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Distributed Ledger Technology –
A Catalyst for New Ideas

Digital Attention Map:
Unveiling Digital Competition
Using Online Search

Heuristic Approaches for QoS-Aware
Cloud Data Center Selection

Deutsche Börse FinTech Hub



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Editorial

Distributed Ledger Technology – A Catalyst for New Ideas

Udo Milkau

The phenomenon “Blockchain” has increasingly been capturing interest. Unfortunately, one can get the impression that a solution is looking for the problem. As a matter of fact, the innovation of distributed ledger technology (DLT) is a catalyst for new ideas and for the role of intermediaries in the financial industry.

But let’s take things one at the time! First, it is known that the current technical implementation of Bitcoin is inefficient, expensive, rather slow, and without sufficient throughput compared with established payment system networks. Nevertheless, it is a solution of a 30 year-old problem: how to create “electronic cash” as a substitute for real cash without any intermediaries that provide “trust”.

Second, Bitcoin is a combination of existing concepts with constraint of “eventual consistency”, because the distributed replicas of the ledger may be temporarily inconsistent, but will eventually be synchronized to reflect a golden record of rights of ownership in a “trustless” network.

Third, DLT consists of: (i) the distributed replicas of a logically uniform ledger, which is based on (ii) an unsophisticated, one-dimensional database for rights of ownership with (iii) a consensus mechanism for synchronization. Bitcoin could bypass the “impossibility of distributed consensus” described by Fischer, Lynch, and Paterson with a game theoretical approach to select a neutral referee by the digital version of tossing dices. This solution for “electronic cash” is indeed a catalyst for new ideas concerning financial transactions, transfer of rights of ownership, and “trustless” relations.

On the one hand, the inefficiency and amount of computer resources required to perform the proof-of-work consensus support a well known position of Niklas Luhmann that “trust is a mechanism to reduce complexity”. There is a significant price to pay if a system trades trust for a technical substitution. Nevertheless, in a Bitcoin world, one essential role of banks as intermediaries for risk would be questionable.



Dr. Udo Milkau
Head of Strategy and Market Development
Transaction Banking
DZ BANK

The consequences of this substitution reach far, and Lawrence Lessig’s dark vision of “Code is Law” can be considered as Shakespeare’s “Shylock 2.0”.

On the other hand, the resources required for a consensus can be reduced if DLT is implemented for a closed group with identified – and thus trusted and permissioned – participants. Yet, an “intra-financial institution DLT” could be a paradigm shift in the way how ledgers, accounts, and financial contracts are set-up and kept in synch. This can be exemplified for securities transactions:

- Can DLT be, e.g., an alternative future basis for “TARGET2-Securities 2.0” to settle securities transactions as compared to other technological developments in the years to come?
- Can DLT make it feasible to create a distributed “electronic corpus and coupon sheet” (in German: “Mantel und Bogen”) for securities in the same way as Bitcoin is “electronic cash”?

- What kind of legal framework would be needed to provide an investor with the same right of ownership and asset protection compared to dematerialized securities kept in a custody chain and with corporate actions triggered by an Issuer-CSD (Central Securities Depository)?
- And – last but not least – what would be the pros and cons in terms of costs, speed, resilience, agility, and governance comparing DLT with bookkeeping of assets in a network of interoperable banks?

Whilst there are many technical feasibility studies with DLT going on, the key question will be about the role and the benefit of intermediaries in the financial industry. To facilitate this discussion, the E-Finance Lab and DZ BANK organize a conference at September 1st, 2016. This conference will be a platform to exchange new ideas, first experiences, and ideas for future research across disciplines and organizations. Let’s go exploring the future!

Research Report

Digital Attention Map: Unveiling Digital Competition Using Online Search

UNDERSTANDING THE COMPETITIVE ENVIRONMENT FOR DIGITAL CONSUMER ATTENTION IS CRUCIAL FOR BANKS' STRATEGIC ACTIONS. THEREFORE, BANKS NEED TO DETERMINE THE MARKET THEY COMPETE FOR, THEIR SUCCESS ON THIS MARKET, AND WHO THEY COMPETE WITH FOR CONSUMER ATTENTION. USING ORGANIC SEARCH ENGINE DATA, WE PROPOSE A NEW APPROACH TO (I) DEFINE THE DIGITAL MARKET, (II) IDENTIFY THE PLAYERS IN THE MARKET, (III) ESTIMATE THE DISTRIBUTION OF DIGITAL CONSUMER ATTENTION ACROSS BANKS, AND (IV) UNCOVER THE COMPETITIVE MARKET STRUCTURE FOR THE ONLINE RETAIL BANKING MARKET IN GERMANY.

