Managed Print Services

Guidelines

BITKOM

■ Imprint

Managed Print Services

Guidelines

Content

1 Management Summary

Printing, in one form or another, is carried out universally, but requirements on security, convenience, operability and clearer cost structures only occasionally receive attention. The management of the output by so-called Managed Print Services lives out a shadowy existence, although German companies alone spend around 34 billion Euro[1] a year on printing and reproduction. It is therefore worth taking a closer look at Managed Print Services – and not just because of the cost savings involved.

Managed Print Services (MPS) is taken to mean all activities and products (hardware, software, consumables and services) that serve the goal of achieving individual and optimally coordinated printing and document processing.

MPS not only lowers direct printing costs, but also the costs of administration and maintenance. Overall, MPS permits the entire output management to be very well integrated into existing IT management arrangements, and in the process simplifies IT processes as a whole. This in consequence has a direct effect on the profitability of the company.

These Guidelines are intended to aid decision makers in restructuring their IT and output environments as well as in the overall document logistics by asking the right questions and attaining the optimum solution through suitable project management.

---

[1] See for example http://www.computerwoche.de/1938933 (As of February 2011)

2 Introduction

Documents, in all of their many forms, are the bearers of information for our knowledge-based society. They are the preferred medium of business communication and form the basis of every archive.

Information printed on paper, i.e. the paper document, is, in spite of all the electronic forms of communication, outstandingly important in today's business correspondence. This remains so in spite of the global span of the Internet, e-mail communication that is now an everyday matter, and the rapid spread of micro-blogging, social networks and real-time chats. Truly important documents are exchanged between business partners using paper. One reason is that in the business world, paper documents enjoy a high degree of legal validity, and a letter is still regarded as the most reliable method of delivering a document. Moreover, for most, the printed document is still seen as being the most efficient medium for the imparting of short-term information, for example through handwritten comments in the document itself.

However, the creation of a paper-based document is a sophisticated process in today's dynamic and highly flexible working environments, since the requirements on the needed printing infrastructure are continually rising. The printing infrastructure must be highly available, fast, efficient and inexpensive. Important documents such as

offers, orders, invoices, dispatch papers, contracts or even simply time-critical documents needed for the next meeting, should be capable of being created quickly, reliably and in high quality at any location within the company. In order to meet these high demands, the printing infrastructure must be actively cared for and optimized. Modern printing infrastructures are a network consisting of complex hardware and software, forming the interfaces between the electronic and the material world within the company. Smooth and efficient operation requires structured management as well as sophisticated service and ongoing optimization – known collectively as "Managed Print Services" (MPS).

These Guidelines explain how modern printing infrastructures can be planned, controlled and administered using Managed Print Services, and also how they can be continually optimized utilizing management processes. The BITKOM Guidelines for Managed Print Services describe what good management means to the printing infrastructure – and can serve as a source of ideas and advice for the optimization of one's own infrastructure. These Guidelines are written for IT decision-makers, purchasers, and specialists and also for trade dealers who wish to learn more about Managed Print Services or deepen their existing knowledge.

3 What are Managed Print Services?

Definition: Managed Print Services (MPS) comprises all measures and products (hardware, software, consumables and services) that serve the goal of achieving individual and optimally coordinated printing and document processing[2].

Determination of an "efficient" printing infrastructure based on classic cost considerations, for example according to Total Cost of Ownership (TCO) or Costs Per Page (CPP), are definitely too inadequate

This is because no document comes into existence upon being printed – the process, and therefore the costs of a printed document, commence when that document is created. An optimal MPS concept is thus distinguished by taking the entire document creation process into account from the electronic document through to output on the hardware. A large proportion of document costs are due to labor costs – the matter of the few cents needed to print on the paper only plays a minor role from the overall cost perspective, but is often wrongly taken into account more than individual cost items due to the fact that it can be more easily recorded.

As well as the analysis and improved design of the information distribution paths of the infrastructure in the company, another important component of Managed Print Services exists, namely those services that can be provided by the supplier of an MPS solution. These include planning, implementation, operation, maintenance and refurbishment of the output devices and their specific solutions needed to carry out these tasks. With Managed Print Services, a tailored and fully scalable outsourcing/ outtasking model can be offered for the entire document output, in order to coordinate the responsibilities for the output devices and their special solutions required to keep the information distribution process in the company up to date. It is important that these models be designed to be future-proof, since the structures and the technological requirements in the company are subject to continuous change. What is today "state of the art" is tomorrow average, and the day after a disruptive factor. This also applies to the often-underestimated subject of output management. When this is not present, or has insufficient emphasis placed upon it, the productivity of the total company suffers.

Indications of an inefficient printing infrastructure can include:
- A high number of differing types of devices in the company
- Hardware with an operating life of more than seven years
- No device management
- No real-time monitoring of the infrastructure
- Unexplained, decentralized responsibilities for devices, consumables and infrastructure
- Decentralized purchasing of consumables and hardware
- Frequent faults and a high degree of internal support effort
- Under-utilized or overloaded printing systems
- Long distances for staff to collect printed documents

MPS helps to eliminate these inefficiencies.

---

[2]   Printers, copiers, scanners, faxes and multifunction systems are known as output devices in the following. MPS is also designated in its extended form as "Managed Document Services".

4 Implementation Procedure

The ideal procedure is oriented towards the well-known "plan – implement – check – improve" cycle. A thorough analysis of the initial situation is important for successful introduction of an MPS solution – not least to determine the potential for savings and thus the cost-effectiveness.

In the analysis phase, the current situation is recorded as accurately as possible. This includes on one hand the hardware used, i.e. the machine park, its status and locations. On the other, the momentary printing conditions are examined and compared to actual requirements.

In the design, a concept for the most economical output infrastructure is created and the processes used within the company are defined. Specific goals are jointly determined by the supplier and the user, and an implementation strategy laid down.

The rollout, i.e. setting up and bringing into service, naturally includes the installation of the hardware and software, but also the training and briefing of the employees and also project management.

In the "manage & support" phase, the user is offered remote and on-site support as required including maintenance and repair, the extent of these services ideally being settled by means of a Service Level Agreement (SLA). Management of consumable materials also brings a great potential for savings.

In the review, the success of the measures taken (given the defined goals) are checked and, if needed, reworked. Ongoing optimization and further development should be further refined in the course of regular meetings.

Subsequent to this brief overview of the subject, its advantages and benefits, the following sections detail the market requirements and processes in the field of MPS.

