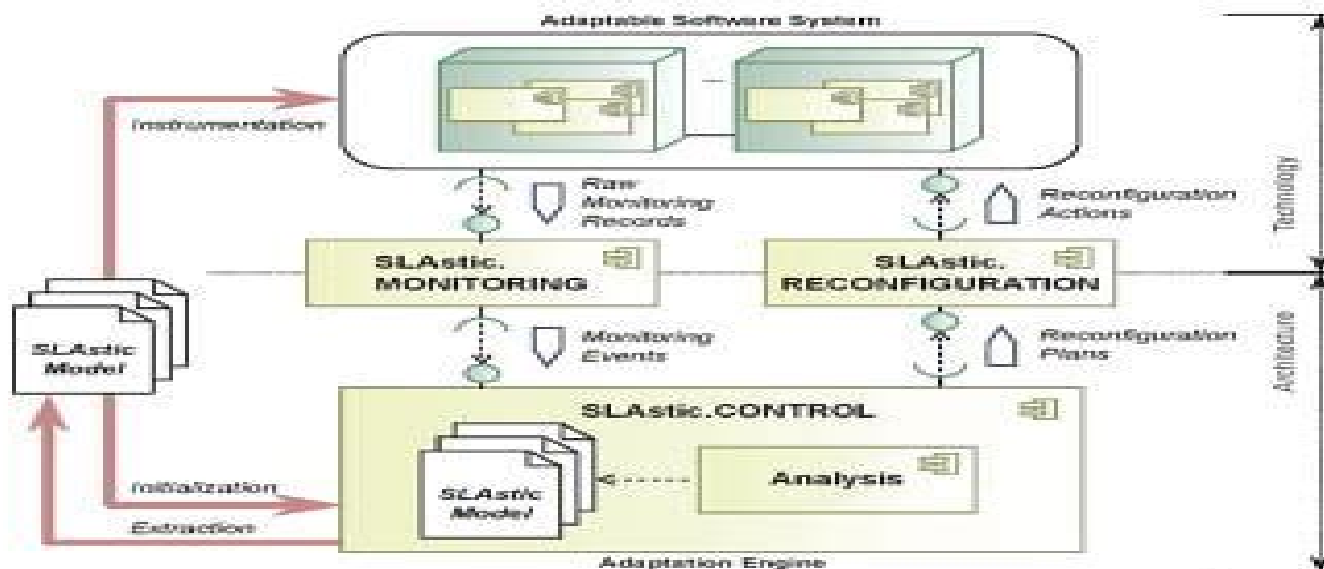


Model-Driven Online Capacity Management for Component-Based Software Systems

André van Hoorn



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Model Driven Online Capacity Management For Component Based Software Systems

**Christoph Meinel, Andreas
Polze, Karsten Beins, Rolf
Strotmann, Ulrich Seibold, Kurt
Rödszus, Jürgen Müller**

Model Driven Online Capacity Management For Component Based Software Systems:

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Hoorn,2014-10-15 Capacity management is a core activity when designing and operating distributed software systems Particularly enterprise application systems are exposed to highly varying workloads Employing static capacity management this leads to unnecessarily high total cost of ownership due to poor resource usage efficiency This thesis introduces a model driven online capacity management approach for distributed component based software systems called SLAStic The core contributions of this approach are a modeling languages to capture relevant architectural information about a controlled software system b an architecture based online capacity management framework based on the common MAPE K control loop architecture c model driven techniques supporting the automation of the approach d architectural runtime reconfiguration operations for controlling a system s capacity as well as e an integration of the Palladio Component Model A qualitative and quantitative evaluation of the approach is performed by case studies lab experiments and simulation