Elham Maleki

Bernd Skiera

Introduction

In recent years, the world experienced tremendous growth of Internet usage. The online landscape has thus become an attractive space where millions of firms seek to draw consumers' attention and improve their online presence (Heinze and Hu, 2006) in order to attract traffic to their websites and persuade consumers to become customers. The retail banking market has also experienced the same growing trend in the digital market. The massive number of consumers and firms in the World Wide Web which provide financial services makes market analysis complex for banks. Yet, understanding this digital competitive mar-

Daniel M. Ringel

ket environment for consumers' digital attention is crucial for managers since such understanding forms the basis for strategic actions around positioning, advertising, and communication as well as website content and design.

Competitive market structure has been studied with various approaches. Yet, those approaches are not applicable for studying competition for digital attention. The digital retail banking market is very large and experiences frequent market entries with various business models including FinTech start-ups. Therefore, banks need to have a precise understanding of who they compete with for digital attention and how

they compete in order to make informed strategic decisions. Moreover, analyzing markets from a demand-side (consumer) perspective is crucial (Adner and Zemsky, 2006) since such analysis provides insights on how consumers search, what is relevant to them in the banking market, and who manages to capture their attention. Although there are some approaches that analyze markets based on consumer decisions (such as surveys and panels), they are usually very time-consuming, costly, require repeat purchases, and suffer from limited cognitive ability of consumers to recall all competitors, and are therefore not applicable to large, fast evolving digital markets.

The aim of this study is to analyze the competitive market structure for digital attention from a demand-side perspective to answer the questions of (i) what is important in the market to define the retail banking market, (ii) who plays a role to identify players in this market, (iii) how important they are by estimating the total attention share they get, and (iv) who do they compete with to understand the structure of the retail banking market.

Our spatial approach is based on the notation that search engine data can be used as a collective memory of consumers (Martinez, 2012) since search engine data contains information about what is important (search terms) and who is important (consumers' clicks) in the market. Using a Digital Attention Map (DAM), banks can define the retail banking market from consumers' perspective, identify different players which are present in their market, evaluate their

success by estimating their digital attention share, and learn about retail banking market structure with different submarkets.

Our Approach

We analyze competition for digital attention of consumers among firms in digital retail banking markets using organic search results in the following five steps:

- First, we define the market by its characteristics (i.e., keywords) to answer what is important in the market from the consumers' perspective.
- Second, we identify players in the market which appear in Google organic search results for our set of keywords.
- Third, we estimate the importance of the players by the amount of digital consumer attention they manage to capture.
- Fourth, we analyze the competitive relations and similarities of each pair of firms in the market and the market structure.
- Fifth, we combine the insights of the previous steps into a single DAM to provide decision makers with an intuitive, easy to grasp, yet rich analysis output.

Empirical Findings

In the empirical application of DAM, we aim to analyze and visualize the competitive market structure for digital attention of consumers in the online market for retail banking in Germany.

We identified 902 keywords (search terms) which are important from the consumers' perspective to define this market. We also check the validity of these 902 keywords by ten experts in the respective market.