Fundamental understanding of printing charakteristics, IT environment and feasibilty

Analyse

Definition of a "business case", proposal for technical solutions and ways of making savings

Design

Regular proposals for performance improvement from the service and finance perspective

Review

Introducing the service and managing the fleet. Ongoing monitoring

Manage & Support

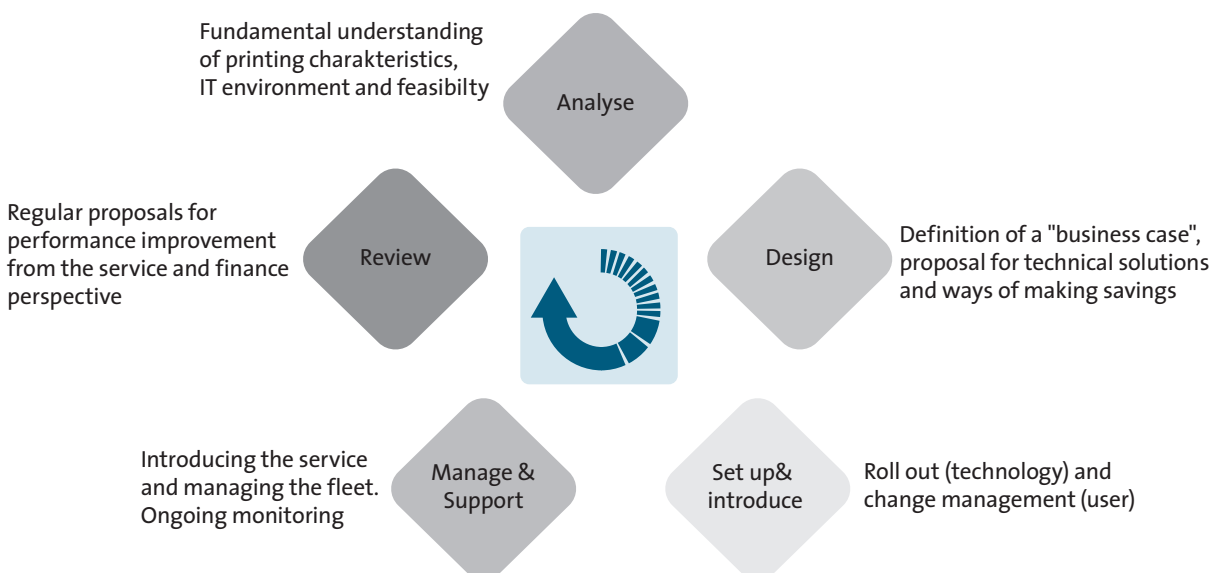Roll out (technology) and change management (user)

Set up& introduce

Figure 1: Procedure for implementation of MPS

5 Market Requirements

Historically, the "printer" market has been seen as a necessary evil. This view of the market has changed over time and it today represents a further and fundamental change in perspective.

Table 1: Paradigms regarding printers

	Previously	Today	Tomorrow
Paradigm	Standalone hardware	Part of the IT infrastructure	Part of business operation value creation
Management	Unmanaged	Managed Print Services	Managed Document Services
Mental Attitude	"Necessary evil"	"An evil held in check"	"Rough diamond"
Strategy	None	Part of the IT strategy	Part of the company strategy
Requirements of the Market	Minimisation of cost	Technical quality and efficiency improvement	Increase of operational value creation
Context	Individual	Printer fleet	Business process

■ 5.1 The "standalone hardware" paradigm

In operational practice, the printers, copiers, scanners, faxes or multifunction devices occupied a gray area between the technical and the IT departments and nobody in the company wanted to (professionally) look after these. Accordingly, the devices were supplied individually, mostly without a plan and in an opportunistic fashion that met the minimum cost requirements. This point of view, which dominated for many years, first began to fatally break down after all-inclusive evaluations such as TCO analyses clearly showed the high costs incurred by both an operation of this nature as well as the provision of the necessary professional and administration staff.

■ 5.2 The "part of the IT infrastructure" paradigm

As this recognition spread through the market, attempts were made to master and keep under control the "necessary evils" of the printer. This subsequently led to changes in the market requirements.

From that point on, printers were regarded as part of the IT infrastructure and were treated in the same way as servers, desktops or laptops. Correspondingly, a need for professional management techniques arose. What has mainly come to the fore is that all printers are seen as a so-called fleet and are managed in their totality similarly to the ITIL standard. Viewed in this way, printers represent particular care and maintenance challenges. Whereas a computer should, and can be, often available up to 99% (or more) without intervention, a printer, because of its high need for consumables and the replacement of worn parts has in general a lower availability.

The market is increasingly seeking suppliers of services who cannot only professionally manage these necessary evils, but also administer and manage the entire fleet of output devices in a similar way to the rest of the IT infrastructure. In such a case, the company must place the operation of the output devices in the hands of the supplier and only pay for a usage-dependent service (with an appropriate availability as documented in the so-called "Service Level Agreements"), for example per page, per workplace, per month or per business event. To meet these market requirements, a potential supplier of services must be proficient across a broad spectrum of capabilities, in particular:

- Procurement/Acquisition and operation of the printer fleet
- Provision of services similar to ITIL[3]
- Safeguarding of access security and governance
- Carrying out of administrative activities

In short, services that are measurable. Details on the individual capabilities can be found in the table at the beginning of this section.

However, the transfer of the printing operation to the services supplier also requires business administration consultation. It is all too easy to lose sight of the operational value creation chain of the business: Printing or output management is in many companies part of – and possibly even a prerequisite for – the core capabilities or operational value creation. This is why appropriate SLAs are decisive.

■ 5.3 The "part of operational value creation" paradigm

Some companies are today already going a step further and are making a quantum leap with regard to their output devices, thus establishing a new market trend. They have turned the tables and no longer see printing as an "evil that can be held in check" but as a "rough diamond". One company asked itself, for example, the strategic question as to what new technical possibilities today's digital printing technologies and printing or document management offer, and how they could profit from these. The result showed that new printing and document management technologies can considerably improve and accelerate upstream processing and handling. In total, the load on the staff was reduced – to the point that recruitment being planned because of the strongly increasing business volume was found to be no longer necessary. Such an integration of the output devices into the business processes and document distribution requires the highest quality and attention when selecting the supplier of services and the SLAs.

