The Art Of Scalability Scalable Web Architecture Processes And Organizations For The Modern Enterprise 2nd Edition

"This is science writing as wonder and as inspiration." —The Wall Street Journal Wall Street Journal From one of the most influential scientists of our time, a dazzling exploration of the hidden laws that govern the life cycle of everything from plants and animals to the cities we live in. Visionary physicist Geoffrey West is a pioneer in the field of complexity science, the science of emergent systems and networks. The term "complexity" can be misleading, however, because what makes West's discoveries so beautiful is that he has found an underlying simplicity that unites the seemingly complex and diverse phenomena of living systems, including our bodies, our cities and our businesses. Fascinated by aging and mortality, West applied the rigor of a physicist to the biological question of why we live as long as we do and no longer. The result was astonishing, and changed science: West found that despite the riotous diversity in mammals, they are all, to a large degree, scaled versions of each other. If you know the size of a mammal, you can use scaling laws to learn everything from how much food it eats per day, what its heart-rate is, how long it will take to mature, its lifespan, and so on. Furthermore, the efficiency of the mammal's circulatory systems scales up precisely based on weight: if you compare a mouse, a human and an elephant on a logarithmic graph, you find with every doubling of average weight, a species gets 25% more efficient—and lives 25% longer. Fundamentally, he has proven, the issue has to do with the fractal geometry of the networks that supply energy and remove waste from the organism's body. West's work has been game-changing for biologists, but then he made the even bolder move of exploring his work's applicability. Cities, too, are constellations of networks and laws of scalability relate with eerie precision to them. Recently, West has applied his revolutionary work to the business world. This investigation has led to powerful insights into why some companies thrive while others fail. The implications of these discoveries are far-reaching, and are just beginning to be explored. Scale is a thrilling scientific adventure story about the elemental natural laws that bind us together in simple but profound ways. Through the brilliant mind of Geoffrey West, we can envision how cities, companies and biological life alike are dancing to the same simple, powerful tune.

In this book, the CEO of Cazton, Inc. and internationally-acclaimed speaker, Chander Dhall, demonstrates current website design scalability patterns and takes a pragmatic approach to explaining their pros and cons to show you how to select the appropriate pattern for your site. He then tests the patterns by deliberately forcing them to fail and exposing potential flaws before discussing how to design the optimal pattern to match your scale requirements. The author explains the use of polyglot programming and how to match the right patterns to your business needs. He also details several No-SQL patterns and explains the fundamentals of different paradigms of No-SQL by showing complementary strategies of using them along with relational databases to achieve the best results. He also teaches how to make the scalability pattern work with a real-world microservices pattern. With the proliferation of countless electronic devices and the ever growing number of Internet users, the scalability of websites has become an increasingly important challenge. Scalability, even though highly coveted, may not be so easy to achieve. Think that you can't attain responsiveness along with scalability? Chander Dhall will demonstrate that, in fact, they go hand in hand. What You'll Learn Architect and develop applications so that they are easy to scale. Learn different scaling and partitioning options and the combinations. Learn techniques to speed up responsiveness. Deep dive into caching, column-family databases, document databases, search engines and RDBMS. Learn scalability and responsiveness concepts that are usually ignored. Effectively balance scalability, performance, responsiveness, and availability while minimizing downtime. Who This Book Is For Executives (CXOs), software architects , developers, and IT Pros

Learn how to design scalable, robust software for cutting-edge communications productsâ?¦ Carrier-grade software must satisfy the stringent quality requirements of network operators whose systems provide mission-critical communications services. This book describes proven carrier-grade software techniques used in flagship products designed by industry leaders such as Lucent, Nortel, and Ericsson. In the age of 24/7, software robustness is a competitive advantage. This authoritative guide for software engineers, managers, and testers of products that face carrier-grade requirements helps you to develop state-of-the-art software that will give you an edge in todayâ??s marketplace. Robust Communications Software: Extreme Availability, Reliability and Scalability for Carrier-Grade Systems offers advice on choosing the right technologies for building reliable software incorporates real-world examples and design rationales when describing how to construct robust, embedded software for communications systems presents a comprehensive set of carrier-grade design patterns that help you to meet extreme availability, reliability, scalability, and capacity requirements gives advice on how to protect against and recover from software faults discusses system installation, operability, maintenance, and on-site debugging

A Washington Post Bestseller Three Principles for Managing—and Avoiding—the Problems of Growth Why is profitable growth so hard to achieve and sustain? Most executives manage their companies as if the solution to that problem lies in the external environment: find an attractive market, formulate the right strategy, win new customers. But when Bain & Company's Chris Zook and James Allen, authors of the bestselling Profit from the Core, researched this question, they found that when companies fail to achieve their growth targets, 90 percent of the time the root causes are internal, not external—increasing distance from the front lines, loss of accountability, proliferating processes and bureaucracy, to name only a few. What's more, companies experience a set of predictable internal crises, at predictable stages, as they grow. Even for healthy companies, these crises, if not managed properly, stifle the ability to grow further—and can actively lead to decline. The key insight from Zook and Allen's research is that managing these choke points requires a "founder's mentality"—behaviors typically embodied by a bold, ambitious founder—to restore speed, focus, and connection to customers: • An insurgent's clear mission and purpose • An unambiguous owner mindset • A relentless obsession with the front line Based on the authors' decade-long study of companies in more than forty countries, The Founder's Mentality demonstrates the strong relationship between these three traits in companies of all kinds—not just start-ups—and their ability to sustain performance. Through rich analysis and inspiring examples, this book shows how any leader—not only a founder—can instill and leverage a founder's mentality throughout their organization and find lasting, profitable growth.

