

# White Paper

# Realizing BPM-as-a-Service – the next level in Cloud Computing

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**Cloud computing in the world of BPM is often related to business process execution with SOA and web services. But business process execution is only one part of the whole BPM lifecycle that a BPMS should support. Therefore the analysis, design and improvement of business processes out of the cloud should be regarded as well in a holistic Business Process Management as a Service (BPMaaS) concept.**

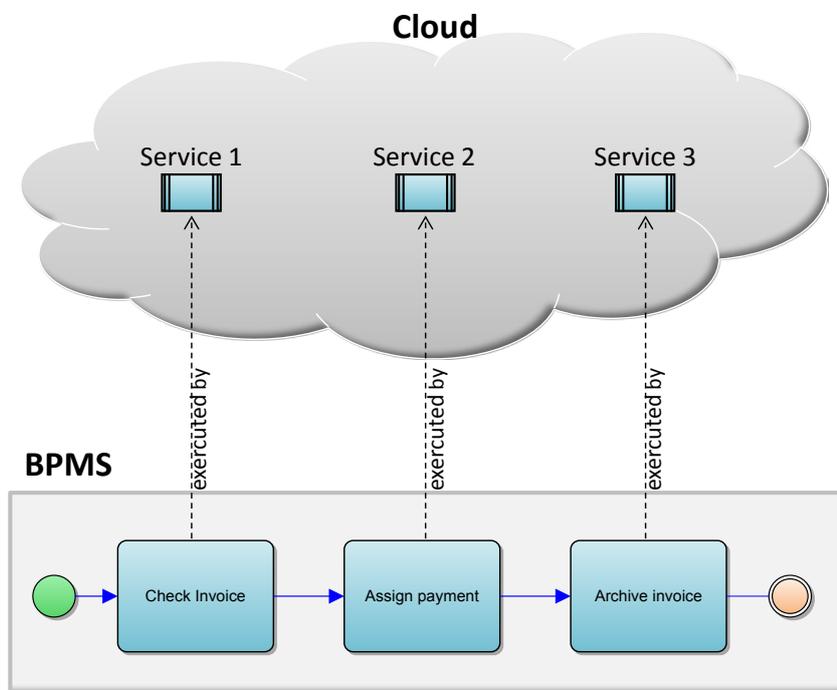
## BPM and Cloud Computing

In 2013 the IT analyst Gartner Inc. predicted that cloud computing will become “the bulk of new IT spend by 2016” (Gartner, 2013). A common classification of services that cloud providers offer has been developed by the National Institute of Standards and Technology (NIST), which divides cloud services into Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS) (Liu et al., 2011). In this classification IaaS is the starting point and refers to basic services such as storage or network, and reaches up to SaaS involving software tools like Customer Relationship Management (CRM) software or whole Office suites. Each of these three levels in this classification abstracts from the functionality of the level below. In this whitepaper the current role of cloud support in the BPM lifecycle is discussed and a new cloud level on top of SaaS, called BPMaaS, is proposed. Furthermore some guidelines whether to migrate to BPMaaS are given.

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# The role of Cloud Computing in the BPM lifecycle

From a Business Process Management (BPM) point of view, cloud computing based on SaaS means that parts of the business process execution are provided in the cloud. Industry standards for business process description like BPMN 2.0 offer an own type of task, called service task, in order to indicate that a service outside the Business Process Management System (BPMS) is executed to realize this task. Especially concepts like the Service-oriented Architecture (SOA) focus on the idea to describe and execute a business process by orchestrating a set of selected (web) services and just define the control and data flow between them inside a BPMS or a business process execution engine. By using SaaS these services or service task are realized in the cloud. Figure 1 illustrates the execution of a business process based on software services that are provided out of the cloud.



**Figure 1: Business Process Management based on SaaS**

This scenario still requires a local BPMS that orchestrates the whole process, additional to the services in the cloud. This means today a cloud support exists only for parts of the BPM lifecycle. However the definition of the BPM lifecycle is seen differently by different researchers and software companies. Therefore the number of phases of the BPM lifecycle varies between 3 phases, as defined by Oracle, and up to 6 phases, as defined by Software AG. But some common phases can be identified in all the BPM lifecycles. At least, there is:

- (1) a phase of process design and analysis,
- (2) a phase of process implementation and execution, and
- (3) a phase of business process controlling and improvement.

The results of the measurement and controlling phase are reused as an input for the design and analysis phase in the next run of the BPM lifecycle. So, in the past, cloud computing in the world of BPM was focused on the implementation and execution phase. This is how today a standard SOA implementation and what is described above in figure 1 are designed.