---

[3] ITIL is a collection of best practices for IT service management. See http://www.itil-officialsite.com/home/home.asp (As of Oct. 2010)

6 MPS as Part of the IT Strategy

An IT strategy oriented towards the company's objectives is directly linked to its business strategy. Only if there is a mutual exchange between both can a company fully exploit its technological possibilities and put its core capabilities into service to achieve a decisive competitive advantage.

Even though there is no uniform definition of an IT strategy, it must at least contain all of the main technology fields. The field of printing is, from the investment perspective alone, often underestimated, although it is a main technological area. Printing generally includes, on one hand, central transaction printing where, for example, monthly contribution invoices or policies are printed on large printing systems and then inserted into envelopes and posted directly; while on the other it contains decentralized office printing where documents are printed out and handled at local workplaces.

Printing is not only important because of the investments the companies make in that area, but also because printed documents that are aimed at customers, partners or suppliers or services must often fulfill compliance[4] requirements. Many companies can neither prove that compliance-relevant documents have been sent in a timely fashion, or whether they have even been printed at all. Since CEOs or Members of Boards carry direct legal responsibility and are personally liable, they have a prime interest in preventing compliance infringements by means of sensible rules – and this also applies to the printing operation.

Moreover, many companies have not defined the persons who are permitted to print confidential documents in decentralized areas and how to ensure that such documents are only handled by authorized persons.

Many company secrets have fallen into the wrong hands due to documents being freely accessible at a printer, and this also applies to erroneous printouts that have not properly been disposed of or documents that are "surprisingly" printed out after a fault on a printer has been remedied. Here also, company management has a special interest in protecting operational secrets.

In addition, all documents that leave a company have high external effects. If documents are tattered, or the colors are smeared or incorrect, this can lead to a massive loss of reputation. Even worse, the impression made by the bad quality of printing can be transferred to the company's products and services – a fatal consequence.

All these aspects lead to one thing – the subject of printing must take a prominent position within an IT strategy. This is a new view, because from the classic perspective printing is only a peripheral area (if at all) within the IT strategy.

The following guidelines can assist in positioning printing meaningfully in the strategic sense:
- Clear division of tasks between central printing (transaction printing) and decentralized printing at the workplace
- Clear sourcing rules, also for the decentralized areas
- Focus on a homogeneous device standard
- Technical integration in the company network
- Use of a professional services supplier for timely administration and maintenance
- Signing of clear contracts including SLAs and termination management
- Establishment of a clear security rulebook in the sense of "who is allowed to print what"; the use of modern

---

4 Compliance is understood as meaning conformance with legislation and regulations

technologies (e.g. so-called "pull printing") may be useful here

- Introduction of stringent control to track where and when documents, particularly those that are compliance-relevant, are printed (and sent)
- Focus on modern types of devices that make a contribution to "Green IT"
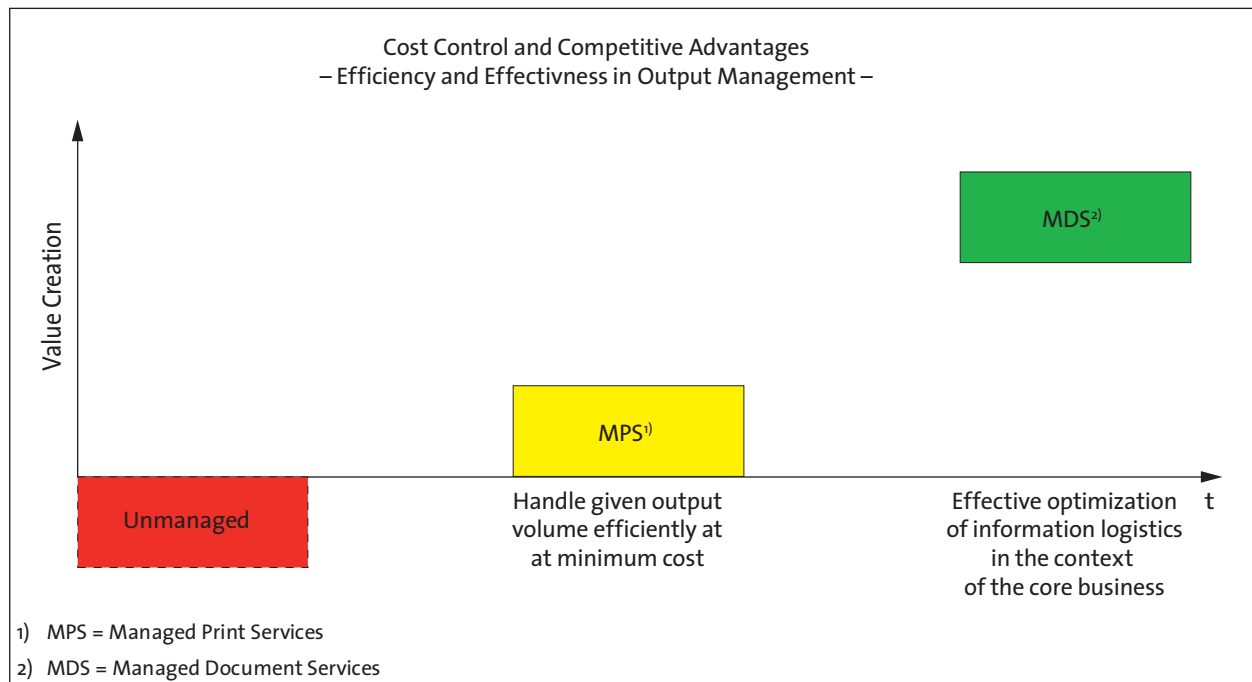
7 Cost Control and Competitive Advantages

Figure 2: Cost control and competitive advantages

If decentralized company printing is viewed as an "evil that can be held in check", this "evil" must be minimized or dealt with as efficiently as possible.

To do so the classic methods of cost checking and control are also used in output management. These above all include[5]:

■ Complete knowledge of the actual current costs for printing, copying, faxing or scanning. As well as the hardware itself, the (seasonal) load, all consumables and the administration and maintenance costs must be taken into account.

■ Ascertaining solid and comparable benchmark values for analysis and positioning or determination of goals in the sense of planned costs. A check should be made as to whether business or operational divisions should be considered separately.

■ Often the need in the Accounting and Management departments is completely different from those in the R&D, Production, Warehousing or Expediting departments. Equally, an independent and comparative consideration of field offices, subsidiaries or factories may be of benefit.

