a total one-time investment of \$ 92,524.08 in 2010.
- 4 Savings on external consultation costs for this project:  
with continuing migration, the company will only require external support in one area. 10 consultant days have been planned for the migration of the System Center. The sum of \$ 11,000.00 has been estimated as the savings to be accrued over the replacing migration alternative.

The Economic Efficiency Assessment also takes into account the **operating costs** from the years 2010 to 2014. The company has gone under the assumption that the **material costs** will not differ between the migration alternatives and also includes personnel costs at a constant value. Only the on-going training costs for the replacing migration alternative (replacing migration to Linux) are set higher in comparison due to the dual platform operation.

2.2.3	<b>Ongoing training / qualification</b>
2.2.3.1	<b>Operating costs for the alternative "replacing migration"</b>

During the operating phase, replacing migration will require continuous training of IT staff, creating training costs for measures on both platforms. The project team estimates expenditures as follows:

2231		2010	2011	2012	2013	2014
not fin	1		7800	7800	7800	7800
fin	2		3000	3000	3000	3000
not fin	3		5850	5850	5850	5850
fin	4		4500	4500	4500	4500

Remarks:

- 1 Continuous training of IT staff on 250 Linux servers: one day per year for 20 participants, in total 20 man-days at \$ 390 each = \$ 7,800.00 per year from 2011 onward.
- 2 The external training costs are \$ 1,500.00 per day. Two groups of ten will participate each year; the costs will amount to \$ 3,000.00 per year from 2011 onward.
- 3 Skills enhancement training for IT staff on the Microsoft Windows Server Standard 2008 R2: 30 participants at 0.5 days = 15 man-days at \$ 390 each; the costs will amount to \$ 5,850.00 per year from 2011 onward.
- 4 The external training costs for Microsoft Windows Server are \$ 1,500.00 per day. Three groups of ten will participate each year; the costs will amount to \$ 4,500.00 per year from 2011 onward.

2.2.3.2	<b>Operating savings from alternative "continuing migration" not chosen</b>
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The continuing migration alternative (to the Microsoft® Windows Server Standard 2008 R2) is also accompanied by costs for continuous training; these, however, are estimated lower in comparison to the replacing migration alternative:

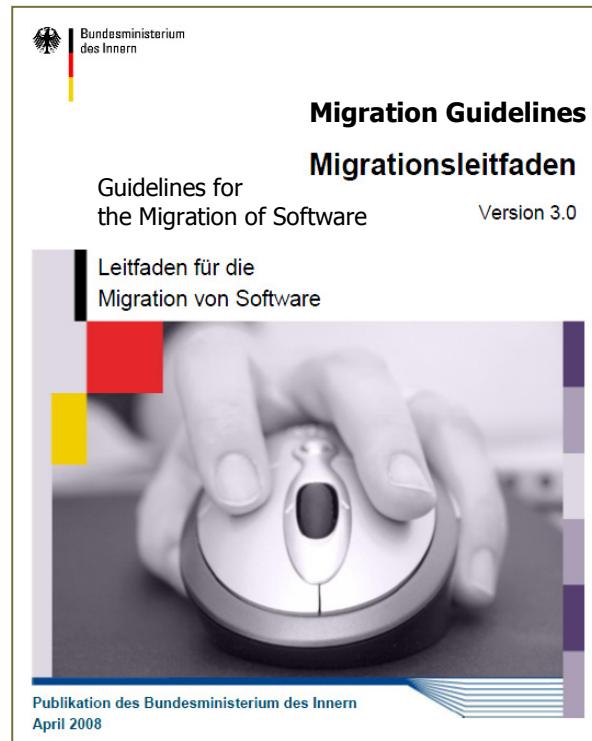
2232		2010	2011	2012	2013	2014
not fin	1		5850	5850	5850	5850
fin	2		4500	4500	4500	4500

Remarks:

- 1 Continuous training of IT staff on the Microsoft Windows Server Standard 2008 R2: 30 participants at 0.5 days = 15 man-days at \$ 390 each; the costs will amount to \$ 5,850.00 per year from 2011 onward.
- 2 The external training costs for Microsoft Windows Server are \$ 1,500.00 per day. Three groups of ten will participate each year; the costs will amount to \$ 4,500.00 per year from 2011 onward.

