



SCI SERIES IN SOFTWARE ENGINEERING

# DevOps

A Software Architect's Perspective

Len Bass

Ingo Weber

Liming Zhu

# Devops A Software Architects Perspective Sei Series In Software Engineering

**Chao Zhang**



## **DevOps A Software Architects Perspective Sei Series In Software Engineering:**

**DevOps** Len Bass,Ingo Weber,Liming Zhu,2015-05-08 The First Complete Guide to DevOps for Software Architects

DevOps promises to accelerate the release of new software features and improve monitoring of systems in production but its crucial implications for software architects and architecture are often ignored In DevOps A Software Architect s Perspective three leading architects address these issues head on The authors review decisions software architects must make in order to achieve DevOps goals and clarify how other DevOps participants are likely to impact the architect s work They also provide the organizational technical and operational context needed to deploy DevOps more efficiently and review DevOps impact on each development phase The authors address cross cutting concerns that link multiple functions offering practical insights into compliance performance reliability repeatability and security This guide demonstrates the authors ideas in action with three real world case studies datacenter replication for business continuity management of a continuous deployment pipeline and migration to a microservice architecture Comprehensive coverage includes Why DevOps can require major changes in both system architecture and IT roles How virtualization and the cloud can enable DevOps practices Integrating operations and its service lifecycle into DevOps Designing new systems to work well with DevOps practices Integrating DevOps with agile methods and TDD Handling failure detection upgrade planning and other key issues Managing consistency issues arising from DevOps independent deployment models Integrating security controls roles and audits into DevOps Preparing a business plan for DevOps adoption rollout and measurement

**Devops** Len Bass,Ingo Weber,Liming Zhu,2015-05-01

DevOps promises to accelerate the release of new software features and improve monitoring of systems in production but its crucial implications for software architects and architecture are often ignored In DevOps A Software Architect s Perspective three leading architects address these issues head on The authors review decisions software architects must make in order to achieve DevOps goals and clarify how other DevOps participants are likely to impact the architect s work They also provide the organizational technical and operational context needed to deploy DevOps more efficiently and review DevOps impact on each development phase The authors also address cross cutting concerns that link multiple functions offering practical insights into compliance performance reliability repeatability and security This guide demonstrates the authors ideas in action with three real world case studies datacenter maintenance for business continuity management of a continuous deployment pipeline and migration to a microservice architecture Comprehensive coverage includes Why DevOps can require major changes in both system architecture and IT roles How virtualization and the cloud can enable DevOps practices Integrating operations and its service lifecycle into DevOps Designing new systems to work well with DevOps practices Overcoming cultural and communication differences between Dev and Ops Integrating DevOps with agile methods and TDD Handling failure detection upgrade planning and other key issues Managing consistency issues arising from DevOps independent deployment models Integrating security controls roles and audits into DevOps Preparing a business plan for

DevOps adoption rollout and measurement      **Future-Proof Software-Systems** Frank J. Furrer,2019-09-25 This book focuses on software architecture and the value of architecture in the development of long lived mission critical trustworthy software systems The author introduces and demonstrates the powerful strategy of Managed Evolution along with the engineering best practice known as Principle based Architecting The book examines in detail architecture principles for e g Business Value Changeability Resilience and Dependability The author argues that the software development community has a strong responsibility to produce and operate useful dependable and trustworthy software Software should at the same time provide business value and guarantee many quality of service properties including security safety performance and integrity As Dr Furrer states Producing dependable software is a balancing act between investing in the implementation of business functionality and investing in the quality of service properties of the software systems The book presents extensive coverage of such concepts as Principle Based Architecting Managed Evolution Strategy The Future Principles for Business Value Legacy Software Modernization Migration Architecture Principles for Changeability Architecture Principles for Resilience Architecture Principles for Dependability The text is supplemented with numerous figures tables examples and illustrative quotations Future Proof Software Systems provides a set of good engineering practices devised for integration into most software development processes dedicated to the creation of software systems that incorporate Managed Evolution