■ Derivation of suitable measures for the minimization or elimination of planned-actual deviations. As well as hardware and consumables synergies, optimization of locations, for example, could be considered, since having the right device at the right place can save unnecessary staff movement time. The administration and maintenance process is a highly important aspect; the question of "make or buy" also arises here, since today there are many renowned suppliers who offer a professional "buy" variant.

[5]   Detailed information on the individual methods can be found in Section 13, Appendix

- Establishment of cost awareness amongst the staff. Depending on the company culture, this can take numerous forms; an internal charging model, possibly temporary in nature, may be helpful.

If on the other hand one regards decentralized company printing as "part of operational value creation", output management must be utilized as effectively as possible in the company as a whole. Here, cost/benefit considerations are not restricted to the printing area only – they relate to the entire value creation chain of the company. The starting points for such considerations are always the business processes in the core business or in the administration processes and no longer in the individual printing areas. The basic questions involved include:

- In which parts of the core or administration processes is there a need for output management (printing, faxing, scanning, or copying)?
- Can suitable software reduce the manual effort required in this environment and, for example, pre-sort business documents electronically, automatically trigger printing and monitor its execution?
- What solutions can be used to formally structure and standardize business correspondence such that faulty printing is minimized and the external image (corporate identity) retained?
- Does it make sense to simultaneously print the attachments belonging to business letters instead of manually including attachments pre-produced in offset along with the letters?

The greater the spectrum of potential attachments, the longer staff can be occupied trying to find the correct attachment. As well as looking for the correct one, the search for the currently valid version can be a further obstacle that eats up working time; a document that is no longer legally valid can have far-reaching negative consequences for the entire company – up to personal liability at top management level.

Success is obvious – a company that has asked itself these questions restructures its core business processes using the possibilities brought to document management by new hardware and more relevant software.

The result is convincing: Highly qualified personnel saves valuable time when processing transactions in the core business. Simultaneously, these highly qualified personnel are disencumbered from the tasks "about printing", which they find tiring and boring.

On the road to establishing print management as part of operational value creation, the following steps are above all necessary:

- Assessing the processes in the core business taking in particular the output management need into account (printing, scanning, faxing or copying)
- Exact documentation of the activities of staff engaged in output management; here also, special attention must be paid to preprocessing and postprocessing
- Analysis of the operational necessities that justify the output requirements
- Research into suitable hardware and, above all, software components that can cover the output requirements
- Modeling of a new planning process that contains the corresponding hardware and software components
- Engaging suitable management resources for design and implementation who must possess equal amounts of expertise in business administration and output management

8 Procedure when Introducing MPS

This section describes in detail what project steps can be taken when introducing an MPS solution. Not all of the steps are necessary for each implementation project.

- Formal presentation of visualized floorplans and a description of the proposed solution
- Financing proposal

■ 8.1 Optimization of the output devices

Optimization of the output devices has the goal of analyzing and suggesting comprehensive improvements for productivity, efficiency and cost reduction as well as rationalization and physical distribution of the devices in the user environment. For cost and efficiency reasons, software-aided analysis with, if possible, visual representation of the analysis results, is to be preferred. The analysis should contain the following points:

- Analysis of the output devices in the customer environment (design requirements)
- Floorplans (after optimization, dependent on the internal guidelines)
- Savings in overall operating costs and forecasts
- All visible areas of improvement: productivity (i.e. volume requirements compared to device capacity), efficiency (i.e. number of units per user, cost reduction) and financing models (e.g. leasing)
- Effectiveness index comparison between current and targeted situation: Devices/users, average device speed, ratio of color devices, degree of device networking, etc.
- Clear understandable recommendation, graphical if possible, based on the documented analysis
- Service level requirements
- Future change potential (e.g. after ramping down recently purchased output devices)

The following activities are typical of this process:

- Clear recommendations for the reworked output device environment
- Proposed implementation plan

■ 8.2 Technical optimization

This step contains technical aspects of document logistics, workflows and processes. These include the identification and recording of technical areas that can potentially help the customer in the improvement of workflow efficiency and the reduction of overall operating costs. The scope of the analysis must be decided between the supplier and the customer in advance.

- All current hardware (PCs, servers, output devices) and software as well as connectivity products and/or infrastructure, including current costs and usage
- Comprehensive descriptions and documentation of the network environment, network traffic and the operating systems
- A comprehensive description of the processes and the document workflows within the individual departments and divisions
- All obvious areas for technical improvement must be documented and should deal with aspects such as productivity improvement, efficiency and financing
- A clear and understandable recommendation based on the areas of improvement with regard to the reworked processes and workflows, supported by a technical solution
- All advantages should be clearly explained

The following results reports should be taken into account:

- A comprehensive technical analysis of customer needs and requirements with specification of the existing hardware (PCs, servers, output devices), software and the existing network

- A description of the technical requirements regarding a new infrastructure (hardware, software, network, processes and workflow)
- A report on the areas noted above (technical recommendation)

■ 8.3 Print workflow optimization

Print workflow optimization leads to a well-documented recommendation that contains information on the hardware, software, network environment, printing guidelines and workflow specifications. Resources, costs and timescales that increase productivity and efficiency and lower costs are determined in advance.

- Analysis of the reworked printing environment (design requirements)
- Floorplans (after optimization, dependent on the internal guidelines)
- Savings in overall operating costs and forecasts
- All visible areas of improvement: productivity (i.e. volume requirements compared to device capacity), efficiency (i.e. number of units per user, cost reduction) and financing models (e.g. leasing)
- Effectiveness index comparison between current and targeted situation: Devices/users, average device speed, ratio of color devices, degree of device networking, etc.
- Clear understandable recommendation based on the documented analysis
- Service level requirements
- Continuity plans and high availability for business-critical printing processes

Optimization of the print workflow contains these elements as well as the analysis of:
- Printing guidelines
- Document workflow
- Software

The following results reports can be expected:
- Clear recommendations for the design of the output environment
- Notes on legislation

■ 8.4 Requirements and tools for trouble-free operation

There exist various suitable tools and methods to maintain trouble-free operation or to maximize the availability of the output environment.

8.4.1 Management reporting

Management reporting serves the purpose of ongoing cost transparency and control as well as documenting service activities. In detail, these include:
- Automatic and precise data capture
- Further processing of the data in the desired formats
- Trend analyses, incident management and the tagging of business-critical processes
- Provision of operational information for those providing service (SLAs and KPIs)
- Monitoring of the carrying out of service improvement plans (SIP)
- Depiction of precise data showing the advantages and their implementation according to strategic and operational decisions

The following should be determined with regard to management reporting:
- Agreement regarding content, frequency and presentation of reports according to SLA
- Data collection, processing and analysis
- Business domain-related representation of information

Within the framework of MPS, it can be of considerable advantage for the management of output devices to utilize manufacturer-independent device management (e.g. a service portal) to be able to include output devices from different manufacturers in equal measure in SLA management.