Model-Driven Online Capacity Management for Component-Based Software Systems André van Hoorn,2014-10-30 Capacity management is a core activity when designing and operating distributed software systems Particularly enterprise application systems are exposed to highly varying workloads Employing static capacity management this leads to unnecessarily high total cost of ownership due to poor resource usage efficiency This thesis introduces a model driven online capacity management approach for distributed component based software systems called SLAStic The core contributions of this approach are a modeling languages to capture relevant architectural information about a controlled software system b an architecture based online capacity management framework based on the common MAPE K control loop architecture c model driven techniques supporting the automation of the approach d architectural runtime reconfiguration operations for controlling a system s capacity as well as e an integration of the Palladio Component Model A qualitative and quantitative evaluation of the approach is performed by case studies lab experiments and simulation

Architecture-Aware Online Failure Prediction for Software Systems Teerat Pitakrat,2018-07-23

Failures at runtime in complex software systems are inevitable because these systems usually contain a large number of components Having all components working perfectly at the same time is if at all possible very difficult Hardware components can fail and software components can still have hidden faults waiting to be triggered at runtime and cause the system to fail This dissertation proposes an architecture aware online failure prediction approach called Hora The Hora approach improves online failure prediction by combining the results of failure prediction with the architectural knowledge about the system The task of failure prediction is split into predicting the failure of each individual component in contrast to predicting the whole system failure Suitable prediction techniques can be employed for different types of components The architectural knowledge is used to deduce the dependencies between components which can reflect how a failure of one component can affect the others The failure prediction and the component dependencies are

combined into one model which employs Bayesian network theory to represent failure propagation The combined model is continuously updated at runtime and makes predictions for individual components as well as inferring their effects on other components and the whole system Architecture-based Evolution of Dependable Software-intensive Systems Heinrich, Robert, 2023-06-05

This cumulative habilitation thesis proposes concepts for i modelling and analysing dependability based on architectural models of software intensive systems early in development ii decomposition and composition of modelling languages and analysis techniques to enable more flexibility in evolution and iii bridging the divergent levels of abstraction between data of the operation phase architectural models and source code of the development phase **HPI Future SOC**

Lab - Proceedings 2019 Christoph Meinel, Andreas Polze, Karsten Beins, Rolf Strotmann, Ulrich Seibold, Kurt Rödszus, Jürgen Müller, 2024-06-28 EN The HPI Future SOC Lab is a cooperation of the Hasso Plattner Institute HPI and industry partners Its mission is to enable and promote exchange and interaction between the research community and the industry partners The HPI Future SOC Lab provides researchers with free of charge access to a complete infrastructure of state of the art hard and software This infrastructure includes components which might be too expensive for an ordinary research environment such as servers with up to 64 cores and 2 TB main memory The offerings address researchers particularly from but not limited to the areas of computer science and business information systems Main areas of research include cloud computing parallelization and In Memory technologies This technical report presents results of research projects executed in 2019

Selected projects have presented their results on April 9th and November 12th 2019 at the Future SOC Lab Day events DE Das Future SOC Lab am HPI ist eine Kooperation des Hasso Plattner Instituts mit verschiedenen Industriepartnern Seine Aufgabe ist die Ermöglichung und Förderung des Austausches zwischen Forschungsgemeinschaft und Industrie Am Lab wird interessierten Wissenschaftlern eine Infrastruktur von neuester Hard und Software kostenfrei für Forschungszwecke zur Verfügung gestellt Dazu zählen teilweise noch nicht am Markt verfügbare Technologien die im normalen Hochschulbereich in der Regel nicht zu finanzieren wären bspw Server mit bis zu 64 Cores und 2 TB Hauptspeicher Diese Angebote richten sich insbesondere an Wissenschaftler in den Gebieten Informatik und Wirtschaftsinformatik Einige der Schwerpunkte sind Cloud Computing Parallelisierung und In Memory Technologien In diesem Technischen Bericht werden die Ergebnisse der Forschungsprojekte des Jahres 2019 vorgestellt Ausgewählte Projekte stellten ihre Ergebnisse am 09 April und 12 November 2019 im Rahmen des Future SOC Lab Tags vor HPI Future SOC Lab Bär, Florian, Barrera-Animas, Ari Yair, Baumann, Annika, Cheng, Feng, Choudhary, Yash, Cooray, Thilini, de Oliveira, Roberto C. L., Di Varano, Igor, Eberhardt, Felix, Eloff, Jan H. P., Ermakova, Tatiana, Fabian, Benjamin, Friedrich, Tobias, Grohmann, Maria, Hecht, Sonja, Huegle, Johannes, Jabeen, Hajira, Jaeger, David, Kelkel, Stefan, Knigge, Marlene, Krcmar, Helmut, Kuster, Bernhard, Lehmann, Jens, López-Cuevas, Armando, Lundberg, Lars, Medina-Pérez, Miguel Angel, Meinel, Christoph, Monroy-Borja, Raúl, Möstl, Christian, Netzeband, André, Neumer, Tamas, Niederleithinger, Ernst, Plauth, Max, Podapati, Sasidhar, Polze, Andreas, Prifti, Loina, Ramírez-Márquez,