*Reference Architectures for Critical Domains* Elisa Yumi Nakagawa,Pablo Oliveira Antonino,2023-03-14 This book presents reference architecture as a key blueprint to develop and evolve critical software intensive systems emphasizing both the state of the art in research and successful industrial cases After outlining the theoretical foundations of reference architecture and presenting an overview of a number of reference architectures proposed over the recent years this book dives into a set of critical application domains including defense health automotive avionics and Industry 4 0 highlighting the respective most relevant reference architectures that have impacted these domains the experience and lessons learned insights gained benefits and drawbacks and factors that make these architectures sustainable The book finishes with the most relevant directions for future advances in reference architectures The content of this book is useful for researchers and advanced professionals in industry in the areas of computing and engineering as well as in critical application domains that increasingly require interconnected large and complex software intensive systems      *Software Technology: Methods and Tools* Manuel Mazzara,Jean-Michel Bruel,Bertrand Meyer,Alexander Petrenko,2019-10-08 This book constitutes the refereed proceedings of the 51st International Conference on Software Technology Methods and Tools TOOLS 2019 held in Innopolis Russia in October 2019 The 19 revised full papers and 13 short papers presented in this book were carefully reviewed and selected from 62 submissions The papers discuss all aspects of software engineering and programming languages machine learning internet of things security computer architectures and robotics and projects      Engineering and Management of Data Centers Jorge Marx Gómez,Manuel Mora,Mahesh S. Raisinghani,Wolfgang Nebel,Rory V. O'Connor,2017-11-10 This

edited volume covers essential and recent development in the engineering and management of data centers Data centers are complex systems requiring ongoing support and their high value for keeping business continuity operations is crucial The book presents core topics on the planning design implementation operation and control and sustainability of a data center from a didactical and practitioner viewpoint Chapters include Foundations of data centers Key Concepts and Taxonomies ITSDM A Methodology for IT Services Design Managing Risks on Data Centers through Dashboards Risk Analysis in Data Center Disaster Recovery Plans Best practices in Data Center Management Case KIO Networks QoS in NaaS Network as a Service using Software Defined Networking Optimization of Data Center Fault Tolerance Design Energetic Data Centre Design Considering Energy Efficiency Improvements During Operation Demand side Flexibility and Supply side Management The Use Case of Data Centers and Energy Utilities DevOps Foundations and its Utilization in Data Centers Sustainable and Resilient Network Infrastructure Design for Cloud Data Centres Application Software in Cloud Ready Data Centers This book bridges the gap between academia and the industry offering essential reading for practitioners in data centers researchers in the area and faculty teaching related courses on data centers The book can be used as a complementary text for traditional courses on Computer Networks as well as innovative courses on IT Architecture IT Service Management IT Operations and Data Centers

Software Engineering Jochen Ludewig, Horst Lichter, 2023-02-28 Das Handbuch f r s Selbststudium f r den Job oder vorlesungsbegleitend erfahrungsbasierter ber und Einblick ins Software Engineering der sowohl die Theorie als auch die Praxis abdeckt umfassend verst ndlich und praxiserprobt Das Buch vermittelt die Grundlagen Erfahrungen und Techniken die den Kern des Software Engineerings bilden Es ist als Material zu Vorlesungen ber Software Engineering konzipiert Auch f r Praktiker die mit der Softwareentwicklung und bearbeitung und den dabei auftretenden Problemen vertraut sind ist das Buch sehr gut geeignet um die Kenntnisse im Selbststudium zu erg nzen und zu vertiefen Der Inhalt des Buches ist in f nf Hauptteile gegliedert Grundlagen Menschen und Prozesse Daueraufgaben im Softwareprojekt Techniken der Softwarebearbeitung Verwaltung und Erhaltung von Software Auch auf die Ausbildung zuk nftiger Software Engineers wird eingegangen Erg nzende Informationen sind auf der Webseite der Autoren verf gbar <https://se.buch.de>

*Next-Gen Digital Services. A Retrospective and Roadmap for Service Computing of the Future* Marco Aiello, Athman Bouguettaya, Damian Andrew Tamburri, Willem-Jan van den Heuvel, 2021-04-09 This book is a festschrift in honour of Mike Papazoglou s 65th birthday and retirement It includes 20 contributions from leading researchers who have worked with Mike in his more than 40 years of academic research Topics are as varied as Mike s and include service engineering service management services and human IoT and data driven services