8.4.2 Service level management

The successful implementation of an MPS project and the smooth operation of an MPS environment are largely dependent on efficient service level management (SLM).

To achieve this, the supplier of services agrees in an SLA, underlying the SLM, the services to be provided, the quality of service (service level) as well as the contractual penalties resulting from nonconformance with the SLA.

Based on the measurable parameters of the SLA, SLM is understood to mean the agreement and monitoring of the SLA as well as the determination and further development of the processes and organizational responsibilities necessary. SLM therefore takes on the function of the targeted control and monitoring of the service provisions within an MPS contract.

Service details

The main SLM activities of an MPS can be summarized in simplified form as follows:

- Establishing a responsible contact person on both sides (single point of contact)
- Determining the requirements on the business processes
- Defining and developing a tailored catalog of services
- Negotiation and agreement of the required service level (SLA)
- Monitoring of the agreed SLA
- Measurement of service quality and satisfaction
- Initiation of countermeasures when service interrupted

In addition, the SLM in an MPS project may contain the so-called multivendor management. This is understood to comprise all processes necessary for management of the supplier relationships to third parties and/or service alliance partners, in order to guarantee the same service level for all devices used. This requires the services provider to conclude agreements that have the same coverage with his partners.

Both SLM and multivendor management can use only one service partner as a communications interface (SPOC – single point of contact) in the MPS project.

The following services are generally included:
- Finance management
- Partner management, multivendor management
- Multivendor management service desk/helpdesk as a communications interface (SPOC)

8.4.3 Ongoing optimization (capacity and availability management)

Ongoing optimization comprises the checking and improvement of the original solution as well as ongoing improvement in service to meet new customer requirements and technological progress through:

- Capacity management that optimizes costs through the use of suitable resources, concentrating on performance, load management and application sizing
- Availability management that ensures suitable maintenance of resource optimization as well as measures to minimize the number of faults
- An important advantage of MPS is the ongoing and flexible possibility to adjust to customer-specific conditions.

8.4.4 Driver management

Managed Print Services increases the efficiency of staff and reduces costs – but does the IT department also benefit from optimized work processes? In practice, the management of a large number of models of devices and driver versions in simultaneous use results in a tacitly accepted workload. A great deal of experience and timeliness is needed to solve, or avoid, the problems associated with a mixed environment. It is in exactly this problem area, invisible at first glance, that Managed Print Services shows its strengths compared to unstructured printing infrastructure and also reveals further savings potential.

With Managed Print Services, an IT administrator can operate all installed printers and multifunction devices within the company with only one universal driver. The effort for certification, and management and the rectification of faults, is markedly reduced. Moreover, standard rules can be defined for printing presets such as duplex or black-white printing in order to reduce printing costs even further.

The structured print environment permits a homogeneous driver and device operation concept that represents a clear advantage for users.

Additional useful functions are simple to implement and are readily accepted by users. One example is printing on a central device either by authentication of a staff pass, a fingerprint or by entering a PIN code. Another is a consolidated scan-to-mail/file/folder concept, which can be of significant advantage to both staff and business processes.

A central management tool, as mentioned in 4.1., should be part of the overall solution.

It should be noted that recently, SaaS (software as a service) solutions in the form of Cloud solutions have gained considerable acceptance since they utilize secure SSL Internet connections and limited protocols.

This regulates the installation, management, checking and error recovery for the entire fleet of devices. A distinct advantage of such a tool is that all conditions are represented in real-time at one point, allowing IT administrators to recognize and rectify problems immediately – the number of, and response times for, helpdesk queries is considerably reduced.

Specifically, the following advantages result for IT administration:
- Savings in the management and support of print servers, clients, printers and multifunction devices
- Increased stability of the print environment
- Reduced certification effort for new devices
- Simpler introduction of new operating systems
- Establishment of additional cost advantages through central printing rules

Managed Print Services can markedly reduce the necessary IT effort necessary by reducing the diversity of devices and driver versions needed for the printing infrastructure. In addition, it ensures high availability of the devices and – as a result of this – more efficient working by the user.

9 Security

Modern output devices are active components in an operational IT network. They have their own operating systems, ports, protocols, hard drives and application programs.

They print, copy, fax and transmit, including sensitive-information and confidential documents, to both internal and external recipients. For this reason, the security requirements are the same as, for example, servers.

Much important company information leaves the premises via output devices without being noticed. Managers and administrators are often not aware of such occurrences. The Federal Office for Information Technology Security (German: BSI) has recently drawn attention to this, pointing out that the number of hackers who are operating systematically and in a targeted manner is increasing. The latest researches have again shown that IT security, above all in the area of output devices, is often not taken seriously enough or that resources to implement measures are simply not in place. According to the BSI, the risk situation is composed of the following:

■ Human error (for example, printouts are not picked up, erroneous printouts not disposed of)
■ Organizational errors (e.g. unlimited access authorizations, administrators not sufficiently trained)
■ Technical failures (e.g. hardware security features not being used)
■ Deliberate actions (e.g. interception of print data in the network, reading out of hard drives)

Why is security necessary in printing, faxing and copying?

The systems:
■ Are active network participants
■ Communicate via various protocols and ports
■ Have memories and hard drives
■ Have their own operating systems
■ Have components similar to those of servers

The special knowledge required has in the meantime become so extensive that specialists are needed. Suppliers of services must support their customers in, for example, the implementation of the IT security norm ISO 27001 in the printing and copying environments in order to meet all of the requirements.

A possible approach to increasing security could be to determine the areas to be organized and the measures to be taken in these, for example:
■ Protection of the systems (for example, protection against changes to configuration and manipulation)
■ Protection of digital data (unencrypted administration of the systems, passwords transmitted as clear text, protection against manipulation of the configuration)
■ Protection of the printed documents (protection against interception and manipulation of print jobs and unauthorized dissemination or copying)

Furthermore, technical measures must be taken to protect these areas.