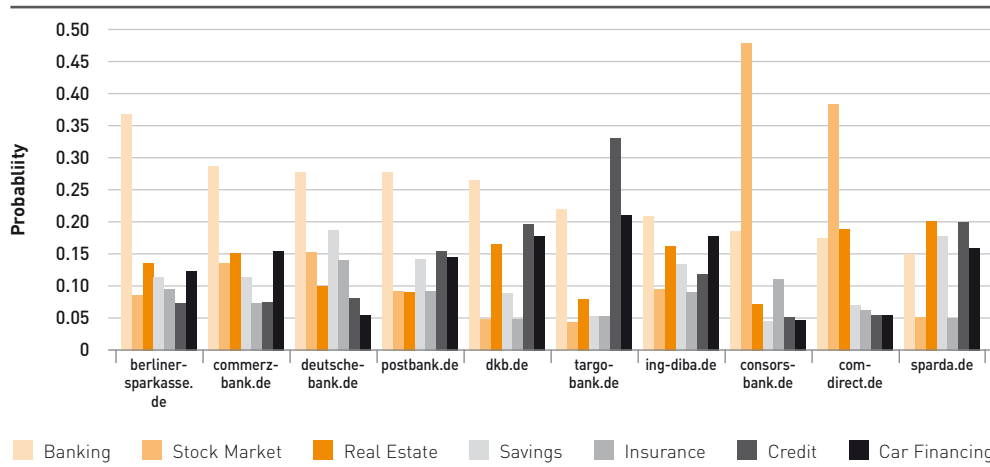


Figure 1: Share of Top Ten Banks in Germany for Each Topic in the Market

We collected search ranks and search volumes for 902 keywords that were selected as market defining keywords. The collected data accounts for a total of 4,360,030 consumer searches in just one month. We identify 606 firms which appear more than five times among the top 30 ranks of google organic search results for our set of keywords.

Using the Latent Dirichlet Allocation (LDA) model with Gibbs sampling, we identify seven main topics in the retail banking market. Figure 1 shows the contribution of top ten banks in Germany in each of the seven identified topics in the market.

Figure 2 depicts the DAM for the online retail banking market in Germany. Each identified firm in the retail banking market is represented by a bubble whose size corresponds to the firm's share of digital attention. The stronger

the digital relation between firms, the closer they appear in the map. We identify eleven distinct submarkets (indicated by bubble color) which upon deeper analysis match submarket themes expected by several bank experts we solicited before map generation.

We also note that the type of business model is a submarket-defining criterion as different colors represent different types of business model in Figure 2.

Conclusion

The stream of past research devoted to competitive analysis among products and brands in digital markets proves the importance of understanding digital competition. However, previous research fell short in investigating competition among hundreds of firms for digital attention of consumers in markets defined by consumer search and thus interest. The con-

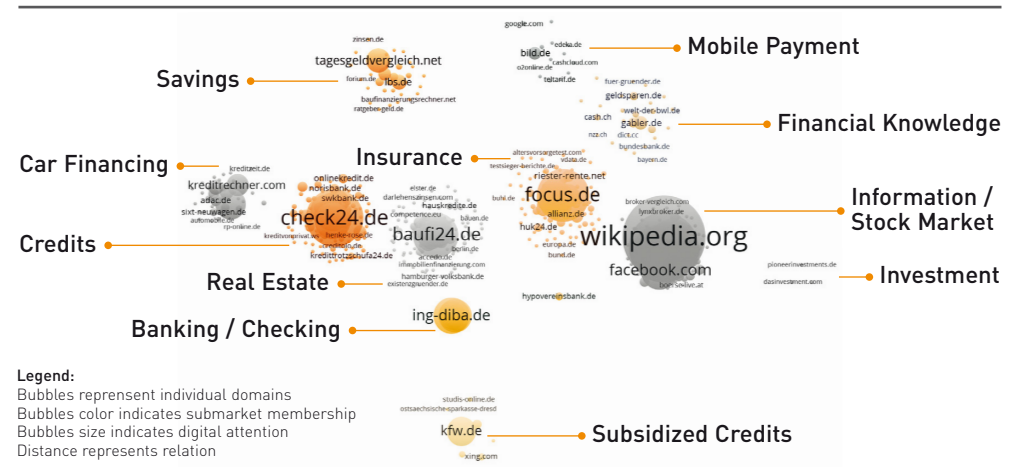


Figure 2: Digital Attention Map for the Online Retail Banking Market in Germany

tribution of this study is of both methodological and substantial nature. We are the first to use readily available and easy to access online search data to define the digital retail banking market, identify competitors which compete for digital attention of consumers in this market, and analyze competitive relations among them. Moreover, we introduce two new metrics to investigate the competitive market structure for digital attention and combine all in a single visual representation called DAM.

Furthermore, we provide banks with a fast and low-cost approach (which is essential in today's rapidly evolving and shifting retail banking market) to obtain insights into the competitive structure of the digital retail banking market, who their competitors for digital attention of consumers are, and how digital attention is distributed across competitors and submarkets. Finally, by using consumer search data from

millions of consumers, we ensure that our analysis reflects the motivation and interests of those targeted by competing firms: the consumers.