José Emmanuel, Rodríguez, Jorge, Rosander, Oliver, Rothenberger, Ralf, Sapegin, Andrey, Schmidt, Christopher, Schmidt, Rainer, Sejdiu, Gözim, Servadei, Lorenzo, Sidorova, Julia A., Sköld, Lars, Soares, Fábio Mendes, Sutton, Andrew M., Trejo, Luis A., van der Walt, Estée, van Hoorn, André, Wilhelm, Mathias, Willnecker, Felix, Zhang, Shuhao, 2019 Das Future SOC Lab am HPI ist eine Kooperation des Hasso Plattner Instituts mit verschiedenen Industriepartnern Seine Aufgabe ist die Ermöglichung und Förderung des Austausches zwischen Forschungsgemeinschaft und Industrie Am Lab wird interessierten Wissenschaftlern eine Infrastruktur von neuester Hard und Software kostenfrei für Forschungszwecke zur Verfügung gestellt Dazu zählen teilweise noch nicht am Markt verfügbare Technologien die im normalen Hochschulbereich in der Regel nicht zu finanzieren wären bspw Server mit bis zu 64 Cores und 2 TB Hauptspeicher Diese Angebote richten sich insbesondere an Wissenschaftler in den Gebieten Informatik und Wirtschaftsinformatik Einige der Schwerpunkte sind Cloud Computing Parallelisierung und In Memory Technologien In diesem Technischen Bericht werden die Ergebnisse der Forschungsprojekte des Jahres 2017 vorgestellt Ausgewählte Projekte stellten ihre Ergebnisse am 25 April und 15 November 2017 im Rahmen der Future SOC Lab Tag Veranstaltungen vor The HPI Future SOC Lab is a cooperation of the Hasso Plattner Institute HPI and industry partners Its mission is to enable and promote exchange and interaction between the research community and the industry partners The HPI Future SOC Lab provides researchers with free of charge access to a complete infrastructure of state of the art hard and software This infrastructure includes components which might be too expensive for an ordinary research environment such as servers with up to 64 cores and 2 TB main memory The offerings address researchers particularly from but not limited to the areas of computer science and business information systems Main areas of research include cloud computing parallelization and In Memory technologies This technical report presents results of research projects executed in 2017 Selected projects have presented their results on April 25th and November 15th 2017 at the Future SOC Lab Day events *HPI Future SOC Lab - Proceedings 2018* Kaushik Rana, Durga Prasad Mohapatra, Julia Sidorova, Lars Lundberg, Lars Sköld, Luís Fernando Lopes Grim, André Leon Sampaio Gradvohl, Jonas Cremerius, Simon Siegert, Anton von Weltzien, Annika Baldi, Finn Klessascheck, Svitlana Kalancha, Tom Lichtenstein, Nuhad Shaabani, Christoph Meinel, Tobias Friedrich, Pascal Lenzner, David Schumann, Ingmar Wiese, Nicole Sarna, Lena Wiese, Araek Sami Tashkandi, Estée van der Walt, Jan H. P. Eloff, Christopher Schmidt, Johannes Hügler, Siegfried Horschig, Matthias Uflacker, Pejman Najafi, Andrey Sapegin, Feng Cheng, Dragan Stojanovic, Aleksandra Stojnev Ilić, Igor Djordjevic, Natalija Stojanovic, Bratislav Predic, Mario González-Jiménez, Juan de Lara, Sven Mischkewitz, Bernhard Kainz, André van Hoorn, Vincenzo Ferme, Henning Schulz, Marlene Knigge, Sonja Hecht, Loina Prifti, Helmut Krcmar, Benjamin Fabian, Tatiana Ermakova, Stefan Kelkel, Annika Baumann, Laura Morgenstern, Max Plauth, Felix Eberhard, Felix Wolff, Andreas Polze, Tim Cech, Noel Danz, Nele Sina Noack, Lukas Pirl, Jossekin Jakob Beilharz, Roberto C. L. De Oliveira, Fábio Mendes Soares, Carlos Juiz, Belen Bermejo, Alexander Mühle, Andreas Grüner, Vageesh Saxena, Tatiana Gayvoronskaya, Christopher Weyand, Mirko