BITKOM

Protection of systems:	■ Set passwords, close unused protocols and services/ports ■ To protect hard drives, multiple data deletion, data encryption and physical hard drive protection must be used ■ Central recording systems should be used so that system error messages are identified and forwarded to the correct points, and also for the purpose of documenting usage of the systems
Protection of digital data:	■ Secure management through encrypted transmission of the configuration parameters (SSL, SNMPv3) and authentication of the multifunction device (802.1x), i.e. only authorized devices may be operated in the network. Secure management is supported by most modern output devices. ■ Protection against interception and manipulation when sending can be achieved by authenticating every user before the transmission of digital data ■ Print jobs are printed in encrypted form. In virtual LANs (VLAN) , a printer or multifunction device is actually in the same network but is logically separate from the other participants. Many manufacturers offer secure solutions for printing via Bluetooth or WLAN.
Protection of printed documents:	■ Use of watermarks that first become visible upon copying and copied records containing a sequential number to ensure that a copy is authorized ■ Treat output devices the same as PCs, no access to information without logging in ■ Print jobs are only issued when the authorized owner of the data is present

Company management must answer the question as to what measures they must of necessity introduce regarding the security of the data in the output management.

10   The Environment

Even although cost savings and a more flexible printing environment are the main reasons for the introduction of Managed Print Services into a company, environmental considerations are increasingly becoming an important decision criterion. They are now mandatory for calls for tenders issued by public authorities. The reason for this is not only the declared goal of the European Union to reduce CO2 emissions by around 20 percent by 2020, but also the increasing environmental awareness of companies and public bodies.

Managed Print Services perfectly combines cost efficiency and sustainability: In such an offering, cost savings through new hardware or an improved delivery chain and a reduction in energy consumption are taken into account in the analysis phase. The need can be considerably lowered just by using multifunction devices – instead of a printer, a scanner, a fax and copier, only one device requires energy. If a device has been awarded an EnergyStar, it has met the strict criteria of this organization and is very eco-friendly. Functions such as a faster-operating sleep mode also help to guarantee such reductions.

Paper consumption can also be reduced by up to 50 percent by automatic duplex printing, thus saving costs and storage space. Currently, this, and the associated production of paper, form one of the biggest items on the environmental balance sheet. A reduction in consumption is therefore a starting point for MPS. The strategies for this include:

- Automatic duplex printing
- Digitalization of work processes
- Printing with defined access rights, for example for color printing
- Printing of forms, brochures or other materials on demand
- Special print options for the printing of online content

Over and above this, the recycling of hardware and peripherals has become a central theme for companies.

More and more companies place emphasis on the later disposal when purchasing a device – whether a printer, a screen or a telephone – and only order from suppliers who have a recycling program for electrical/electronic scrap. This applies even more if the purchased printers or multifunction devices are already to some extent manufactured from recycled materials and are therefore twice as environmentally-friendly.

Another aspect of sustainability is that of consumables for printers and multifunction devices. This includes various toner and ink cartridges that require elaborate storage. When these are empty or past their use-by date, they must be disposed of. In a Managed Print Services architecture, this is handled differently – the toner or ink level of each individual printer can either be seen directly, or the hardware sends a warning message when the cartridge nears the end of its life and a replacement is ordered automatically. All suppliers offer the necessary recycling process for the spent cartridges.

As in all projects, however, it is important that employees are involved right from the beginning. Only in this way do they feel themselves to be part of the process and are therefore able to support it actively. If company or public institution employees support sustainable processes and a modern printing architecture based on Managed Print Services, the success of these measures is more or less assured.

Possible measures that can be taken are:
- Consolidation of devices (copiers, printers, faxes, scanners)
- Reduction in power consumption by installing energy-saving devices
- Usage of environmentally-certified devices
- Reduction in expenditure by using duplex and combined functions
- Reduction in erroneous printing by using an on-demand print function

11 Effects

Only a few companies know their printing costs. In addition, these differ according to the various sectors and are in general several percent of the company turnover – and well above 10 percent in sectors, such as the advertising industry, that print intensively.

This alone is reason enough to take the subject of MPS seriously. When these costs and the processes that lead to the output become clear, measures to lower costs can be taken.

■ 11.1 Practical example 1

The Caritasverband (Charity Association) in Bavaria has not only recognized the savings potential of Managed Print Services with regard to the consolidation of its hardware and peripherals, but also with regard to energy consumption. When switching over to Managed Print Services, Caritas replaced all of its faxes, printers, scanners and copiers with multifunction devices. From the 1100 inkjet and laser printers with over 100 different model variants, 760 printers and multifunction devices, in seven different models, remained after consolidation.

Caritas not only saved on footprint and storage space, but particularly in energy consumption. By implementing an MPS system, the Charity saved the remarkable sum of 30,000 Euros in energy costs alone over the contract period. To this must be added further cost reductions in paper consumption due to duplex printing, and also in support.

■ 11.2 Practical example 2

The management of almost all printing systems in a Hamburg clinical center has been passed to a supplier of services. The Clinic profits from this through clear costing and simplified processes.

The savings comprise the following:
- Massive savings in overall costs (more than 30 percent)
- Electricity savings of around 11,000 Euros in the first year
- System availability greater than 98 percent
- User access very intuitive
- Usage increased by 50 percent per system