Success on the web is measured by usage and growth. Web-based companies live or die by the ability to scale their infrastructure to accommodate increasing demand. This book is a hands-on and practical guide to planning for such growth, with many techniques and considerations to help you plan, deploy, and manage web application infrastructure. The Art of Capacity Planning is written by the manager of data operations for the world-famous photo-sharing site Flickr.com, now owned by Yahoo! John Allspaw combines personal anecdotes from many phases of Flickr's growth with insights from his colleagues in many other

industries to give you solid guidelines for measuring your growth, predicting trends, and making cost-effective preparations. Topics include: Evaluating tools for measurement and deployment Capacity analysis and prediction for storage, database, and application servers Designing architectures to easily add and measure capacity Handling sudden spikes Predicting exponential and explosive growth How cloud services such as EC2 can fit into a capacity strategy In this book, Allspaw draws on years of valuable experience, starting from the days when Flickr was relatively small and had to deal with the typical growth pains and cost/performance trade-offs of a typical company with a Web presence. The advice he offers in The Art of Capacity Planning will not only help you prepare for explosive growth, it will save you tons of grief.

Written in Henry Liu's clear, concise style, Java Performance and Scalability gets right to the point. With clearly explained concepts, most pertinent theories, precise step-by-step procedures, and large volume of illustrative charts and tables with highly reliable data supporting behind, you gain quickly the necessary knowledge and skills for being able to cope with Java application performance and scalability issues without having to resort to more experienced professionals or expensive external consultants. Specifically, it helps you learn the following knowledge and skills that are essential for you to become more effective in contributing to the success of your organization: * What you need to know at minimum about the architecture of modern hardware so that you can make smart decisions on when you should pour your time on your application and when you can just throw in more advanced hardware to get by. * What you need to know about garbage collection theories in general and how they are implemented with widely used Java Virtual Machines like HotSpot JVMs. * Precise methodologies, procedures, and programs that you can start to use immediately to help you profile and tune your Java applications. * How you can design and build performance and scalability into your product proactively without having to face tough retrofitting decisions or even torrents of customer escalations later on. In addition, the book contains interesting data for your reference, associated with oops compression, CMS garbage collection tuning, DoEscapeAnalysis, G1 versus CMS comparison, etc., all based on full scale, rigorous performance and scalability tests with real products.

As open systems continue to replace traditional mainframe systems, system scalability is becoming an increasingly important topic. This guide offers techniques for designing reliable and scalable online transaction processing (OLTP) applications using Oracle. It covers hardware and I/O operation; benchmark and database monitoring systems; Oracle internals, operation, and implementation; and UNIX operating system issues that impact Oracle performance and scalability. The CD-ROM contains source code for dbaman, code examples, and public domain software. Annotation copyrighted by Book News, Inc., Portland, OR

Master the art of designing web client and server with Google's bold and productive language – Dart About This Book Create robust applications with unit tests, documentation, and diagnostic logging Master the core Dart language, type system, and key development tools Connect to existing web services, process JSON, and create your own framework for the data display Use mixins, reflections, annotations, and other metadata programming techniques to create powerful app Who This Book Is For If you are familiar with web development and are looking to learn, or even just evaluate, Dart as a multipurpose language, this learning path is for you. No familiarity with the Dart language is assumed. For beginners, it will serve as a guide to rapidly accelerate from a novice level to the master level; for intermediate to advanced developers it will quickly fill in the gaps on Dart and can explore a range of application types and powerful packages that are demonstrated in a practical manner. What You Will Learn Handle form data and encryption Set up your Dart environment to achieve the highest productivity Run and debug the Dart server and web applications and compile them in JavaScript Work with PostgreSQL—an industry standard relational database system Create robust applications with unit tests, documentation, and diagnostic logging Develop command-line applications, and explore the key data structures and libraries Detect and use HTML5 features that will help you deliver rich, cross-platform content Demonstrate the power of Polymer web components for binding data and structuring your web pages In Detail Designed to create next generation apps, Google's Dart offers a much more robust framework and also supersedes JavaScript in several aspects. Familiar yet innovative, compact yet scalable, it blows away the accumulated JavaScript legacy limitations. Dart was designed for great tool-ability and developer productivity, allowing you to create better application faster than before. Google chose it for their billion dollar advertising business and you have its power for your projects too. The first module will introduce you the Dart language starting from its conception to its current form, and where it headed is through engaging substantial practical projects. You will be taken through building typical applications and exploring the exciting new technologies of HTML5. The second module will show you how to add internalization support to your web applications and how i18n and i10n access can be embedded into your code to design applications that can be localized easily. You will be shown how to organize client-to-server communication and how different HTML5 features can be used in Dart. Finally, this module will show you how you can store data locally, break the storage limit, and prevent security issues in your web application. The third module is a pragmatic guide that will increase your expertise in writing all kinds of applications, including web apps, scripts, and server-side apps. It provides rich insights on how to extend your Dart programming skills. Altogether, this course provides you the power to create powerful applications with Dart, without worrying about your knowledge leading to you having to make compromises to the end product! This Learning Path has been curated from three Packt products: Dart By Example By Davy Mitchell Mastering Dart By Sergey Akopkokhyants Dart Cookbook By Ivo Balbaert Style and approach This is an enticing learning path that starts from the very basics to gradually pick up pace as the story unfolds. Each topic is explained with the help of recipes that solves a real-world problem involving hands-on work thus giving you a deep insight into the world of DART.