But in this scenario the process design and analysis phase, as well as the business process controlling and improvement phase, are not supported out of the cloud. Therefore the most claimed benefits of cloud computing (Sereff, 2014) are neglected for both of these phases. The most important achievable benefits are pay per use, scalability and shifting installation and maintenance efforts to the cloud provider, even if it's the own IT department in the case of a private cloud. But as the BPMS still runs locally, and licenses for each client are required, most of the hardware that is sized to handle load peaks will be idle, and efforts for installation and maintenance are still required.

Therefore the next level of abstraction in cloud computing above SaaS will be Business Processes Management as a Service (BPMaaS) that offers the whole BPM lifecycle out of the Cloud. This enhanced cloud stack is shown in figure 2.

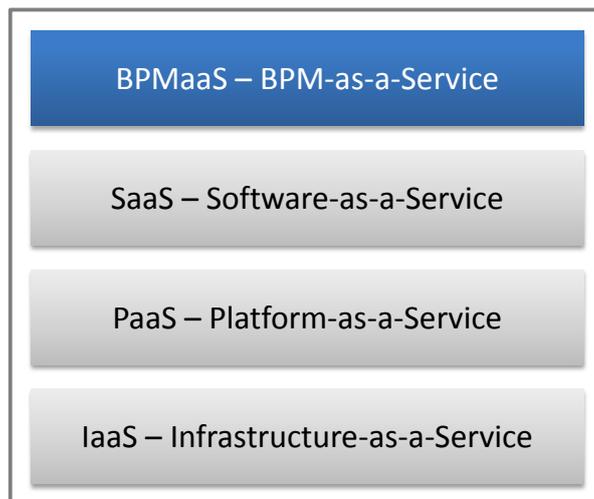
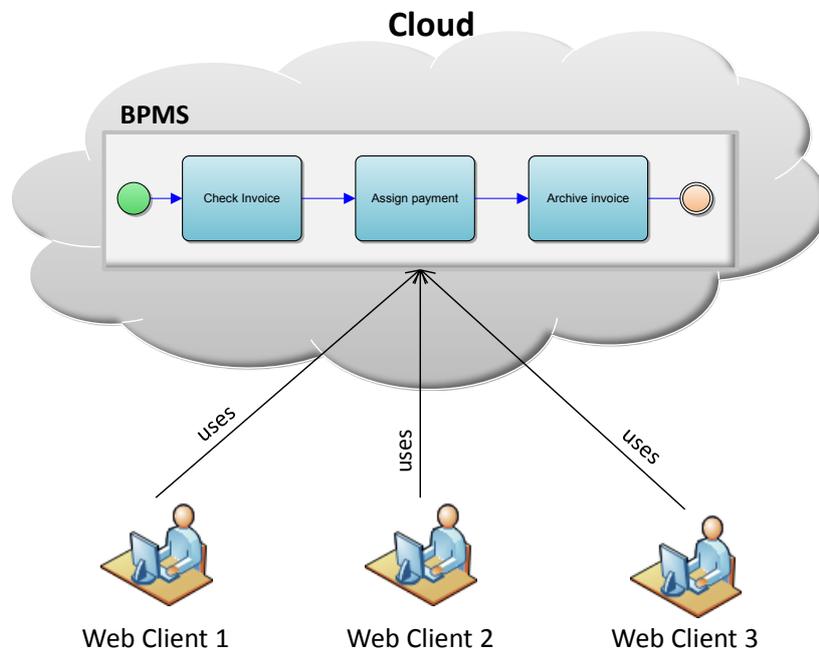


Figure 2: BPMaaS as next cloud level on top of SaaS

## BPMaaS as the next cloud level

BPMaaS is the next logical evolution level of Business Process Management in conjunction with cloud computing. Thus the major idea of BPMaaS is to support all phases out of the cloud and not only the execution of business processes. Therefore the Business Process Management System (BPMS) itself is migrated into the cloud. Figure 3 illustrates that idea, in which the BPMS is provided as a Service (BPMaaS).



**Figure 3: BPM in the cloud with BPaaS**

In a company that will practice BPaaS the whole functionality of the BPMS is accessible via a standard web browser. This obsoletes a local installation and maintenance on each client. Furthermore the update, backup and roll-out of new software versions of the BPMS, as well as of the managed business processes, can be done at a single point. Furthermore the release cycle management of a company's business process models is a demanding task in Business Process Analysis (BPA), as older versions of the process models have to be archived for governance and compliance reasons, and every new version should be published inside the organization synchronously. Therefore from a department's point of view all business process management activities that are related to communicating, updating, publishing or reviewing business process models can be outsourced as a service to the IT or Quality management department that is leading the company's BPM activities. This helps to reduce costs and to enforce governance and compliance rules.