Initial situation

```
                    ┌──────────────────┐
                    │  4.500 devices   │
                    └────────┬─────────┘
        ┌──────────────┬─────┴──────┬──────────────────┐
┌───────────────┐ ┌──────────────┐ ┌──────────────┐ ┌─────────────────────┐
│  400 models   │ │ 41 suppliers │ │ TCO was      │ │ Low usage per       │
│               │ │              │ │ unknown      │ │ device              │
└───────────────┘ └──────┬───────┘ └──────────────┘ └──────────┬──────────┘
                  ┌───────────────┐                  ┌─────────────────────┐
                  │  High price   │                  │ High operational    │
                  │               │                  │ costs               │
                  └──────┬────────┘                  └─────────────────────┘
                  ┌───────────────┐
                  │ High          │
                  │ administrative│
                  │ load          │
                  └───────────────┘
```
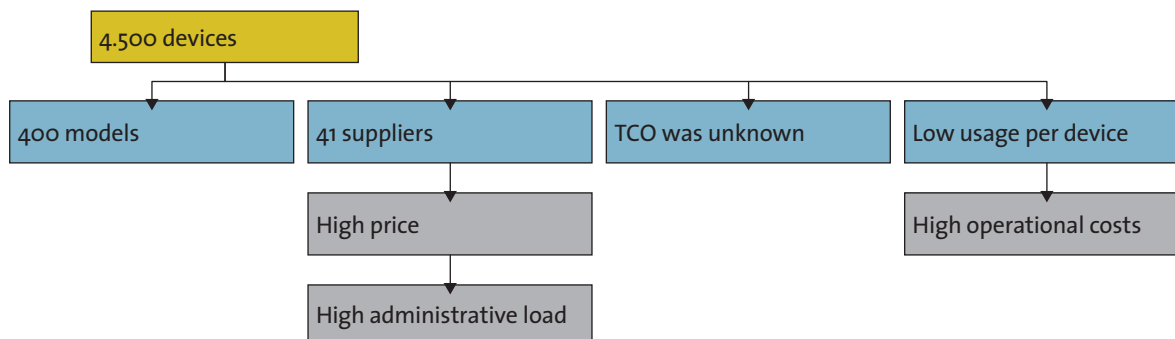
Situation after conclusion of project

```
                    ┌──────────────────┐
                    │    Solution      │
                    └────────┬─────────┘
        ┌──────────────┬─────┴──────┬──────────────────┐
┌───────────────┐ ┌──────────────┐ ┌──────────────┐ ┌─────────────────────┐
│ 10 different  │ │ 1 supplier/  │ │ All costs    │ │ Completed accounted │
│ models        │ │ 2 manufacturer│ │ transparent  │ │ for                 │
└───────┬───────┘ └──────┬───────┘ └──────┬───────┘ └──────────┬──────────┘
┌───────────────┐ ┌──────────────┐ ┌──────────────┐ ┌─────────────────────┐
│ Stock         │ │ Utilities    │ │ Scan to PDF  │ │ Device portal       │
│ management    │ │ management   │ │              │ │                     │
└───────┬───────┘ └──────┬───────┘ └──────┬───────┘ └─────────────────────┘
┌───────────────┐ ┌──────────────┐ ┌──────────────┐
│ Invoicing with│ │ Papier &     │ │ Secure       │
│ upload        │ │ toner refills│ │ printing     │
│ to ERP system │ │ by services  │ │              │
│               │ │ supplier     │ │              │
└───────────────┘ └──────────────┘ └──────────────┘
```
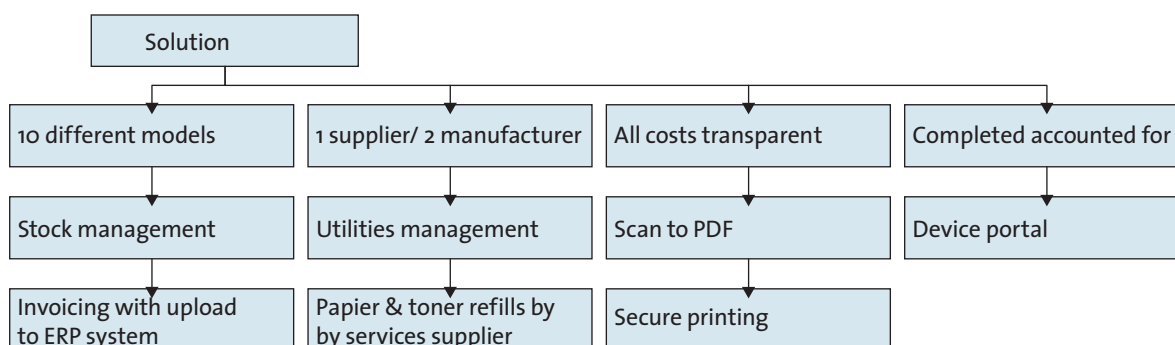
Figure 3: Project situation

■ 11.3 Practical example 3

System optimization and document management through Optimized Print Services at the Wohnungsbaugesellschaft Meiningen Company.

The Wohnungsbaugesellschaft Meiningen (WBG) Company manages over 2000 rental apartments and offers a range of additional services for the tenants. This results in a monthly printing volume of around 17,000 pages. The implementation phase of an MPS project began in June 2010, with a new generation of systems of replacing the previous printing infrastructure. In addition, the company is using a modular document management system to administer an electronically archive documents.

The combination of both of these measures has meant a massive gain in productivity for the team and has reduced yet again the number of systems in use.

The advisory phase commenced at the beginning of 2010. This was initiated by collecting data to give a comprehensive view of the printers, copiers and fax devices present in all departments to allow the answering of core questions:

■ Where do the around 14,000 black/white and 3000, printouts currently being printed originate? What proportion of this do the Housing Management, Equipment, Commercial, Service Center, Executive Management and Social Management Departments each have?

■ Which systems are available there and what costs from these arise as a result?

The energy balance of the document production is also meticulously determined:

Power consumption, emissions and the disposal of consumable material residues are critical factors when assessing the ecological compatibility of the existing structure. Piece by piece, a precise and comprehensive picture of the actual situation was revealed. This was analyzed, the end result being an exactly tailored master plan that showed where, and why, alternatives in the print infrastructure would pay off.

In practice, this meant for WBG that four workgroup systems took on most of the print output from July 2010 onwards. The energy efficiency, with a maximum power consumption of 1500 W, is also excellent. The workgroup systems were supplemented with a laser printer, a multifunction system specially designed for smaller offices. Every system has a specially selected location.

Short travel paths for staff and efficient loading of the systems were the decisive criteria for this choice.

The analysis and the operational recommendation was not however limited to the hardware and its efficiency. After an inventory had been made of the systems according to cost and energy consumption, the work processes concerned in the creation of documents were also recorded.

12   In Conclusion

Managed Print Services offer companies the possibility
to record and control their printing costs. By doing so, the
entire output management of the company becomes
more efficient – i.e. more can be achieved for the same
amount of money. By extending the MPS concept to the
entire lifecycle of business documents, the company is in a
position of being able to improve its core business proces-
ses and thus react more quickly to market requirements.

13 Attachment: Recommendations for a Checklist

When introducing and operating Managed Print Services, numerous processes take place that can be split up into the areas of MPS optimization, requirements and tools in order to permit smooth operation and a high degree of security. These processes are briefly described in the form of a checklist in the following.