## Commentary on the Qualitative Evaluation

The WiBe Framework specifies the binding criteria which can be used to evaluate the qualitative strategic importance of a pending IT project, and establishes the importance of the individual criterion. Each criterion can be evaluated on a scale of zero (irrelevant or not adequately met) to ten (excellently fulfilled). Out of these values and quantifiers, the **(WiBe Q) Index** is established from 0 to 100. This procedure for benefit value analysis is described in the WiBe Framework; the criteria are detailed in the "Guidelines for the Migration of Software", **Migration Guidelines**, Version 3.0, April 2008, a publication of the German Ministry of the Interior. The references to WiBe Q are included here, whereby several terms have been up-dated.



### 1. Priority of the IT migration project

#### 1.1 Relevance within the IT framework concept

With this evaluation, you have qualitatively classified your IT project in terms of its contribution to the realisation of the valid IT framework concept (and this, ultimately, in comparison to other IT projects running and planned). The significance of the pending IT measure as a prerequisite for other measures to follow is documented.

This criterion is a "**quasi-MUST criterion**": when the evaluation arrives at "10 points" here, the IT measure should generally be carried out. The prerequisite for such an evaluation is that the IT measure in question is mandatory to the realisation of a major part of the plans included in the IT framework concept. It follows that only very few of a concern's IT measures achieve the 10 point rating – and only those of highest priority. It is therefore recommended that all IT measures be organised according to their priority, thus providing the basis rational for the awarding of points in this category.

0	2	4	6	8	10
irrelevant	of secondary importance	important IT measure, but not time-critical	prerequisite for further important IT measures	important and time-critical IT measure	key role in the IT framework concept
		MS WS 2	RHEL		

#### 1.2 Integration into the company's overall IT expansion

With this criterion you evaluate whether or not the IT measure fits into the company's information management strategy. This means, you convey the overall significance of the project: all considerations relating to the project that aim for joint expansion of information technology (integrative, standard-setting and in compliance with the standards) are to be included here.

0	2	4	6	8	10
of no significance or of no positive effect	minimum facilitation of IT upgrade	further-reaching facilitation of IT upgrade	IT measure is important, but not time-critical	IT measure is important and time-critical	IT measure is mandatory for IT integration group-wide
		RHEL		MS WS 2	

### **1.3 Follow-up effects for communication partners**

With this criterion, the group-wide interoperability of the IT measure is evaluated. Migrations can make other standard formats necessary for the exchange and further use of data. The less noticeable the ensuing effects for other communication partners, the higher the solution's quality rating.

<b>0</b>	<b>2</b>	<b>4</b>	<b>6</b>	<b>8</b>	<b>10</b>
no positive group-wide effects	no noticeable improvement in information exchange for the users	improvement in selected areas of the group-wide information exchange	considerable improvement in a specific business process (type)	considerable improvement in several business process types	considerable improvement through group-wide standardisation of data structures and process routines
	<b>RHEL, MS WS 2</b>				

### **1.4 Pilot project nature of the IT measure**

The initial development and implementation of innovative processes involved with migration projects can be, for the investing organisational unit, uneconomical in terms of the WiBe KN (net present value calculation). At the same time, this process can deliver important insight for projects to follow, leading to savings in development costs in other areas of the company. Ideally, the IT solution developed should be transferable to other company areas (the one-for-all principle).

At the centre of this criterion is not only the pilot character of the migration project, but also the further usefulness of the entire project result for others. The further and more comprehensive the spectrum of applicability for these innovative solutions is within the concern, as well as the more detailed the concept of the migration project is documented for further use, the higher the strategic ranking.

<b>0</b>	<b>2</b>	<b>4</b>	<b>6</b>	<b>8</b>	<b>10</b>
not significant	first application of a standard solution	first application of an individual solution with further stages planned	internal pilot project with individual solution & subsequent investment	pilot project with further fields of application for various organisational units	pilot project with group-wide solution coverage (one for all)
<b>MS WS 2</b>	<b>RHEL</b>				

### **1.5 Use of existing technologies**

This criterion evaluates whether or not technical solutions and processes, which have already proven themselves in other organisational areas of the concern, will be applied to the IT project planned. The further use of existing technical solutions not only tends to reduce investment costs, but also promotes the group-wide establishment of technical standards, thus avoiding isolated solutions.