Many social entrepreneurs struggle to take successful, innovative programs that address social problems on a local or limited basis and scale them up to expand their impact in a more widespread, deeper, and efficient way. In Scaling Social Impact , the editors address this issue with a comprehensive collection of original papers.

Know how your company can accelerate growth by not only tapping into new growth vectors, but also by adapting its organization, culture, and processes. To oversee growth from an idea to a company with billions in revenue, CEOs must reinvent many aspects of their company in anticipation of it reaching ever-higher revenues. Author Peter Cohan takes you through the four stages of scaling: winning the first customers, building a scalable business model, sprinting to liquidity, and running the marathon. What You'll Learn Discover how founders keep their CEO positions by managing the organizational change needed to reach the next stage of scaling Read case studies that illustrate how CEOs craft growth strategies, raise capital, create culture, build their organizations, set goals, and manage processes to achieve them Discover principles of successful scaling through comparisons of successful and less successful companies Use the Scaling Quotient to assess your startup's readiness to grow Follow a road map for turning your idea into a company that can change the world Who This Book Is For Entrepreneurs, aspiring CEOs, capital providers, and all other key stakeholders

"This book presents, discusses, shares ideas, results and experiences on the recent important advances and future challenges on enabling

technologies for achieving higher performance"--Provided by publisher.

Transform Your Organization by Scaling Leadership How do senior leaders, in their own words, describe the most effective leaders—the ones that get results, grow the business, enhance the culture and leave in their wake a trail of other really effective leaders? Conversely, how do senior leaders describe the kind of leader that undercuts the organization's capacity and capability to create its future? This book, based on groundbreaking research, shows how senior leaders describe and develop leadership that works, that does not, that scales, and that limits scale. Is your leadership built for scale as you advance in today's volatile, uncertain, dynamic, and disruptive business environment? This context puts a premium on a very particular kind of leadership—High-Creative leadership capable of rapidly growing the organization while simultaneously transforming it into more agile, innovative, adaptive and engaging workplace. The research presented in this book suggests that senior leaders can describe the High-Creative leadership with surprising clarity. They also describe with equal precision the High-Reactive leadership that cancels itself out and seriously limits scale. Which type of leader are you? You scale your leadership by increasing the multiple on your leadership in three ways. First, by developing the strengths that differentiate the most effective leaders from the strengths deployed by the most Reactive and ineffective leaders. And second, by increasing your leadership ratio—the ratio of most the effective strengths to the most damaging liabilities. Third, by developing High-Creative leaders all around you. Scaling Leadership provides a proven framework for magnifying agile and scalable leadership in your organization. Scalable leadership drives forward-momentum by multiplying high-achieving leaders at scale so that growth, productivity and innovation increase exponentially. Creative leaders multiply their strengths beyond technical competence by leading in deep relationship, with radical humanity, passion and integrity. Drawing upon decades of solid research and experience enhancing individual capability and collective leadership effectiveness with Fortune 500 companies and government agencies, the authors provide an innovative and efficient framework to help you: Take stock of your own personal balance of leadership strengths and weaknesses Scale your leadership in deep relationship and high integrity Proliferate high-achievers throughout your organization's leadership system Identify ineffective leadership and course-correct quickly Transform your organization by transforming leadership Scaling Leadership is an invaluable tool for executives, managers, and leaders in business, academia, nonprofit organizations, and more. This innovative resource provides effective techniques, real-world examples, and expert guidance for organizations seeking to improve performance, align and execute strategies, and transform their business with scalable leadership capability.

This volume offers a simple, systematic guide to creating a knowledge sharing practice in your organization. It shows how to build the enabling environment and develop the skills needed to capture and share knowledge gained from operational experiences to improve performance and scale-up successes. Its recommendations are grounded on the insights gained from the past seven years of collaboration between the World Bank and its clients around the world—ministries and national agencies operating in various sectors—who are working to strengthen their operations through robust knowledge sharing. While informed by the academic literature on knowledge management and organizational learning, this handbook's operational background and many real-world examples and tips provide a missing, practical foundation for public sector officials in developing countries and for development practitioners. However, though written with a public sector audience in mind, the overall concepts and approaches will also hold true for most organizations in the private sector and the developed world.