■ 13.1 Steps for MPS optimization

Process	Description
Actual situation analysis (7.1.)	Analysis of the as-is situation at all company locations
Target state planning (7.2. & 7.3.)	Creation of a target concept for all locations ■ Setting up a business case in cooperation with Controlling and the IT department
Migration	Creation of migration concept[6]
Shopping basket	Creation of a company-wide standardized device catalog/shopping basket
Rollout	■ Rollout planning agreed with services suppliers according to planning requirements ■ Slippage due to modifications are possible and must be taken into account
Briefing	■ Briefing of those responsible by the services supplier in the course of a pilot installation ■ During the rollout, staff are briefed onsite in the operation of the devices by the services supplier (user training if necessary)
Handover	Documenting the installation and commissioning by means of a handover log maintained by the staff responsible.
Monitoring	Active monitoring of all devices should be aimed for: ■ The asset management system should permit recording of all commercial information relating to output devices ■ Mapping of device lifecycles ■ Incident management, problem management and change management can use the IT service management (ITSM) tool of the client
Asset management	Alternatively, the supplier can use his own ITSM tool but must ensure that all information in this tool is available to the client in his own ITSM tool

Management and up-to-date documentation of data and configurations

---

6   A migration concept describes the necessary steps of the transition process to the target hardware machine park.

■ 13.2 Requirements and tools for trouble-free operation

These include all processes related to the maintenance and support of devices as well as to supplying these with consumables.

Incident management	■ Generation of tasks, incidents or reviews in the incident management system (help-desk system) ■ Ticket workflow in Incident Manager ■ Feedback on status and ticket numbers
Hotline	Provision of a hotline in the desired language
2nd Level	provision of 2nd level support: (fault analysis and rectification)
Break+Fix	■ Repair or exchange within the scope of the SLA ■ Delivery of the replacement parts ■ Bringing back into operation
IMAC/R (Install, Move, Add, Change /Remove)	■ Informal interface between external services suppliers and internal IT management ■ IMAC/R of the devices is coordinated via the service center and if necessary agreed with the bidder/supplier
Move	This service comprises the relocation and transport of a printing system that is under contract within a building or to another client location
Remove	■ On return of devices, the contractor must ensure that hard drives have their contents deleted in such a way that these cannot be reconstructed ■ The above also applies to hard drives that are replaced in the course of maintenance and troubleshooting ■ This must be done with a tool from the hard drive manufacturer that permits complete deletion of the contents of a hard drive
Automatic supply of toner	■ Fleet management reports a defined threshold value (e.g. fill level of a printer toner cartridge under 20 percent) ■ Handover to an ordering system to trigger corresponding consumables procurement ■ Proactive supplying of all locations with consumables (except paper, transparencies, staples)
Return of cartridges	Free provision and return pickup of collection bins for consumables
Maintenance	■ Intervals according to manufacturer information ■ Carrying out of necessary firmware upgrades ■ Maintenance and repair of devices on site (including cleaning)
Preventative maintenance	■ Preventative measures to maintain the functionality of the printers in use ■ Should be carried out once a year and depends on number of pages produced
Reporting	■ Information shown via reporting system ■ Export possibilities (e.g. as files in the CSV, PDF, XLS, XML formats) ■ Possibility of initiating automated external processes (events) upon defined threshold values of certain KPIs via various interfaces ■ Reporting via freely configurable views for all objects and information

Specific reports	The services supplied must be documented in clear and meaningful reports. Monthly reports across the reporting period should above all contain: ■ Availabilities/Downtimes ■ Changes carried out ■ Number of calls per fault class ■ Resource usage ■ Problems that have occurred and untypical system conditions Monthly reports should be handed over at the latest on the third work day of the month in electronic format. Service tickets and their status must be able to be seen by the client at any time
Accounting	Fleet Management provides defined data with accounting information (e.g. costs per cost center or user based on actual current click price) in the form of XML data on a regular basis. This is automatically transferred to an accounting and controlling system via a system interface for further processing there.
SLA measurement	The services provided by the supplier must be measured completely and objectively. The KPIs and measurement criteria (such as location, cycle and time of the measurement) to be measured are determined in detail in the concept phase
Service management	Suitable and binding structures for effective service management must be created that include joint communications routines at the various responsibility levels. Records of the meetings must be kept. Within the service management framework, reliable and resilient escalation processes must be defined.
Monitoring	The output devices report events via SNMP ■ All main systems and components serviced by the supplier must be continually monitored by him ■ For this purpose, the supplier must provide and utilize suitable tools ■ Proactive system management – critical system conditions should be monitored and identified at an early stage (24 hour, 7 day) ■ Replacement parts and consumables are delivered to each location unasked ■ If a printer reports that toner must be replenished, this message is sent in parallel to all those responsible for the devices. Replenishment must be carried out by the services supplier without assistance. ■ The client does not attempt to keep a stock of toner. The supplier ensures that the devices are supplied with toner at all times. ■ Faults, cleaning or other maintenance derivatives are also recognized by the service supplier's monitoring system. The exact processes must be agreed in the detailed concept.
Multifunction device system time	The device takes its system time from a central time service
Driver management	Central administration of the drivers on the print server, mapping via point&print
Innovation management	Undertaking optimization measures forms part of the standard tasks. Technological or other innovation opportunities in the course of carrying out the contract should be utilized to the full by the bidder to the advantage of the client. Such activities must always be coordinated in advance and agreed separately.

■ 13.3 Security, convenience and governance

Security	Access control	Internal administration for control of authorized addition to location and access control of persons, roles and groups
	Authentication	Every employee, together with his user information, can be found in the Active Directory (AD). In both of these systems, the logon information and any authorizations are known for all users.
Convenience	Pull-printing	■ The print job is saved in the spooling module until the user has authenticated himself on an output device that has been enabled for his use ■ The print job is then added to the wait queue of the printer. After the output device has announced completion, the print job is deleted. ■ If a print job is not picked up, it is deleted after a configurable period of time and the message is sent to Monitoring
Governance	Communication	The supplier should participate in regular meetings and to a certain extent also keep records of these. The most important meetings include: ■ Status meetings (weekly during the transition) ■ Control Board sessions (monthly) ■ IT strategy meeting (annually)
	Termination management	For normal or exceptional contract termination, the contractual relationship must be terminated in an orderly fashion. The basics of the corresponding procedure must be sent along with the offer and determined in the services contract. The possible costs for a transition upon contract termination must be shown in the offer.

The Federal Association for Information Technology, Telecommunications and New Media (BITKOM) represents more than 1,350 companies in Germany. Its 1,000 direct members generate a sales volume of 135 billion Euros annually and employ 700,000 people. They include providers of software and IT services, telecommunications and Internet services, manufacturers of hardware and consumer electronics, and digital media businesses. BITKOM campaigns in particular for a modernization of the education system, for an innovative economic policy and a future-oriented Internet policy.