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Research Report

Heuristic Approaches for QoS-Aware Cloud Data Center Selection

OVER THE LAST DECADE, IT PROVISIONING VIA CLOUDS HAS BECOME A COMMON PRACTICE. MEANWHILE, COMPLEX SOFTWARE SERVICES WITH STRINGENT QUALITY OF SERVICE (QOS) REQUIREMENTS ARE DELIVERED BY CLOUD PROVIDERS OVER THE INTERNET. TO ACHIEVE A COST-EFFICIENT AND QOS-AWARE SERVICE PROVISIONING, THE SELECTION OF APPROPRIATE CLOUD RESOURCES IS A HIGHLY IMPORTANT TASK. IN THIS REPORT, WE OFFER CONCEPTS AND TOOLS TO SERVICE PROVIDERS FOR AN ACCELERATED RESOURCE SELECTION IN LARGE ENVIRONMENTS.

Ronny Hans

Introduction

Information Technology (IT) can both be seen as a major enabler and a major expense for service provisioning in the financial industry. Because of the fierce and continuously growing competition, e.g., through FinTechs, cost savings remain mandatory. Besides the cost, flexibility, scalability, and a high service quality are further requirements for IT systems.

In terms of cost, flexibility, and scalability, cloud computing may be a promising substrate to provide IT services. Over the last decade, cloud computing has become a key paradigm for the provisioning of IT services. The seminal idea was to provide elastic infrastructure resources in order to enable users to adapt their demand to usage cycles and load

Ralf Steinmetz

surges. Today, the requirements go beyond merely supplying resources to applications with high-quality requirements, i.e., Quality of Service (QoS) constraints.

Cost-savings in cloud computing are accomplished by consolidation and centralization of resources (Creeger, 2009) with the consequence of high latencies. As a consequence, when using the public cloud infrastructure, providers are only partly able to provide software services with rigid latency constraints (Choy et al., 2012).

Thus, provisioning of only cost-driven cloud infrastructures appears inadequate for sophisticated and highly interactive applications. In order to optimize future or existing cloud

infrastructures to software service providers, we address the following research questions:

1. How to efficiently plan the utilization of new and of existing resources in cloud infrastructures?
2. How to determine reliable approaches that improve and guarantee the quality of the solution to the resource assignment problem?

Optimization Approach for Data Center Selection

In our model, we consider a (private) cloud provider which aims to choose among a given number of geographically distributed cloud resources, i.e., data centers. Here, each data center provides different amounts of various resources, which results in different types of costs – fixed and variable costs. The provided resources are characterized by QoS guarantees.

The data centers provide their services to user clusters, which represent a group of users in a certain area. These user clusters are characterized by a specific demand and certain QoS requirements, e.g., latency requirements for specific services.

A basic example is given in Figure 1. Herein, a (private) cloud provider aims to serve four user clusters (U1 to U4) through its data centers (D1 and D2). The different sizes of the symbols refer to the particular resource demand of each user cluster and the resource supply of

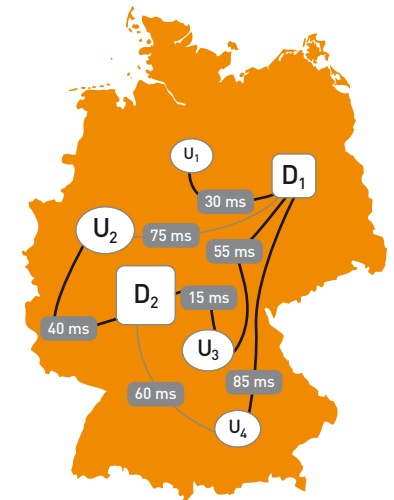


Figure 1: Simplified Example of a Cloud Data Center Selection Problem

the data centers, respectively. Furthermore, the respective latencies are denoted at the connecting edges and differ depending on the network topology.

The optimization problem consists in the fact of minimizing the costs for selected resources while meeting the QoS constraints of the clients.

The corresponding mathematical model can be solved by off-the-shelf solver frameworks (Hans et al., 2013). However, in the worst case, the computation time of such integer programs grows exponentially. For large environments, such an approach is hardly feasible, even if it delivers the optimal result for a given