Winner of the Shingo Publication Award Accelerate your organization to win in the marketplace. How can we apply technology to drive business value? For years, we've been told that the performance of software delivery teams doesn't matter?that it can't provide a competitive advantage to our companies. Through four years of groundbreaking research to include data collected from the State of DevOps reports conducted with Puppet, Dr. Nicole Forsgren, Jez Humble, and Gene Kim set out to find a way to measure software delivery performance?and what drives it?using rigorous statistical methods. This book presents both the findings and the science behind that research, making the information accessible for readers to apply in their own organizations. Readers will discover how to measure the performance of their teams, and what capabilities they should invest in to drive higher performance. This book is ideal for management at every level.

If you're looking to take full advantage of multi-core processors with concurrent programming, this practical book provides the knowledge and hands-on experience you need. The Art of Concurrency is one of the few resources to focus on implementing algorithms in the shared-memory model of multi-core processors, rather than just theoretical models or distributed-memory architectures. The book provides detailed explanations and usable samples to help you transform algorithms from serial to parallel code, along with advice and analysis for avoiding mistakes that programmers typically make when first attempting these computations. Written by an Intel engineer with over two decades of parallel and concurrent programming experience, this book will help you: Understand parallelism and concurrency Explore differences between programming for shared-memory and distributed-memory Learn guidelines for designing multithreaded applications, including testing and tuning Discover how to make best use of different threading libraries, including Windows threads, POSIX threads, OpenMP, and Intel Threading Building Blocks Explore how to implement concurrent algorithms that involve sorting, searching, graphs, and other practical computations The Art of Concurrency shows you how to keep algorithms scalable to take advantage of new processors with even more cores. For developing parallel code algorithms for concurrent programming, this book is a must.

Winner of the International Book Awards for General Business Winner of the Readers' Favorite International Book Award for Non-Fiction Business It's been over a decade since Verne Harnish's best-selling book Mastering the Rockefeller Habits was first released. Scaling Up (Rockefeller Habits 2.0) is the first major revision of this business classic which details practical tools and techniques for building an industry-dominating business. This book is written so everyone -- from frontline employees to senior executives -- can get aligned in contributing to the growth of a firm. Scaling Up focuses on the four major decision areas every company must get right: People, Strategy, Execution, and Cash. The book includes a series of new one-page tools including the updated One-Page Strategic Plan and the Rockefeller Habits ChecklistTM, which more than 40,000 firms around the globe have used to scale their companies successfully -- many to $10 million, $100 million, and $1 billion and beyond - while enjoying the climb!

Data is at the center of many challenges in system design today. Difficult issues need to be figured out, such as scalability, consistency, reliability, efficiency, and maintainability. In addition, we have an overwhelming variety of tools, including relational databases, NoSQL datastores, stream or batch processors, and message brokers. What are the right choices for your application? How do you make sense of all these buzzwords? In this practical and comprehensive guide, author Martin Kleppmann helps you navigate this diverse landscape by examining the pros and cons of various technologies for processing and storing data. Software keeps changing, but the fundamental principles remain the same. With this book, software engineers and architects will learn how to apply those ideas in practice, and how to make full use of data in modern applications. Peer under the hood of the systems you already use, and learn how to use and operate them more effectively Make informed decisions by identifying the strengths and weaknesses of different tools Navigate the trade-offs around consistency, scalability, fault tolerance, and complexity Understand the distributed systems research upon which modern databases are built Peek behind the scenes of major online services, and learn from their architectures

Understand the principles of software architecture with coverage on SOA, distributed and messaging systems, and database modeling Key Features Gain knowledge of architectural approaches on SOA and microservices for architectural decisions Explore different architectural patterns for building distributed applications Migrate applications written in Java or Python to the Go

language Book Description Building software requires careful planning and architectural considerations; Golang was developed with a fresh perspective on building next-generation applications on the cloud with distributed and concurrent computing concerns. Hands-On Software Architecture with Golang starts with a brief introduction to architectural elements, Go, and a case study to demonstrate architectural principles. You'll then move on to look at code-level aspects such as modularity, class design, and constructs specific to Golang and implementation of design patterns. As you make your way through the chapters, you'll explore the core objectives of architecture such as effectively managing complexity, scalability, and reliability of software systems. You'll also work through creating distributed systems and their communication before moving on to modeling and scaling of data. In the concluding chapters, you'll learn to deploy architectures and plan the migration of applications from other languages. By the end of this book, you will have gained insight into various design and architectural patterns, which will enable you to create robust, scalable architecture using Golang. What you will learn Understand architectural paradigms and deep dive into Microservices Design parallelism/concurrency patterns and learn object-oriented design patterns in Go Explore API-driven systems architecture with introduction to REST and GraphQL standards Build event-driven architectures and make your architectures anti-fragile Engineer scalability and learn how to migrate to Go from other languages Get to grips with deployment considerations with CICD pipeline, cloud deployments, and so on Build an end-to-end e-commerce (travel) application backend in Go Who this book is for Hands-On Software Architecture with Golang is for software developers, architects, and CTOs looking to use Go in their software architecture to build enterprise-grade applications. Programming knowledge of Golang is assumed.

