

# **Preface for the 2nd International Workshop on Business Process Management in the Cloud (BPMC)**

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## **Introduction**

Cloud computing is a paradigm for the on-demand delivery of infrastructure, platform, or software as a service. Cloud computing enables network access to a shared pool of configurable computing and storage resources as well as applications which can be tailored to the consumer's needs. Cloud resources can be rapidly provisioned and released, and are billed based on actual use, thus reducing up-front investment costs. Not only can individual services be hosted on virtual infrastructures but also complete process platforms. Further, besides benefits to run-time Business Process Management (BPM), cloud-based services can enable collaboration between geographically dispersed teams during design-time and assist the design process in general – amongst others, process modelling as a service removes the need for installation of software, and is thus more attractive for the occasional user.

A cloud-based architecture for BPM may provide important benefits:

- **Elasticity:** process engines or process tasks can scale up/out or down/in depending on the actual load to reduce investment cost and manage load peaks.
- **Flexibility:** processes can be assembled with more flexibility as service selection can not only include the software but also the platform or infrastructure for it to run on.
- **Measurement:** as service applications in the cloud are individually metered, detailed measurement data is available and can be used to provide additional services such as process monitoring.

The research directions of core interest to the 2nd International Workshop on Business Process Management in the Cloud (BPMC 2014) are summarized by three questions:

- How can BPM benefit from the cloud?
- What should BPM in the cloud look like?
- What can BPM bring to cloud computing practices?

Among a number of challenges, there is a lack of conceptualization and theory on BPM with respect to cloud computing. For the most part, the topic of cloud computing has only been implicitly regarded in BPM research when discussing design-time tools. Few works have addressed workflow enactment in the cloud to date. However, a detailed research agenda which covers theory, design-time, run-time, and use cases is missing. The goal of the 2nd International Workshop on Business Process Management in the Cloud is to lay the foundation for such a research agenda.

Submissions from the scientific community were invited for the above mentioned problem domain as well as related issues. Hence, the main areas of interest to the workshop were

- Cloud and BPM: concepts and theory
- Design-time BPM in the cloud
- Run-time BPM in the cloud
- Use cases for BPM in the cloud

Unfortunately only few papers were submitted this year, out of which only one was accepted after review based on quality, relevance, and originality. The paper is titled “YAWL in the Cloud: Supporting Process Sharing and Variability”. It describes an approach and tool for collaborative BPM in the cloud: using configurable process models to support the variations of processes, as encountered in different Dutch municipalities. The paper highlights the benefits of using a cloud-based approach at different stages of the BPM lifecycle, introduces the approach and tool, and presents a proof-of-concept scenario.

Furthermore, Gero Decker from Signavio gave an inspiring keynote talk at the workshop. The title of the talk and the corresponding paper is “BPM in the Cloud – Trends and Challenges”. Gero Decker is a co-founder and co-CEO of Signavio, a BPM vendor and BPM Software as a Service provider. In his keynote, he discussed the differences between cloud-based and traditional BPM solutions and their respective clientele, and structured the space of BPM in the cloud.

The keynote sparked a lively debate which was moderated by Ingo Weber. He took up some of the aspects mentioned in the keynote and combined them with prevalent topics of the upcoming BPM conference as well as observations from the general mind shift towards a more service-oriented, cloud-based environment not only for BPM. The discussion continued long after workshop. The result is the following list of the open topics:

- *Process Mining in the Cloud.* Process Mining is a very hot topic in BPM, yet there are few approaches to take this success to the cloud. What would be required to achieve this, and for which parts of process mining is that a sensible approach? As it stands, process mining is an expert method, and even tools with a streamlined user experience require deep understanding of background concepts. But are there aspects of process mining that are of interest for large-scale adoption, and hence should be moved to the cloud?
- *Fragmentation.* The complexity that comes with the fragmentation of using many small, focused cloud offerings poses a challenge to traditional IT management.

How can this fragmentation be managed effectively? Can BPM contribute, or is that solely a task for enterprise architecture?

- *Continuous BPM Deployment.* New cloud-based approaches that enable less specialized users to create (executable) process models will drastically reduce cycle times and frequencies. Just as with the software engineering advances of continuous integration (CI) and continuous deployment (CD), the time for designing a changed model and deploying it to production will shorten, and the frequency will increase sharply. In software engineering, release frequency has been reduced from a few times a year to many times per day. If BPM takes a similar turn, this leads to several challenges:
  - *Process model testing.* Automatic testing of process models should become prevalent. The area seems heavily underdeveloped, compared to its likely future importance, since works on process model testing are few and far between.
  - *Process model drift.* High frequency of deployments will lead to drift in process model collections: there will be many versions of each model, and the management and storage of these becomes more challenging. A particular issue is that of tracing interacting processes in the face of drift: which versions of models A and B are integrated with version X of process C?
- *Cloud services governance.* One trend in the cloud is that individual teams start using cloud services, often without governance through their organization, and pay for it out of their team budget. A question for the BPM, services, and compliance communities is: how can targeted, mass-scale governance over cloud service usage be implemented, without imposing massive overheads?
- *Technical questions* include:
  - *Client-side data processing.* Cloud applications often implement a different data handling paradigm, where data is kept at the source and computation is moved to the data. How can BPMSs pick up this development? For instance, should process execution move in part to the UI, such as a browser interface, to process data stored locally on a user's machine directly?
  - *Open APIs.* Many cloud applications offer and use open APIs over the web. Is there enough support from BPM for this trend, both from the ease-of-use side and from the API offering side? Is lightweight integration sufficiently supported by BPMSs, will it be, or will that be a competing technology?
  - *Mobile & BPM.* Do BPMSs offer mobile access to analytics and to control over process execution?

Although only few papers were submitted, a strong audience at the conference confirmed the interest of the community in the topic. The cloud is a huge trend, and the BPM field cannot afford to miss it. In addition to the above list, a summary of the state-of-the-art and challenges in Elastic Business Process Management authored by Schulte, Janiesch, Venugopal, Weber, and Hoenisch is currently in press at Future Generation Computer Systems. We hope the collective set of open questions will help to stimulate and guide more research in this area.

## **Organizers**

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