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An Approach for Guiding Developers to Performance and Scalability Solutions Heger, Christoph,2018-09-05 The quality of enterprise software applications plays a crucial role for the satisfaction of the users and the economic success of the enterprises Software applications with unsatisfying performance and scalability are perceived by its users as low in quality as less interesting and less attractive and cause frustration when preventing the users from attaining their goals This book proposes an approach for a recommendation system that enables developers who are novices in software perform

Performance Problem Diagnostics by Systematic Experimentation Wert, Alexander,2018-03-29 In this book we introduce an automatic experiment based approach for performance problem diagnostics in enterprise software systems The proposed approach systematically searches for root causes of detected performance problems by executing series of systematic performance tests The presented approach is evaluated by various case studies showing that the presented approach is applicable to a wide range of contexts

Workload-sensitive Timing Behavior Analysis for Fault Localization in Software Systems Matthias Rohr,2015-03-10 Software timing behavior measurements such as response times often show high statistical variance This variance can make the analysis difficult or even threaten the applicability of statistical techniques This thesis introduces a method for improving the analysis of software response time measurements that show high variance Our approach can find relations between timing behavior variance and both trace shape information and workload intensity information This relation is used to provide timing behavior measurements with virtually less variance This can make timing behavior analysis more robust e g improved confidence and precision and faster e g less simulation runs and shorter monitoring period The thesis contributes TracSTA Trace Context Sensitive Timing Behavior Analysis and WiSTA Workload Intensity Sensitive Timing Behavior Analysis TracSTA uses trace shape information i e the shape of the control flow corresponding to a software operation execution and WiSTA uses workload intensity metrics e g the number of concurrent software executions to create context specific timing behavior profiles Both the applicability and effectiveness are evaluated

in several case studies and field studies The evaluation shows a strong relation between timing behavior and the metrics considered by TracSTA and WiSTA Additionally a fault localization approach for enterprise software systems is presented as application scenario It uses the timing behavior data provided by TracSTA and WiSTA for anomaly detection