Fully updated! Fifty Powerful, Easy-to-Use Rules for Supporting Hyper Growth "Whether you're taking on a role as a technology leader in a new company or you simply want to make great technology decisions, Scalability Rules will be the go-to resource on your bookshelf." –Chad Dickerson, CTO, Etsy Scalability Rules, Second Edition, is the easy-to-use scalability primer and reference for every architect, developer, network/software engineer, web professional, and manager. Authors Martin L. Abbott and Michael T. Fisher have helped scale hundreds of high-growth companies and thousands of systems. Drawing on their immense experience, they present 50 up-to-the-minute technical best practices for supporting hyper growth practically anywhere. Fully updated to reflect new technical trends and experiences, this edition is even easier to read, understand, and apply. Abbott and Fisher have also added powerful "stories behind the rules": actual experiences and case studies from CTOs and technology executives at Etsy, NASDAQ, Salesforce, Shutterfly, Chegg, Warby Parker, Twitter, and other scalability pioneers. Architects will find powerful technology-agnostic insights for creating and evaluating designs. Developers will discover specific techniques for handling everything from databases to state. Managers will get invaluable help in setting goals, making decisions, and interacting with technical teams. Whatever your role, you'll find practical risk/benefit guidance for setting priorities, translating plans into action, and gaining maximum scalability at minimum cost. You'll learn how to Simplify architectures and avoid "over-engineering" Design scale into your solution, so you can scale on a just-in-time basis Make the most of cloning and replication Separate functionality and split data sets Scale out, not up Get more out of databases without compromising scalability Eliminate unnecessary redirects and redundant double-checking Use caches and CDNs more aggressively, without unacceptable complexity Design for fault tolerance, graceful failure, and easy rollback Emphasize statelessness, and efficiently handle state when you must Effectively utilize asynchronous communication Learn from your own mistakes and others' high-profile failures Prioritize your actions to get the biggest "bang for the buck"

If you need to build a scalable, fault tolerant system with requirements for high availability, discover why the Erlang/OTP platform stands out for the breadth, depth, and consistency of its features. This hands-on guide demonstrates how to use the Erlang programming language and its OTP framework of reusable libraries, tools, and design principles to develop complex commercial-grade systems that simply cannot fail. In the first part of the book, you'll learn how to design and implement process behaviors and supervision trees with Erlang/OTP, and bundle them into standalone nodes. The second part addresses reliability, scalability, and high availability in your overall system design. If you're familiar with Erlang, this book will help you understand the design choices and trade-offs necessary to keep your system running. Explore OTP's building blocks: the Erlang language, tools and libraries collection, and its abstract principles and design rules Dive into the fundamentals of OTP reusable frameworks: the Erlang process structures OTP uses for behaviors Understand how OTP behaviors support client-server structures, finite state machine patterns, event handling, and runtime/code integration Write your own behaviors and special processes Use OTP's tools, techniques, and architectures to handle deployment, monitoring, and operations

Annotation This book constitutes the refereed proceedings of the 16th International Euro-Par Conference held in Ischia, Italy, in August/September 2010. The 90 revised full papers presented were carefully reviewed and selected from 256 submissions. The papers are organized in topical sections on support tools and environments; performance prediction and evaluation; scheduling and load-balancing; high performance architectures and compilers; parallel and distributed data management; grid, cluster and cloud computing; peer to peer computing; distributed systems and algorithms; parallel and distributed programming; parallel numerical algorithms; multicore and manycore programming; theory and algorithms for parallel computation; high performance networks; and mobile and ubiquitous computing.

50 Powerful, Easy-to-Use Rules for Supporting Hypergrowth in Any Environment Scalability Rules is the easy-to-use scalability primer and reference for every architect, developer, web professional, and manager. Authors Martin L. Abbott and Michael T. Fisher have helped scale more than 200 hypergrowth Internet sites through their consulting practice. Now, drawing on their unsurpassed experience, they present 50 clear, proven scalability rules—and practical guidance for applying them. Abbott and Fisher transform scalability from a "black art" to a set of realistic, technology-agnostic best practices for supporting hypergrowth in nearly any environment, including both frontend and backend systems. For architects, they offer powerful new insights for creating and evaluating designs. For developers, they share specific techniques for handling everything from databases to state. For managers, they provide invaluable help in goal-setting, decision-making, and interacting with technical teams. Whatever your role, you'll find practical risk/benefit guidance for setting priorities—and getting maximum "bang for the buck." • Simplifying architectures and avoiding "over-engineering" • Scaling via cloning, replication, separating functionality, and splitting data sets • Scaling out, not up • Getting more out of databases without compromising scalability • Avoiding unnecessary redirects and redundant double-checking • Using caches and content delivery networks more aggressively, without introducing unacceptable complexity • Designing for fault tolerance, graceful failure, and easy rollback • Striving for statelessness when you can; efficiently handling state when you must • Effectively utilizing asynchronous communication • Learning quickly from mistakes, and much more

As a developer, you are aware of the increasing concern amongst developers and site architects that websites be able to handle the vast number of visitors that flood the Internet on a daily basis. Scalable Internet Architectures addresses these concerns by teaching you both good and bad design methodologies for building new sites and how to scale existing websites to robust, high-availability websites. Primarily example-based, the book discusses major topics in web architectural design, presenting existing solutions and how they work. Technology budget tight? This book will work for you, too, as it introduces new and innovative concepts to solving traditionally expensive problems without a large technology budget. Using open source and proprietary examples, you will be engaged in best practice design methodologies for building new sites, as well as appropriately scaling both growing and shrinking sites. Website development help has arrived in the form of Scalable Internet Architectures.