<b>0</b>	<b>2</b>	<b>4</b>	<b>6</b>	<b>8</b>	<b>10</b>
adoption of a process not possible	adoption of a process requires great effort for minor degree of dissemination	adoption of a process requires medium effort for minor degree of dissemination	adoption of a process requires minor effort to achieve minor degree of dissemination	adoption of a process requires medium effort to achieve high degree of dissemination	adoption of a process requires minor effort to achieve high degree of dissemination
		<b>RHEL</b>			<b>MS WS 2</b>

## 1.6 Platform and manufacturer independence

With this criterion you evaluate how far, on one hand, the migration aspired to allows (also in future) for its implementation on other platforms; on the other, how far further expansion steps and IT architecture are possible without the intervention of the software manufacturers, or, existing or future-planned platforms can be designed and configured with various providers. The less difficult the switch from one platform to another is with this solution, the higher the rate of platform – and, as a rule, manufacturer – independence (in cases where platforms from other providers are available).

0	2	4	6	8	10
Irrelevant, or only minor effects to be expected	minor qualitative improvements without strategic importance	software can be transferred to other platforms with little effort	platform and manufacturer Independence assured	platform and manufacturer Independence and protection of investment assured	far reaching configuration autonomy regarding continuing use of existing hard-and software
RHEL, MS WS 2					

## 2. Increase in quality of dedicated tasks

### 2.1 Improved job performance

In this criterion, the qualitative effects regarding the processing of tasks are evaluated: does the work process itself improve, and with it the quality of the product? Qualitative improvements can, for example, bring higher transparency and simplicity to the work process, as well as relieve work duplication and routines. But more up-to-date, more complete and less redundant information sources, as well as lower rates of error through interactive help functions for user support, are also elements valid to an evaluation. The migration can continue to uphold and observe high quality standards in complicated business processes (e.g. quality management according to ISO 9001 or the EFQM model).

When evaluating this criterion, a separation between the effects in terms of formal improvements (the processing flow itself is improved) and material improvements (the results of the processing flow are themselves improved) should be observed.

0	2	4	6	8	10
not significant or of no positive benefit	minor improvement in the formal work process	medium improvement in the formal work process	considerable improvement in the formal work process	considerable improvement in the material work result	considerable improvement in formal work process and material work result
RHEL, MS WS 2					

### 2.2 Acceleration of work procedures and processes

IT measures usually achieve a qualitative improvement in the execution of jobs at hand by accelerating work processes and their flow. These effects are, as far as they are capable of being calculated in terms of shortened processing times, recorded in monetary value, as current operational benefits, in the WiBe KN. The acceleration of workflow and processes enables faster provision of services (reduction of processing time). These effects occur through electronic communication, the reduction of media gaps, access to up-to-date databases – as well as those accessible to all authorised personnel – culminating in the elimination of various processing stations. More up-to-date, more precise forms of communication reduce transport, waiting and set-up times. The estimation of this qualitative criterion is achieved through critical evaluation of the improvements that an IT measure will provide its users.

0	2	4	6	8	10
not significant or of no positive benefit	minimum acceleration expected but effects not rateable	up to 10% shorter processing times possible	up to 30% shorter processing times possible	up to 50% shorter processing times possible	up to 70% shorter processing times possible
RHEL, MS WS 2					

### 2.3 Group-wide standardised and uniform work

The criterion determines how far the new IT measures will be instrumental in replacing previously inconsistent operational processes (both formal and material) with consistent ones. This value can be reached by accessing current and similarly structured data and through the organisational and (technical informational) coordination of processes. In any case, the external influence, in terms of “how the process affects different external recipients”, is to be observed.

0	2	4	6	8	10
not significant or of no positive benefit	no noticeable reduction in special cases expected	isolated internal improvements	major improvement regarding a specific type of process	major improvement through internal standardisation of data structures and process routines	major improvement through comprehensive standardisation of data structures and process routines
RHEL	MS WS 2				

### 2.4 Increasing understandability and reproducibility

This criterion evaluates the contribution of the IT solution to the increase in understandability and reproducibility for both its internal and external recipients. An essential aspect can be, for example, the availability of information, the transmittal of information as well as the transparency of decisions.

0	2	4	6	8	10
not significant or of no positive benefit	only minor changes in the current situation	various minor shortcomings corrected	major former shortcomings eliminated	imminent qualitative improvement for some recipients	imminent qualitative improvement for many recipients
RHEL, MS WS 2					

### 2.5 Image improvement

A better image can be achieved by the better rendering of services, and, by relaying the existence of this improved performance more effectively to external recipients. In so far as the IT measure can (despite all subjective evaluations and many imponderables) provide a positive contribution here, this effect is to be included in the assessment.