Also, experiences in business process management show that there are typically different types of stakeholders and users in each company. On the one hand there are the BPMS power users that are often process owners, who view, design and improve business process models as part of their daily work. On the other hand there exists a group of casual BPMS users who view business processes when they are required to execute them. BPaaS doesn't have much effect on the first group, but reduces the hurdle to access the needed business process models, as no more special tools are needed and every platform that offers a web browser can be used. This can be especially a benefit for employees that work externally or are on a business trip, because as long as they can establish a VPN connection to their company's network they have access to the BPMS. The same applies for teams or departments that are distributed at different locations.

Taken as a whole, all benefits as well all disadvantages of cloud usage are applied to the BPMS with BPMaaS. Table 1 summarizes the PROs and CONs of BPMaaS.

+ Pros	- Cons
<ul style="list-style-type: none"> <li>• Pay per use</li> <li>• Reduced installation and maintenance efforts</li> <li>• Scalability</li> <li>• No special software tools need to access business processes</li> <li>• OS independent on client-side</li> <li>• Thin clients possible</li> <li>• Easy update of BPMS and business process models</li> <li>• Synchronous company-wide publication of business process models</li> <li>• Easier backups</li> <li>• No mismatch with local versions possible</li> <li>• Collaborating easier with partners</li> </ul>	<ul style="list-style-type: none"> <li>• Depending on cloud availability</li> <li>• Depending on network access</li> <li>• Security issues</li> <li>• Tradeoff between security and accessibility from outside the company's network</li> </ul>

**Table 1: PROs and CONs of BPMaaS**

The next section is dedicated to a guideline that gives a hint when a BPMaaS introduction is useful.