**Relational and Algebraic Methods in Computer Science** Uli Fahrenberg, Wesley Fussner, Roland Gl ck, 2024-08-11 This book constitutes the refereed proceedings of the 21st International Conference RAMiCS 2024 held in Prague Czech Republic during August 19-22 2024 The 15 full papers presented in this book were carefully reviewed and selected from 21 submissions They focus on mathematical foundations to

applications as conceptual and methodological tools in computer science and beyond Architektur für Websysteme Daniel Takai, 2017-09-11 Dieses Buch enthält das Wissen um die Architektur von Web bzw. Gesch. ftssystemen also Systemen die über das Internet funktionieren und für die Arbeit mit Menschen entworfen werden. Es richtet sich also an Softwarearchitekten oder jene die Software Architekt werden möchten sowie Anforderungsingenieure und Manager die ihr technisches Wissen vertiefen möchten um den richtigen Fokus setzen zu können. Das Buch beschreibt drei Architekturstile für die Serviceorientierte Architektur, die Microservice Architektur und den Domänengetriebenen Entwurf, drei Entwurfsstandards für Services, Open Hosts und den Service Bus und enthält ein eigenes Qualitätsmodell für Web und Gesch. ftssysteme, das sich als Bewertungs- und Planungsgrundlage eignet und aus 19 Qualitätsmerkmalen besteht. Jedes Qualitätsmerkmal ist durch zahlreiche Techniken und Methoden detailliert beschrieben.

### **Advanced Information Networking and Applications**

Leonard Barolli, 2025-05-17 Networks of today are going through a rapid evolution and there are many emerging areas of information networking and their applications. Heterogeneous networking supported by recent technological advances in low power wireless communications along with silicon integration of various functionalities such as sensing, communications, intelligence and actuations are emerging as a critically important disruptive computer class based on a new platform networking structure and interface that enable novel low cost and high volume applications. Several of such applications have been difficult to realize because of many interconnection problems. To fulfill their large range of applications, different kinds of networks need to collaborate and wired and next generation wireless systems should be integrated in order to develop high performance computing solutions to problems arising from the complexities of these networks. This volume covers the theory, design and applications of computer networks, distributed computing and information systems. The aim of the volume *Advanced Information Networking and Applications* is to provide latest research findings, innovative research results, methods and development techniques from both theoretical and practical perspectives related to the emerging areas of information networking and applications.

### **Service-Oriented and Cloud Computing**

Kyriakos Kritikos, Pierluigi Plebani, Flavio de Paoli, 2018-09-03 This book constitutes the refereed proceedings of the 7th IFIP WG 2.14 European Conference on Service Oriented and Cloud Computing, ESOC 2018, held in Como, Italy, in September 2018. The 10 full and 5 short papers presented in this volume were carefully reviewed and selected from 32 submissions. The volume also contains one invited talk in full paper length. The main event mapped to the main research track which focused on the presentation of cutting edge research in both the service oriented and cloud computing areas. In conjunction, an industrial track was also held attempting to bring together academia and industry through showcasing the application of service oriented and cloud computing research, especially in the form of case studies in the industry.

### *Safety and Security of Cyber-Physical Systems* Frank J.

Furrer, 2022-07-20 Cyber physical systems (CPSs) consist of software controlled computing devices communicating with each other and interacting with the physical world through sensors and actuators. Because most of the functionality of a CPS is

implemented in software the software is of crucial importance for the safety and security of the CPS This book presents principle based engineering for the development and operation of dependable software The knowledge in this book addresses organizations that want to strengthen their methodologies to build safe and secure software for mission critical cyber physical systems The book Presents a successful strategy for the management of vulnerabilities threats and failures in mission critical cyber physical systems Offers deep practical insight into principle based software development 62 principles are introduced and cataloged into five categories Business Provides direct guidance on architecting and operating dependable cyber physical systems for software managers and architects **Software Architecture** Bedir

Tekinerdogan,Catia Trubiani,Chouki Tibermachine,Patrizia Scandurra,Carlos E. Cuesta,2023-09-07 This book constitutes the refereed proceedings of the 17th International Conference on Software Architecture ECSA 2023 held in Istanbul Turkey in September 2023 The 16 full papers and the 9 short papers included in this volume were carefully reviewed and selected from 71 submissions They address the most recent innovative and significant findings and experiences in the field of software architecture research and practice *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 Krause,Markus Frank,Sebastian Bischoff,Freya Behrens,Julius Rückin,Adrian Ziegler,Thomas Vogel,Chinh Tran,Irene Moser,Lars Grunske,Gábor Szárnyas,József Marton,János Maginecz,Dániel Varró,János Benjamin Antal,2023-06-06 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 2018 Selected projects have presented their results on April 17th and November 14th 2017 at the Future SOC Lab Day events **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 - Proceedings 2020** Christoph Meinel, Andreas Polze, Karsten Beins, Rolf Strotmann, Ulrich Seibold, Kurt Rödszus, Jürgen Müller, Jürgen Sommer, 2024-08-09 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 2020 Selected projects have presented their results on April 21st and November 10th 2020 at the Future SOC Lab Day events **Software Architecture** Patrizio Pelliccione, Rick Kazman, Ingo Weber, Anna Liu, 2023-09-11 This book provides a collection of cutting edge research roadmaps