From the Foreword: "The authors of the chapters in this book are the pioneers who will explore the exascale frontier. The path forward will not be easy... These authors, along with their colleagues who will produce these powerful computer systems will, with dedication and determination, overcome the scalability problem, discover the new algorithms needed to achieve exascale performance for the broad range of applications that they represent, and create the new tools needed to support the development of scalable and portable science and engineering applications. Although the focus is on exascale computers, the benefits will permeate all of science and engineering because the technologies developed for the exascale computers of tomorrow will also power the petascale servers and terascale workstations of tomorrow. These affordable computing capabilities will empower scientists and engineers everywhere." — Thom H. Dunning, Jr., Pacific Northwest National Laboratory and University of Washington, Seattle, Washington, USA "This comprehensive summary of applications targeting Exascale at the three DoE labs is a must read." — Rio Yokota, Tokyo Institute of Technology, Tokyo, Japan "Numerical simulation is now a need in many fields of science, technology, and industry. The complexity of the simulated systems coupled with the massive use of data makes HPC essential to move towards predictive simulations. Advances in computer architecture have so far permitted scientific advances, but at the cost of continually adapting algorithms and applications. The next technological breakthroughs force us to rethink the applications by taking energy consumption into account. These profound modifications require not only anticipation and sharing but also a paradigm shift in application design to ensure the sustainability of developments by guaranteeing a certain independence of the applications to the profound modifications of the architectures: it is the passage from optimal performance to the portability of performance. It is the challenge of this book to demonstrate by example the approach that one can adopt for the development of applications offering performance portability in spite of the profound changes of the computing architectures." — Christophe Calvin, CEA, Fundamental Research Division, Saclay, France "Three editors, one from each of the High Performance Computer Centers at Lawrence Berkeley, Argonne, and Oak Ridge National Laboratories, have compiled a very useful set of chapters aimed at describing software developments for the next generation exa-scale computers. Such a book is needed for scientists and engineers to see where the field is going and how they will be able to exploit such architectures for their own work. The book will also benefit students as it provides insights into how to develop software for such computer architectures. Overall, this book fills an important need in showing how to design and implement algorithms for exa-scale architectures which are heterogeneous and have unique memory systems. The book discusses issues with developing user codes for these architectures and how to address these issues including actual coding examples.' — Dr. David A. Dixon, Robert Ramsay Chair, The University of Alabama, Tuscaloosa, Alabama, USA

Every day, companies struggle to scale critical applications. As traffic volume and data demands increase, these applications become more complicated and brittle, exposing risks and compromising availability. This practical guide shows IT, devops, and system reliability managers how to prevent an application from becoming slow, inconsistent, or downright unavailable as it grows. Scaling isn't just about handling more users; it's also about managing risk and ensuring availability. Author Lee Atchison provides basic techniques for building applications that can handle huge quantities of traffic, data, and demand without affecting the quality your customers expect. In five parts, this book explores: Availability: learn techniques for building highly available applications, and for tracking and improving availability going forward Risk management: identify, mitigate, and manage risks in your application, test your recovery/disaster plans, and build out systems that contain fewer risks Services and microservices: understand the value of services for building complicated applications that need to operate at higher scale Scaling applications: assign services to specific teams, label the criticalness of each service, and devise failure scenarios and recovery plans Cloud services: understand the structure of cloud-based services, resource allocation, and service distribution

This invaluable roadmap for startup engineers reveals how to successfully handle web application scalability challenges to meet increasing product and traffic demands. Web Scalability for Startup Engineers shows engineers working at startups and small companies how to plan and implement a comprehensive scalability strategy. It presents broad and holistic view of infrastructure and architecture of a scalable web application. Successful startups often face the challenge of scalability, and the core concepts driving a scalable architecture are language and platform agnostic. The book covers scalability of HTTP-based systems (websites, REST APIs, SaaS, and mobile application backends), starting with a high-level perspective before taking a deep dive into common challenges and issues. This approach builds a holistic view of the problem, helping you see the big picture, and then introduces different technologies and best practices for solving the problem at hand. The book is enriched with the author's real-world experience and expert advice, saving you precious time and effort by learning from others' mistakes and successes. Language-agnostic approach addresses universally challenging concepts in Web development/scalability—does not require knowledge of a particular language Fills the gap for engineers in startups and smaller companies who have limited means for getting to the next level in terms of accomplishing scalability Strategies presented help to decrease time to market and increase the efficiency of web applications