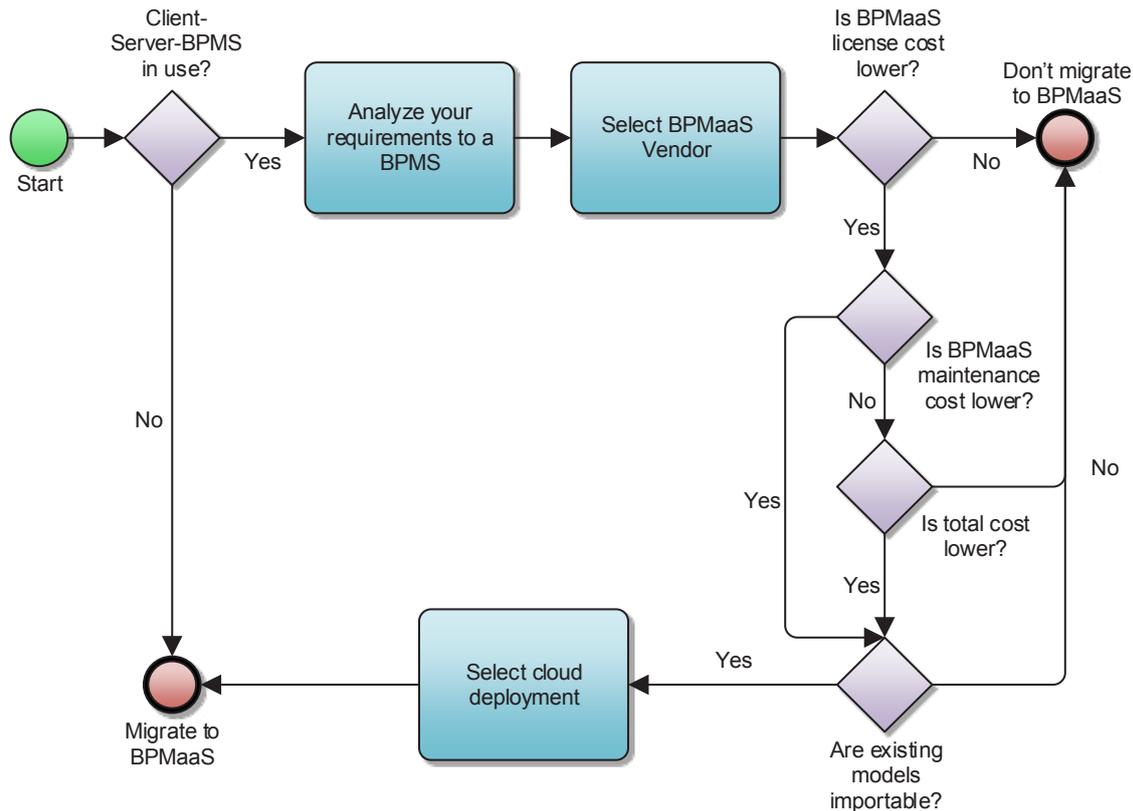
## Realization of BPMaaS

Before you start to implement BPMaaS you should clarify which components and functionality are required for BPMS realization out of the cloud. Of course the use of BPM software differs from company to company, but if we refer to the BPM lifecycle then the cloud support of phases 1 and 3 needs to be emphasized.

Amongst others Filho and Costa (2013) gathered the requirements to an BPMS by reviewing the scientific literature on that topic. Other requirements can be deviated by the selection criteria for a BPMS (BPM Institute, 2014). Starting from the presented lifecycle and taking these two sources into account, a set of necessary components can be derived. BPMaaS has to provide a proper support for all business process design activities. This means a component that allows to create and to share business process models out of the cloud, as well as a component that allows for the publication of the created business process models in an easy way should be provided. Additionally, a component to export the created business process models into an

execution environment is necessary. Finally, a component that supports actions for process improvement in terms of a continuous business process improvement (CPI) should be integrated, and all governance processes in relation with business process models, like reviewing and releasing a business process model, should be available.

Some BPMS offer these required functionalities in a client-server model with locally installed clients. Therefore the question arises for which companies it might be applicable to consider a migration of their whole BPM software into the cloud in the sense of BPMaaS. Figure 4 shows a short test to determine if a BPMaaS introduction might be promising.



**Figure 4: BPMaaS appraisal process**

The first decision tests whether the company already has a BPMS in use. If that's not the case, a direct introduction of BPMaaS should be considered. If there is a BPMS available in the company, a comparison between the existing system and a BPMaaS solution should be done.

The first step in order to do this comparison is to analyze the company-specific requirements to a BPMS. Therefore typical stakeholders can be interviewed and the features of the current BPMS can be sorted on a black- or whitelist. All features that are not used or do not bring a relevant benefit are put on the blacklist, and all frequently used features and as well all additionally desired features are put on the whitelist.

These two requirement lists can be the starting point of the BPMaaS vendor selection. The selected vendor should ideally offer all features on the whitelist, and should charge extra license fees for the blacklist features.

After a concrete vendor is selected, the license costs of the existing BPMS and the BPMaaS solution should be compared. The result of this comparison strongly depends on the vendor's payment model. Especially for large companies or quickly growing companies, a flat payment model is desirable, because it makes the costs calculable and easier to predict. Furthermore it reduces the effort in license management, as the assignment of licenses to users can be omitted.

Beside the license costs, including fees for update and support, the maintenance costs in your own company should be regarded. Especially if the BPMaaS solution is hosted by the own IT department there might be higher maintenance costs than for a client-server BPMS. Therefore these costs should be compared. In case that the BPMaaS solution's license fees are lower but its maintenance cost are higher or vice-versa the total cost of ownership should be taken into account.

After a look at the requirements and costs, then the migration of already existing business process models should be regarded. Many companies have already invested a lot of time in the creation of their business process models. Therefore in most cases the BPMaaS solution should be able to import already existing models.

If the TCO comparison is positive for the BPMaaS, and the important process models can be migrated, the way of cloud deployment (Sereff, 2014) has to be chosen. The major choice is between a public or private cloud. The advantage of hosting a BPMaaS solution in a public cloud can be lower costs, but its disadvantage is that the cloud provider or government authorities might have access to confidential and critical information. Currently, most companies prefer private to public clouds (Gaudin, 2014) (Roos, 2013), especially when they handle personal or critical information, such as banks or insurance providers.

## **Conclusion**

Currently, in most companies, only parts of the BPM lifecycle are supported out of the cloud. In a BPM lifecycle that consists of the three phases – (1) process design and analysis, (2) process implementation and execution and (3) process controlling and improvement – the focus of cloud support is on phase 2, the execution phase. In order to support the whole lifecycle, BPMaaS is the next logical step for Business Process Management in conjunction with cloud computing. The major idea of BPMaaS is to offer the entire functionality of a BPMS itself as a Service in the cloud. Therefore all benefits of SaaS can be transferred to BPM tooling, but it should be remembered that a structured comparison between a BPMaaS solution and a client-server BPMS should be done before BPMaaS is introduced.

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