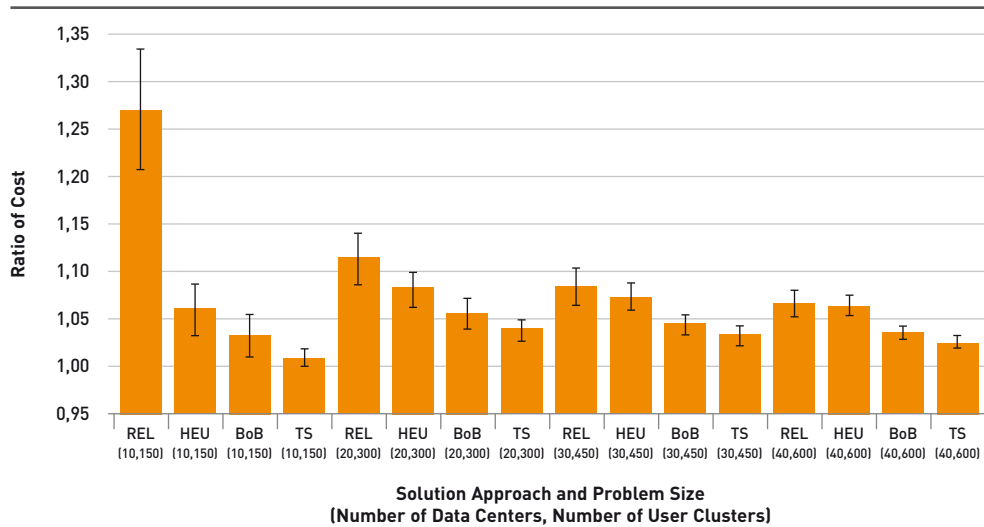


Figure 2: Ratio of Costs (Based on Macro-Average; with 95% Confidence Intervals) Between the Exact Approach and the Heuristic Approaches by Heuristic Approach and Test Case (Sample Size n = 100 per Test Case)

problem. To overcome this issue, we developed different heuristic approaches and evaluate their suitability.

Heuristic Approaches

In general, heuristics trade solution quality against performance. Thus, an increase in performance usually happens on the expense of the solution quality. Further, for increased efficiency, heuristics need to be developed or adapted subject to the given problem and the application scenario.

As an initial approach to solve the problem described earlier, we introduced a relaxed version of the model that can be solved using a linear program (LP). This heuristic approach

quickly delivers less accurate solutions by relaxing some given constraints (Hans, 2013). The advantage of the approach is its simplicity and, again, the possibility to use off-the-shelf solver frameworks. But this simplicity is at the same time a major drawback. It is a very general solution and ignores the specific structure of the problem. Using specifically developed or adapted approaches, substantial improvements in both solution quality and performance can be achieved.

A very good performance, i.e., a very low computation time, is delivered by simple heuristics, such as greedy algorithms. In our research, we use priority-driven heuristics to find valid solutions for the optimization problem described

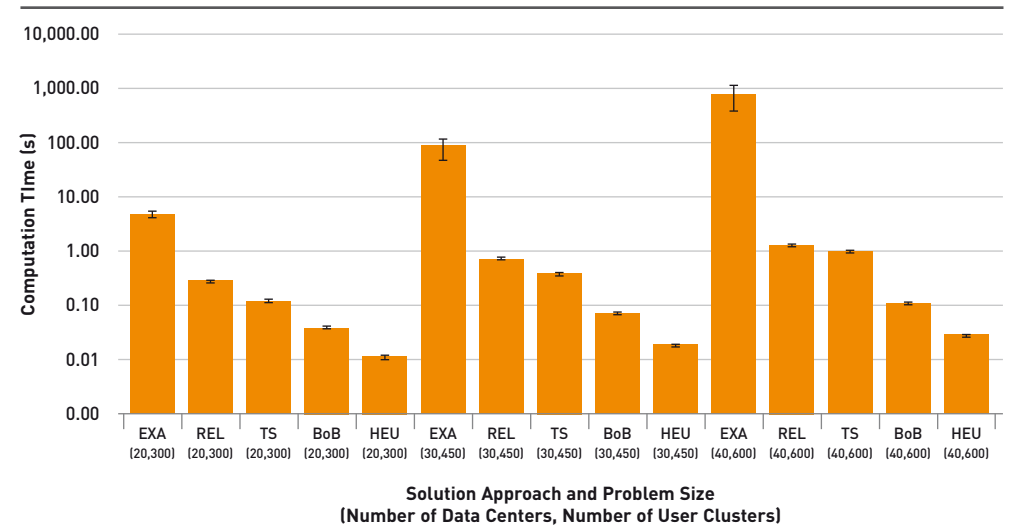


Figure 3: Observed Mean Computation Times (with 95% Confidence Intervals) by Heuristic Approach and Test Case (Sample Size n = 100 per Test Case; Please Note the Logarithmic Scaling of the Ordinate)

earlier. Therefore, we evaluate various priority and cost allocation roles for an efficient resource assignment. Combining these rules in our priority-based framework, we are able to generate numerous heuristics, each with different solution quality and performance (Hans et al., 2015).