0	2	4	6	8	10
not significant or of no positive benefit	no significant change over the short term	positive effect expected for some recipients	positive effects middle term for many recipients	sustainable positive effect for several recipients	sustainable positive effect for many recipients
RHEL, MS WS 2					

## 3. Staff-related effects

### 3.1 Attractiveness of working conditions

The introduction of new IT solutions alters the routines in familiar work processes and is accompanied by the implementation of new hardware and/or software. This can increase the (subjectively experienced) attractiveness of the workplace for the user, also by the higher qualifications achieved through their use of state-of-the-art technology. A positive influence on the attractiveness of the workplace tends to positively influence the level of employee satisfaction and, thus, productivity. This criterion should be verified with regard to solutions within the client area. The conversion to a new and different Desktop can lead to

uncertainty and apprehension, even to resistance and opposition, in some cases. These familiar side effects are, of course, offset by decidedly positive ones: OSS solutions provide even for private use without legal or taxation problems – thus enhancing the working environment's attractiveness.

0	2	4	6	8	10
no or insignificant improvement	minor improvement	medial improvement in a few areas	medial improvement in several areas	major improvement in a few areas	major improvement in several areas
<b>RHEL, MS WS 2</b>					

### 3.2 Ensuring/expanding qualifications

Introduction of new IT solutions can, middle term, effect the qualifications of the staff involved in two ways. On the one hand, IT solutions lead to the acquisition of new skills in dealing with IT systems: the introduction of such solutions leads indirectly to expanded qualifications on the part of the users. On the other hand, the implementation of new IT solutions can also be associated with the acquisition of more complex and demanding areas of responsibility. In tandem with user training, this results in increased qualifications in the specific areas of competence.

0	2	4	6	8	10
no or no positive effect	few effects in IT proficiency expected	major effects in IT proficiency expected	major effects in implementation of IT and task-related further development	significant expansion of task-related qualifications	extensive, field-related higher qualification
<b>RHEL, MS WS 2</b>					

## Attachment 2: Products and Solutions Implemented

### Microsoft® products and solutions within the migration concept

- Windows Server 2008 R2 Standard
- Windows Server 2008 R2 Datacenter

See product descriptions (May 2010):

<http://www.microsoft.com/windowsserver2008/en/us/r2-editions-overview.aspx>

- Windows Remote Desktop Service CAL 2008
- Windows Server CAL 2008

See product descriptions (May 2010):

<http://www.microsoft.com/windowsserver2008/en/us/rds-product-home.aspx>

<http://www.microsoft.com/windowsserver2008/en/us/client-licensing.aspx>

- Microsoft SCOM System Center Operations Manager 2007 R2 Server
- Microsoft SCCM System Configuration Manager 2007 R2 Server
- Microsoft DPM Data Protection Manager 2007 Server
- Microsoft VMM Virtual Machine Manager 2008 R2
- System Center Server Management Suite Enterprise

See product descriptions (May 2010):

<http://www.microsoft.com/systemcenter/en/us/default.aspx>

<http://www.microsoft.com/systemcenter/en/us/operations-manager.aspx>

<http://www.microsoft.com/systemcenter/en/us/configuration-manager.aspx>

<http://www.microsoft.com/systemcenter/en/us/data-protection-manager.aspx>

<http://www.microsoft.com/systemcenter/en/us/virtual-machine-manager.aspx>

<http://www.microsoft.com/systemcenter/en/us/management-suites.aspx>

### Red Hat® products and solutions within the migration concept

- RHEL AP Red Hat Enterprise Linux Advanced Platform - 'standard subscription'
- RHEL AP Red Hat Enterprise Linux Advanced Platform - 'premium subscription'
- RHEL Red Hat Enterprise Linux - 'standard subscription'
- RHEL Red Hat Enterprise Linux - 'premium subscription'

See product descriptions (May 2010): <http://www.redhat.com/rhel/server/>

The selection of 'Advanced Platform' RHEL AP for the business-critical database/ application / web server has been made based on a deployment comparison, see:

[http://www.redhat.com/rhel/purchasing\\_guide.html](http://www.redhat.com/rhel/purchasing_guide.html)

The allocations to 'standard' and 'premium' subscriptions have been made according to manufacturer information regarding 'Production Support Service Level', see:  
<https://www.redhat.com/support/policy/sla/production/>

- RHSS Red Hat Satellite Server
- RH GFS Global File System (contains RH Cluster Suite)
- RHN Red Hat Management Module
- RHN Red Hat Provisioning Module
- RH Proxy Server

See product descriptions (May 2010):

[http://www.redhat.com/red\\_hat\\_network/](http://www.redhat.com/red_hat_network/)

<http://www.redhat.com/gfs/>

<https://www.redhat.com/apps/store/systems/management.html>

<https://www.redhat.com/apps/store/systems/provisioning.html>

<https://www.redhat.com/rhn/details/architecture/>

## Attachment 3: Economic Efficiency Assessments with the WiBe® Framework

Investments in Information and Communications Technology (ICT) aim at improving the overall efficiency of the agency and enterprise – a logical demand in times of scarce financial means. Arriving at a consensus is not always simple, and thus not surprising that assessment of economic efficiency leads to frequent discussions between ICT managers and the management board.