In the race to compete in today's fast-moving markets, large enterprises are busy adopting new technologies for creating new products, processes, and business models. But one obstacle on the road to digital transformation is placing too much emphasis on technology, and not enough on the types of processes technology enables. What if different lines of business could build their own services and applications—and decision-making was distributed rather than centralized? This report explores the concept of a digital business platform as a way of empowering individual business sectors to act on data in real time. Much innovation in a digital enterprise will increasingly happen at the edge, whether it involves business users (from marketers to data scientists) or IoT devices. To facilitate the process, your core IT team can provide these sectors with the digital tools they need to innovate quickly. This report explores: Key cultural and organizational changes for developing business capabilities through cross-functional product teams A platform for integrating applications, data sources, business partners, clients, mobile apps, social networks, and IoT devices Creating internal API programs for building innovative edge services in low-code or no-code environments Tools including Integration Platform as a Service, Application Platform as a Service, and Integration Software as a Service The challenge of integrating microservices and serverless architectures Event-driven architectures for processing and reacting to events in real time You'll also learn about a complete pervasive integration solution as a core component of a digital business platform to serve every audience in your organization.

Scaling Impactintroduces a new and practical approach to scaling the positive impacts of research and innovation. Inspired by leading scientific and entrepreneurial innovators from across Africa, Asia, the Caribbean, Latin America, and the Middle East, this book presents a synthesis of unrivalled diversity and grounded ingenuity. The result is a different perspective on how to achieve impact that matters, and an important challenge to the predominant more-is-better paradigm of scaling. For organisations and individuals working to change the world for the better, scaling impact is a common goal and a well-founded aim. The world is changing rapidly, and seemingly intractable problems like environmental degradation or accelerating inequality press us to do better for each other and our environment as a global community. Challenges like these appear to demand a significant scale of action, and here the authors argue that a more creative and critical approach to scaling is both possible and essential. To encourage uptake and co-development, the authors present actionable principles that can help organisations and innovators design, manage, and evaluate scaling strategies. Scaling Impactis essential reading for development and innovation practitioners and professionals, but also for researchers, students, evaluators, and policymakers with a desire to spark meaningful change. scaling is both possible and essential. To encourage uptake and co-development, the authors present actionable principles that can help organisations and innovators design, manage, and evaluate scaling strategies. Scaling Impactis essential reading for development and innovation practitioners and professionals, but also for researchers, students, evaluators, and policymakers with a desire to spark meaningful change.

Praise from the Reviewers: "The practicality of the subject in a real-world situation distinguishes this book from others available on the market." —Professor Behrouz Far, University of Calgary "This book could replace the computer organization texts now in use that every CS and CpE student must take. . . . It is much needed, well written, and thoughtful." —Professor Larry Bernstein, Stevens Institute of Technology A distinctive, educational text onsoftware performance and scalability This is the first book to take a quantitative approach to the subject of software performance and scalability. It brings together three unique perspectives to demonstrate how your products can be optimized and tuned for the best possible performance and scalability: The Basics—introduces the computer hardware and software architectures that predetermine the performance and scalability of a software product as well as the principles of measuring the performance and scalability of a software product Queuing Theory—helps you learn the performance laws and queuing models for interpreting the underlying physics behind software performance and scalability, supplemented with ready-to-apply techniques for improving the performance and scalability of a software system API Profiling—shows you how to design more efficient algorithms and achieve optimized performance and scalability, aided by adopting an API profiling framework (perfBasic) built on the concept of a performance map for drilling down performance root causes at the API level Software Performance and Scalability gives you a specialized skill set that will enable you to design and build performance into your products with immediate, measurable improvements. Complemented with real-world case studies, it is an indispensable resource for software developers, quality and performance assurance engineers, architects, and managers. It is anideal text for university courses related to computer and software performance evaluation and can also be used to supplement a course in computer organization or in queuing theory for upper-division and graduate computer science students.

Software services are established as a programming concept, but their impact on the overall architecture of enterprise IT and business operations is not well-understood. This has led to problems in deploying SOA, and some disillusionment. The SOA Source Book adds to this a collection of reference material for SOA. It is an invaluable resource for enterprise architects working with SOA.The SOA Source Book will help enterprise architects to use SOA effectively. It explains: What SOA is How to evaluate SOA features in business terms How to model SOA How to use The Open Group Architecture Framework (TOGAF™) for SOA SOA governance This book explains how TOGAF can help to make an Enterprise Architecture. Enterprise Architecture is an approach that can help management to understand this growing complexity. Kubernetes is the operating system of the cloud native world, providing a reliable and scalable platform for running containerized workloads. In this friendly, pragmatic book, cloud experts John Arundel and Justin Domingus show you what Kubernetes can do—and what you can do with it. You'll learn all about the Kubernetes ecosystem, and use battle-tested solutions to everyday problems. You'll build, step by step, an example cloud native application and its supporting infrastructure, along with a development environment and continuous deployment pipeline that you can use for your own applications. Understand containers and Kubernetes from first principles; no experience necessary Run your own clusters or choose a managed Kubernetes service from Amazon, Google, and others Use Kubernetes to manage resource usage and the container lifecycle Optimize clusters for cost, performance, resilience, capacity, and scalability Learn the best tools for developing, testing, and deploying your applications Apply the latest industry practices for security, observability, and monitoring Adopt DevOps principles to help make your development teams lean, fast, and effective

A guide to developing Web sites using scalable applications.