Besides depending on the selected rules, the solution quality and performance also depend on the given problem instance. Since, in real world scenarios, the characteristic of a problem instance, e.g., the demand, is uncertain, the selection of appropriate rules is hard to handle and the solution quality cannot be guaranteed.

To this end, we provide a best-of-breed approach that enables assembling heuristics with differ-

ent characteristics and thus also different solution qualities. Our approach aims at a steady solution quality of the optimization problem compared to single heuristics. The main idea is to efficiently use different heuristics for the same cloud resource assignment problem. Proposed heuristics are either executed concurrently or sequentially, and the best solution in terms of minimal total cost is returned.

We determine the set of (priority-based) heuristics to be used based on quality comparisons and the statistical paired t-test. We use this tool to infer whether a selected heuristic delivers better quality of statistical significance, or not. Those heuristics that deliver the highest solution quality without statistical differences

among each other are grouped into a candidate heuristic group. With respect to performance, we select the candidate heuristic group and identify the heuristics that have the lowest computation time. For different test cases, we thus identify the best and fastest heuristics. The identified heuristics form our best-of-breed approach.

Besides the simple heuristics and the best-of-breed approach, we adopt the metaheuristic tabu search for our optimization problem. This heuristic approach is used to guide a local search procedure to avoid local optima and thus to improve the solution quality. Since tabu search is an improvement procedure, it requires an initial solution which can be calculated with one of the approaches described earlier. For a current solution, tabu search analyzes the solution neighborhood and tries to find a better one. If a better solution is found, it is stored in a long term memory. If only inferior solutions are available, the one with the best solution quality is used. To avoid directly switching to an already considered solution, a short term memory, i.e., tabu list, stores already visited solutions. Such solutions are forbidden for a given number of iterations. To assess our heuristic approaches we compare them to the exact solution approach.

For further details regarding the latter two approaches, we refer the interested reader to our recent publication (Hans et al., 2016), which contains a detailed description of the heuristic approaches.

Evaluation Results

We evaluate our approach based on two variables, i.e., the cost ratio and the computation time. The first variable assesses the solution quality while the latter assesses the corresponding performance. The independent variables include the number of data centers and user clusters. We consider latency as the desired QoS parameter.

We evaluated the following approaches: Exact/optimal approach (EXA), the LP relaxed approach (REL), a priority-based heuristic (HEU), the best-of-breed heuristic (BoB), and the tabu search heuristic (TS). For the sake of readability, we listed the heuristics in descending order regarding the evaluation result.

Figure 2 shows the solution quality provided by our approaches. First, we observe that, in general, the solution quality compared to the exact approach improves with an increasing number of data centers and user clusters.

We also observe that the difference between the best-of-breed approach and the tabu search approach decreases with growing problem size. In addition, Figure 3 shows the performance measured through the computation time of the different approaches. Here, we show significant savings when dropping the exact approach and using heuristics instead. It is also noteworthy that the difference in computation time between tabu search and the best-of-breed approach grows constantly

under an increasing number of data centers and user clusters.

Hence, through sacrificing a small fraction of the solution quality, the best-of-breed approach provides a much higher performance at a still very high quality of the cloud resource allocation.

Conclusion

Cloud computing provides the infrastructure for modern IT services with high quality of service requirements. A cloud provider seeking to minimize initial and running costs requires optimal resource selection to enable QoS-aware IT service provisioning.

In this report, we briefly described the cloud data center selection problem and discussed some corresponding advanced heuristics approaches. Since the particular approaches differ in solution quality as well as in performance, we consider and compare multiple approaches to solve this optimization problem. We present a best-of-breed approach that combines the benefits of different heuristics to provide a high solution quality and low computation costs. Further, we compare the approaches with our tabu search heuristic.

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Insideview

Deutsche Börse FinTech Hub

INTERVIEW WITH HAUKE STARS

Recently, Deutsche Börse opened its FinTech Hub in Frankfurt, making it one of the first major companies of the region to support the Hessian State Government's FinTech initiative to set up a FinTech cluster in Frankfurt.

Ms. Stars, why is Deutsche Börse getting involved here?