that attempt to determine and perhaps even shape the future of software architecture research. It contains a distillation of the outputs from several ICSA 2022 working sessions and the subsequent work from the authors. Software architecture research involves the study of the design and analysis of software systems focusing on the high level structure and organization of software components as well as the interactions and relationships between them. It also focuses on the non technical aspects of software design how teams are organized and how they communicate and work together. The first three chapters of the book investigate software architecture for emerging classes of software systems with widespread interest including quantum computing artificial intelligence centric systems and systems within value based ecosystems. Subsequent chapters investigate the role of architecture in relation to modern development processes sharing of data as an enabler for furthering research in software architecture and teaching software architecture. In summary this book provides an overview of the latest research and directions in software architecture covering a wide array of current and emerging topics. Specifically this book is a valuable resource for researchers and students to aid them in identifying fruitful paths for future research.

**Software Engineering Aspects of Continuous Development and New Paradigms of Software Production and Deployment** Jean-Michel Bruel, Manuel Mazzara, Bertrand Meyer, 2019-01-18 This book constitutes revised selected papers from the First International Workshop on Software Engineering Aspects of Continuous Development and New Paradigms of Software Production and Deployment DEVOPS 2018 held at the Chateau de Villebrumier France in March 2018. The 17 papers presented in this volume were carefully reviewed and selected from 23 submissions. They cover a wide range of problems arising from DevOps and related approaches current tools rapid development deployment processes effects on team performance analytics trustworthiness microservices and related topics.

**Continuous Architecture in Practice** Eoin Woods, Murat Erder, Pierre Pureur, 2021-05-26 Update Your Architectural Practices for New Challenges Environments and Stakeholder Expectations. I am continuously delighted and inspired by the work of these authors. Their first book laid the groundwork for understanding how to evolve the architecture of a software intensive system and this latest one builds on it in some wonderfully actionable ways. Grady Booch, Chief Scientist for Software Engineering IBM Research. Authors Murat Erder, Pierre Pureur and Eoin Woods have taken their extensive software architecture experience and applied it to the practical aspects of software architecture in real world environments. Continuous Architecture in Practice provides hands on advice for leveraging the continuous architecture approach in real world environments and illuminates architecture's changing role in the age of Agile DevOps and cloud platforms. This guide will help technologists update their architecture practice for new software challenges. As part of the Vaughn Vernon Signature Series, this title was hand selected for the practical delivery oriented knowledge that architects and software engineers can quickly apply. It includes in depth guidance for addressing today's key quality attributes and cross cutting concerns such as security performance scalability resilience data and emerging technologies. Each key technique is demonstrated through a start to finish case study reflecting the

authors deep experience with complex software environments Key topics include Creating sustainable coherent systems that meet functional requirements and the quality attributes stakeholders care about Understanding team based software architecture and architecture as a flow of decisions Understanding crucial issues of data management integration and change and the impact of varied data technologies on architecture Architecting for security including continuous threat modeling and mitigation Architecting for scalability and resilience including scaling microservices and serverless environments Using architecture to improve performance in continuous delivery environments Using architecture to apply emerging technologies successfully Register your book for convenient access to downloads updates and or corrections as they become available See inside book for details

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In a time characterized by interconnectedness and an insatiable thirst for knowledge, the captivating potential of verbal expression has emerged as a formidable force. Its power to evoke sentiments, stimulate introspection, and incite profound transformations is genuinely awe-inspiring. Within the pages of "**Devops A Software Architects Perspective Sei Series In Software Engineering**," a mesmerizing literary creation penned with a celebrated wordsmith, readers attempt an enlightening odyssey, unraveling the intricate significance of language and its enduring effect on our lives. In this appraisal, we shall explore the book's central themes, evaluate its distinctive writing style, and gauge its pervasive influence on the hearts and minds of its readership.

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