Model Driven Online Capacity Management For Component Based Software Systems: Bestsellers in 2023 The year 2023 has witnessed a noteworthy surge in literary brilliance, with numerous compelling novels captivating the hearts of readers worldwide. Lets delve into the realm of popular books, exploring the fascinating narratives that have charmed audiences this year. The Must-Read : Colleen Hoover's "It Ends with Us" This poignant tale of love, loss, and resilience has captivated readers with its raw and emotional exploration of domestic abuse. Hoover expertly weaves a story of hope and healing, reminding us that even in the darkest of times, the human spirit can triumph. Model Driven Online Capacity Management For Component Based Software Systems : Taylor Jenkins Reids "The Seven Husbands of Evelyn Hugo" This captivating historical fiction novel unravels the life of Evelyn Hugo, a Hollywood icon who defies expectations and societal norms to pursue her dreams. Reids captivating storytelling and compelling characters transport readers to a bygone era, immersing them in a world of glamour, ambition, and self-discovery. Model Driven Online Capacity Management For Component Based Software Systems : Delia Owens "Where the Crawdads Sing" This mesmerizing coming-of-age story follows Kya Clark, a young woman who grows up alone in the marshes of North Carolina. Owens spins a tale of resilience, survival, and the transformative power of nature, captivating readers with its evocative prose and mesmerizing setting. These popular novels represent just a fraction of the literary treasures that have emerged in 2023. Whether you seek tales of romance, adventure, or personal growth, the world of literature offers an abundance of compelling stories waiting to be discovered. The novel begins with Richard Papen, a bright but troubled young man, arriving at Hampden College. Richard is immediately drawn to the group of students who call themselves the Classics Club. The club is led by Henry Winter, a brilliant and charismatic young man. Henry is obsessed with Greek mythology and philosophy, and he quickly draws Richard into his world. The other members of the Classics Club are equally as fascinating. Bunny Corcoran is a wealthy and spoiled young man who is always looking for a good time. Charles Tavis is a quiet and reserved young man who is deeply in love with Henry. Camilla Macaulay is a beautiful and intelligent young woman who is drawn to the power and danger of the Classics Club. The students are all deeply in love with Morrow, and they are willing to do anything to please him. Morrow is a complex and mysterious figure, and he seems to be manipulating the students for his own purposes. As the students become more involved with Morrow, they begin to commit increasingly dangerous acts. The Secret History is an exceptional and suspenseful novel that will keep you guessing until the very end. The novel is a cautionary tale about the dangers of obsession and the power of evil.

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Table of Contents Model Driven Online Capacity Management For Component Based Software Systems

1. Understanding the eBook Model Driven Online Capacity Management For Component Based Software Systems
 - The Rise of Digital Reading Model Driven Online Capacity Management For Component Based Software Systems
 - Advantages of eBooks Over Traditional Books
2. Identifying Model Driven Online Capacity Management For Component Based Software Systems
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Model Driven Online Capacity Management For Component Based Software Systems
 - User-Friendly Interface
4. Exploring eBook Recommendations from Model Driven Online Capacity Management For Component Based Software Systems
 - Personalized Recommendations
 - Model Driven Online Capacity Management For Component Based Software Systems User Reviews and Ratings
 - Model Driven Online Capacity Management For Component Based Software Systems and Bestseller Lists
5. Accessing Model Driven Online Capacity Management For Component Based Software Systems Free and Paid eBooks
 - Model Driven Online Capacity Management For Component Based Software Systems Public Domain eBooks
 - Model Driven Online Capacity Management For Component Based Software Systems eBook Subscription Services
 - Model Driven Online Capacity Management For Component Based Software Systems Budget-Friendly Options
6. Navigating Model Driven Online Capacity Management For Component Based Software Systems eBook Formats
 - ePub, PDF, MOBI, and More
 - Model Driven Online Capacity Management For Component Based Software Systems Compatibility with Devices
 - Model Driven Online Capacity Management For Component Based Software Systems Enhanced eBook Features
7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Model Driven Online Capacity Management For Component Based Software Systems

- Highlighting and Note-Taking Model Driven Online Capacity Management For Component Based Software Systems
- Interactive Elements Model Driven Online Capacity Management For Component Based Software Systems
- 8. Staying Engaged with Model Driven Online Capacity Management For Component Based Software Systems
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Model Driven Online Capacity Management For Component Based Software Systems
- 9. Balancing eBooks and Physical Books Model Driven Online Capacity Management For Component Based Software Systems
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Model Driven Online Capacity Management For Component Based Software Systems
- 10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
- 11. Cultivating a Reading Routine Model Driven Online Capacity Management For Component Based Software Systems
 - Setting Reading Goals Model Driven Online Capacity Management For Component Based Software Systems
 - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Model Driven Online Capacity Management For Component Based Software Systems
 - Fact-Checking eBook Content of Model Driven Online Capacity Management For Component Based Software Systems
 - Distinguishing Credible Sources
- 13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
- 14. Embracing eBook Trends
 - Integration of Multimedia Elements
 - Interactive and Gamified eBooks

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