We want to give start-ups in the financial sector a jump start, Frankfurt should become Germany's leading FinTech center. This is not just a local theme; Deutsche Börse aims to promote Germany's start-up and investment culture. Eventually, this will contribute to growth and create jobs – the jobs of the 21st century.

There is a very vigorous start-up community in Berlin. What does Frankfurt have to offer?

Berlin is Germany's start-up capital, but Frankfurt will become Germany's FinTech capital because it offers optimal conditions. Brilliant business ideas can connect directly to the financial community. The opportunity to network is very important for

young and upcoming businesses. In the FinTech Hub itself we are offering fully equipped offices. Fintech companies are thus provided with a suitable environment to further develop new ideas and entrepreneurial concepts. They also receive on-site support from employees of the Deutsche Börse Venture Network who share their expertise in order to help founders develop their companies in a targeted way in the areas of financing, building a network, and acquiring customers.

How many applications did you receive and by which criteria were the start-ups selected?

There were a total of 25 applications. Together with consultants, we looked at the business models and their potential. And then we evaluated how their personalities would fit into the hub. Since we do not have much space, we focused on very young companies. Eventually, we selected four companies with a total of 30 employees: "Fintura", a loan rate comparison portal for SMEs; "dwins", an account switching service; "Savedroid", an automatic money saver app; and the "CASHLINK Payments" payment system.



Hauke Stars
Member of the Executive Board
Deutsche Börse AG

Three of these companies have moved their headquarters to Frankfurt.

Do you think we will be seeing more FinTech IPOs?

In the long-run, we might. But you have to look at this in a larger context: promoting innovative business ideas is part of our broad offering, which begins with start-ups and continues with later-stage financing via Deutsche Börse Venture Network, extending through to IPOs and traditional exchange trading. To this end, we will be introducing additional offerings in the future.

Many FinTech companies are relocating to the U.S. Do you think this will ever change?

Globally, the U.S. in particular set the tone in the field of digital financial technology. That is not because there are no clever ideas and innovative business models here in Germany. Instead, what we lack is an investment culture that encourages the entrepreneurial spirit. The goal must therefore be to build up an extensive ecosystem of

growth financing, not just in Germany, but in Europe, in order to close the financing gap that clearly exists for growth companies.

Deutsche Börse is a technology company – is that why you feel drawn to FinTechs?

Technological innovations have significantly changed financial markets in the past and will also change them in the future. Deutsche Börse is a good example of this: at the end of the 90s, we introduced electronic trading; the world's stock exchanges gradually followed suit. Today, disruptive innovations are particularly initiated and advanced by FinTechs. Deutsche Börse takes two approaches here: firstly, we integrate technical innovations into our business model, as we did with the 360T FX platform. Secondly, we create optimum conditions for young FinTech companies to be able to implement their ideas and grow.

I am very excited about the further development of Frankfurt as the FinTech center of Germany.

Thank you for this interesting conversation.

Infopool

News

Joint Blockchain Conference of the E-Finance Lab and DZ BANK

On September 1st, 2016 the E-Finance Lab and DZ Bank will jointly host the first conference on "Blockchain: Technology, Legalities and Regulation, and Application in the Finance Realm". Participants have the chance to discuss the related issues and consequences of the potentially disruptive Blockchain technology for financial markets with experts from industry and academia such as Gerd Ruecker (Head of Innovation and New Technologies, Deutsche Börse), Heiko Hees (Founder and CEO, brainbot technologies), and Roman Beck (Professor at the IT University of Copenhagen).

FinanceCom 2016 in Frankfurt

Advancements in information and communication technologies have paved the way to new business models, markets, networks, services, and players in the financial services industry. FinanceCom 2016 invites academic work that helps to understand, drive, and exploit the associated systems, technologies, and opportunities. This year's FinanceCom conference takes place in Frankfurt am Main on December 8th, 2016 and the topic of the conference is "The Analytics Revolution in Finance". Prof. Gomber (layer 2) is one of the three local organization chairs. For further information, please visit: <http://www.financecom2016.is.uni-freiburg.de/>.

Blockchain Summerschool 2016

For the first time, the former E-Finance Lab member, Professor Beck (IT University Copenhagen), will host a Blockchain Summer School in Copenhagen. From August 15th to the 18th, participants will have the opportunity to discuss the application of Blockchain technology with experts from different industries. The course also includes an introduction to Blockchain-based application programming. For further information see: <http://blockchainschool.eu/>.