Planning and approving ICT projects requires founded, methodical calculation and documentation of pending costs and anticipated benefits – not just an examination of a project's feasibility. Some economic effects (benefits in particular) can only be measured with difficulty monetarily, if at all. Economic efficiency assessments must carefully consider the aspects beyond the monetary effects in order to facilitate a sound decision. This is where the **WiBe® Framework** comes in.

### What is economic efficiency and how can it be determined?

The principle of economic efficiency is based on achieving the most favourable relationship between the set purpose and the means used to attain it, i.e.: the benefits anticipated from an ICT project should stand in highest ratio possible to the anticipated costs for attaining them.

The scientific tool for reaching this equation is the **WiBe® Framework**, taken from *Wirtschaftlichkeits-Betrachtung*, the German term for economic efficiency assessment. This is applied to individual projects and procurement measures and thereby distinguishes itself from periodic cost and activity accounting.

### ► WiBe® Framework

The **WiBe® Framework** is already internationally acknowledged for its reliable economic efficiency assessments. Some of the planning questions it answers include:

- Which **costs and benefits** will occur from this project within a specified period of time?
- Which **budget-relevant outcomes** are expected from the project?
- Which further **qualitative effects** of importance can be derived?
- Why is it **advisable** to accomplish this ICE project at this time?

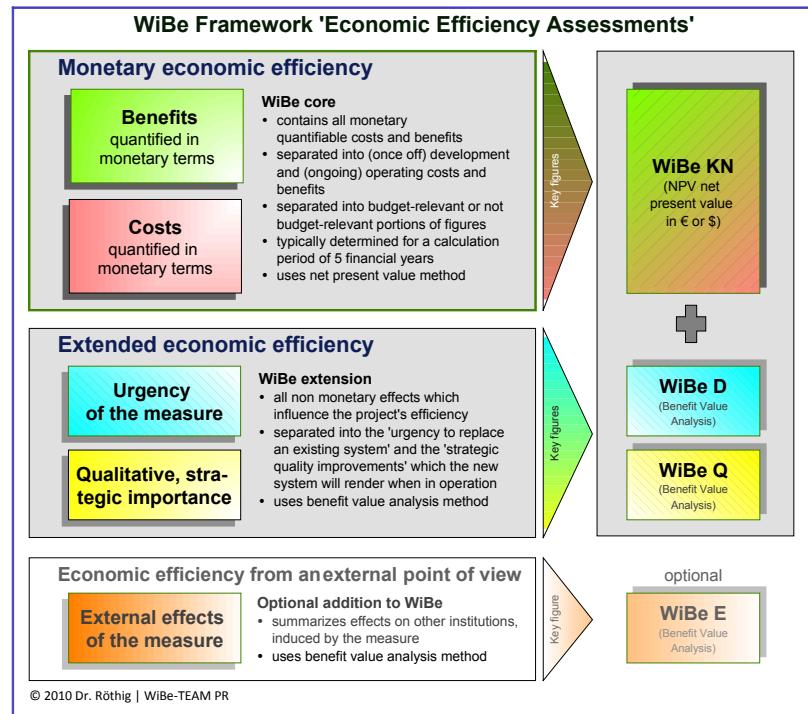
The **WiBe® Framework** extrapolates the traditional project considerations and provides solid statements as to the economic efficiency of the measures planned.

- Because economic efficiency assessment deals with assumptions about the future, the approach taken must be methodical and transparent organized about a common framework.
- **Monetary evaluations** constitute the core of each assessment, thus the method of **net present value** is recommended as the most suitable procedure. All future disbursements and deposits of an ICT measure are discounted to the base year of the calculation, i.e., the year in which the ICT measure is to commence. The sum of all net values within the calculation period represents the cumulative net value. If the sum is favorable, the project is economically efficient.
- Non-monetary, **qualitative evaluations** supplement **WiBe®** core calculations by describing additional effects of the ICT measure which cannot be measured in money. A **benefits analysis**, weighing all qualitative criteria with respect to their relative importance, is given a score on a scale from 0 to 10 to reflect the **value of benefits**. The higher the score, the better the qualitative prognosis for pending ICT measures.