Presentations

Andreas Hackethal (layer 3) will speak at the conference "Fonds 4.0: Vertrieb im digitalen Zeitalter" organized by Börsen-Zeitung on June 20th, 2016 on the topic "Fonds 4.0: Überlegungen zur digitalen Fondsvermarktung 2020".

Successful Disputation

Fedor Rahn (team Prof. Hackethal, layer 3) has received his doctoral degree on March 21st, 2016 with his dissertation on "Essays on Retail Lending in Germany". Congratulations!

New Management at the Chair of Prof. Steinmetz (Layer 1)

Dr.-Ing. Sonja Bergsträßer joined the E-Finance Lab as new coordinator for the Multimedia Communications Lab (Prof. Steinmetz, layer 1). She is following Dr.-Ing. Christoph Rensing. In April, he has handed over the responsibilities as well as the editorial work for the E-Finance Lab newsletter to her. Dr.-Ing. Bergsträßer has received her doctoral degree in 2010 and is working at the Multimedia Communications Lab as senior scientist since then.

Selected E-Finance Lab Publications

Risius, M.; Benthaus, J.; Akolk, F.:

Is It Worth It? Dismantling the Process of Social Media Related Sales Performance.

In: Proceedings of the 24th European Conference on Information Systems (ECIS 2016), Istanbul, Turkey, 2016.

Maleki, E.; Ringel, D. M.; Skiera, B.; Doppler, C.:

Digital Consumer Attention: Unveiling Digital Competition using Online Search.

In: Proceedings of the European Marketing Academy Conference, Oslo, Norway, 2016.

Ringel, D. M.; Skiera, B.:

Visualizing Asymmetric Competition among More than 1,000 Products Using Big Search Data.

In: Marketing Science, Special Issue on "Big Data: Integrating Marketing, Statistics, and Computer Science", 35 (2016) 3, pp. 511-534.

Haferkorn, M.; Siering, M.; Zimmermann, K.:

Strategic Competitive Advantages through Enterprise Systems: The Case of Exchange Systems.

In: Lugmayr, A. (ed.), Lecture Notes in Business Information Processing (LNBIP), Vol. 217, pp. 79-89; Springer International Publishing, Switzerland, 2015.

Koch, J.:

The Phenomenon of Project Overfunding on Online Crowdfunding Platforms – Analyzing the Drivers of Overfunding.

In: Proceedings of the 24th European Conference on Information Systems (ECIS 2016), Istanbul, Turkey, 2016.

Richerzhagen, B.; Richerzhagen, N.; Schönherr, S.; Hark, R.; Steinmetz, R.:

Stateless Gateways – Reducing Cellular Traffic for Event Distribution in Mobile Social Applications.

In: Proceedings of the International Conference on Computer Communication and Networks (ICCCN 2016), Waikoloa, Hawaii, USA, 2016.

For a comprehensive list of all E-Finance Lab publications see

<http://www.efinancelab.com/publications>

Infopool

RESEARCH PAPER: SOCIAL MEDIA AND FIRM EQUITY VALUE

The goal of this paper is to compare predictive power of different (i.e., Social Media-based and online behavioral) metrics for the equity value of nine U.S. technology firms on a daily basis. It was previously established that online behaviors (i.e., Google searches and web traffic) have significant explanatory power for the firm value. The results of this study show, however, that Social Media measures (i.e., sentiment of blog posts and quality of consumer ratings) have a significantly stronger and faster impact on daily abnormal returns and idiosyncratic risk estimates than online behaviors. Thus, Social Media metrics provide incremental explanatory power over existing measures, which can be harnessed for predicting company-specific equity value movements.

Luo, X.; Zhang, J.; Duan, W.

In: *Information Systems Research*, 24 (2013) 1, pp. 146-163.

RESEARCH PAPER: ATTRACTING EARLY STAGE INVESTORS: EVIDENCE FROM A RANDOMIZED FIELD EXPERIMENT

The authors analyze how investors with different levels of experience respond to different characteristics of early-stage start-ups when making an investment decision. In a field experiment investors receive randomized sets of information about the start-ups before their investment decision. The authors show that experienced investors pay more attention to personal information about founding start-up members, and less to firm trajectory and the existence of other investors. Less experienced investors evaluate all kinds of information equally. The results suggest that personal assets are important for start-up funding, but also seem to reveal successful start-ups to experienced investors.

Bernstein, S.; Korteweg, A. G.; Laws K.

Forthcoming in: *Journal of Finance*, (2015).

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