## What determines an ICT project's extended economic efficiency?

The *extended* economic efficiency is determined by measuring the impact of various criteria on a project, such as:

- **Cost and benefit parameters** as quantified in **monetary terms**,
- The **time urgency for replacing** an existing system,
- Strategic **quality improvement** through implementation of a new ICT system,
- The **external impact** an ICT project will have on other institutions.



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The WiBe® Framework is the brainchild of economic expert Peter Roethig, PhD, initially developed for the fulfilment of a directive from the German Ministry of the Interior. Undergoing consistent further development and refinement, WiBe®, one of the first frameworks worldwide to be applied for the economic efficiency assessment of ICT projects, is widely used in administrative government.

Today, the **WiBe 4.1** framework is the version of choice, applied widely at federal, state and municipal levels in Germany and Europe. It is now also a viable projection option for a growing number of countries beyond Europe.

## Which factors are necessary when projecting with WiBe®?

To ensure the highest feasibility and integrity, all potential factors must be carefully projected and then comprehensively and methodically calculated. These are:

### Profitability: economy of cost vs. benefit

All parameters defining cost and benefit which are capable of being quantified in monetary terms are of central importance.

### Investment & development costs

These are the one-time, initial expenditures made primarily for hardware and software, installation & systems implementation.

### Operating costs & benefits

These are ongoing costs reflecting consumable materials, personnel expenditures, maintenance and/or system updating, etc. The analysis assesses the efficiency of each cost criterion within the new system, indicating the savings attainable through discontinuation of the old process. The end balance shows additional vs. fewer or lower operating costs and is reflected in the subsequent cost-benefit calculation.

The calculated or estimated figures are discounted from the base year of calculation and form the **net present value** of the ICT project ('*WiBe KN*'). If the result is favourable, the project is economically efficient.

Aside from monetary impacts there are further evaluations and indication measures which serve to determine the *extended* economic efficiency of the ICT project. These concern the qualitative aspects which are detailed in a **benefit analysis**.

### Urgency surrounding the ICT measure

The urgency called for in replacing a system currently in use is an important factor in the assessment. What about reliable, continuous maintenance? Are there restrictions for further expansion, personnel bottlenecks or interface problems? Will existing legal restraints remain valid, or will system replacing facilitate a new solution?

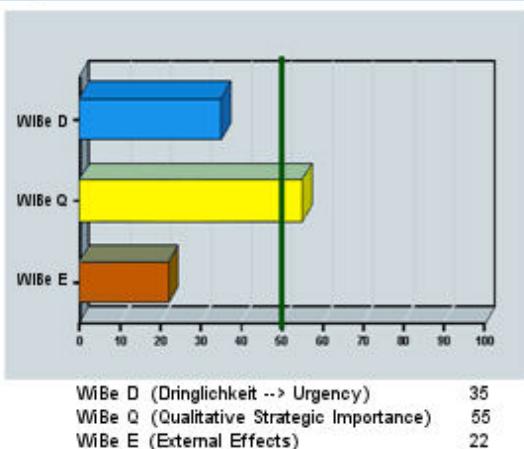
### Qualitative, strategic importance

The qualitative-strategic relevance of the new solution is a central criterion. For example, how will the solution fit into the sector's overall development? How significant will the quality increase be upon completion of the specialized tasks? These and numerous further questions are asked and evaluated.

### External effects of the ICT measure

The ICT solution can affect (intentionally or non-intentionally) external parties and institutions substantially. These 'external effects' have to be considered if they are more than just incidental. For example, how is user friendliness from the customer side? Does the customer gain any direct economic benefit?

#### Qualitative Indices



### How do the WiBe® key data figures simplify assessment?

WiBe® generated key data figures deliver a set of rules decisive for the effective launching of individual ICT projects. For example, when **positive net present value** shows the ICT project to be economically efficient even before consideration of urgency, strategic importance or external effects; commencement with the project is recommended.

Likewise, a **negative net present value** marks the ICT project as planned to be inefficient in a monetary sense. However, projects can be qualified as efficient in an *extended* sense when key data figures regarding urgency, quality index and an optional external effects analysis surpass predefined thresholds.