Python is a wonderful programming language that allows writing applications quickly. But how do you make those applications scale for thousands of users and requests? It takes years of practice, research, trial and errors to build experience and knowledge along the way. Simple questions such as "How do I make my code faster?" or "How do I make sure there is no bottleneck?" cost hours to find good answers. Without enough background on the topic, you'll never be sure that any answer you'll come up with will be correct. The Hacker's Guide to Scaling Python will help you solve that by providing guidelines, tips and best practice. Adding a few interviews of experts on the subject, you will learn how you can distribute your Python application so it is able to process thousands of requests.

The major research results from the Scalable Input/Output Initiative, exploring software and algorithmic solutions to the I/O imbalance. As we enter the "decade of data," the disparity between the vast amount of data storage capacity (measurable in terabytes and petabytes) and the bandwidth available for accessing it has created an input/output bottleneck that is proving to be a major constraint on the effective use of scientific data for research. Scalable Input/Output is a summary of the major research results of the Scalable I/O Initiative, launched by Paul Messina, then Director of the Center for Advanced Computing Research at the California Institute of Technology, to explore software and algorithmic solutions to the I/O imbalance. The contributors explore techniques for I/O optimization, including: I/O characterization to understand application and system I/O patterns; system checkpointing strategies; collective I/O and parallel database support for scientific applications; parallel I/O libraries and strategies for file striping, prefetching, and write behind; compilation strategies for out-of-core data access; scheduling and shared virtual memory alternatives; network support for low-latency data transfer; and parallel I/O application programming interfaces.

Eliminate the guesswork involved in writing and deploying a cloud application. This step-by-step guide uses PHP to minimize the complexity of the code and setup, but the tools and techniques can be applied on any platform using any language. Everything that you need to jumpstart your application on the cloud is right here. Clear diagrams, step-by-step configuration information, and complete code listings tell you everything you need to get off the ground and start developing your cloud application today. This book introduces several cloud architectures and technologies that will help you accelerate your application in the cloud. Chapters cover load-balanced clusters, database replication, caching configuration, content delivery networks, infinite-scale file storage, and cloud system administration. Cloud computing has dramatically changed the landscape of web hosting. Instead of spending weeks negotiating contracts for servers, new servers can be deployed with the push of a button, and your application can be resized

almost instantly to meet today's needs. No matter what size of web application you are developing, you can benefit from modern cloud servers, and this is the guide to tell you how. What You'll Learn Use the cloud and its various platforms with Docker management tools Build a simple PHP-based scalable web application Create a basic cloud cluster Work with Amazon and Google Cloud Platform in your PHP web application development Who This Book Is For Developers who have some prior programming experience, including PHP, and who are new to building applications

This critical volume combines theoretical and empirical work across disciplines to explore what threatens scalability—and what enables it—in the early childhood field. Authors and editors provide specific recommendations to help professionals refine and apply the science of scaling in their programs, research, and decision making. Written by leading experts in early childhood, economics, psychology, public health, philanthropy, and more, chapters and commentaries shine light on how to effectively use experimental insights for policy purposes. The result is a comprehensive and forward-thinking guide to the challenges and possibilities of effective scaling in early childhood and beyond. Essential reading for researchers, practitioners, funders, and policy makers alike, this book raises vital questions and provides a vision for the long-term journey to scalable evidence.

The Art of ScalabilityScalable Web Architecture, Processes, and Organizations for the Modern EnterpriseAddison-Wesley Professional

The Comprehensive, Proven Approach to IT Scalability–Updated with New Strategies, Technologies, and Case Studies In The Art of Scalability, Second Edition, leading scalability consultants Martin L. Abbott and Michael T. Fisher cover everything you need to know to smoothly scale products and services for any requirement. This extensively revised edition reflects new technologies, strategies, and lessons, as well as new case studies from the authors' pioneering consulting practice, AKF Partners. Writing for technical and nontechnical decision-makers, Abbott and Fisher cover everything that impacts scalability, including architecture, process, people, organization, and technology. Their insights and recommendations reflect more than thirty years of experience at companies ranging from eBay to Visa, and Salesforce.com to Apple. You'll find updated strategies for structuring organizations to maximize agility and scalability, as well as new insights into the cloud (IaaS/PaaS) transition, NoSQL, DevOps, business metrics, and more. Using this guide's tools and advice, you can systematically clear away obstacles to scalability–and achieve unprecedented IT and business performance. Coverage includes • Why scalability problems start with organizations and people, not technology, and what to do about it • Actionable lessons from real successes and failures • Staffing, structuring, and leading the agile, scalable organization • Scaling processes for hyper-growth environments • Architecting scalability: proprietary models for clarifying needs and making choices–including 15 key success principles • Emerging technologies and challenges: data cost, datacenter planning, cloud evolution, and customer-aligned monitoring • Measuring availability, capacity, load, and performance Foreword by Bill Gates LinkedIn cofounder, legendary investor, and host of the award-winning Masters of Scale podcast reveals the secret to starting and scaling massively valuable companies. What entrepreneur or founder doesn't aspire to build the next Amazon, Facebook, or Airbnb? Yet those who actually manage to do so are exceedingly rare. So what separates the startups that get disrupted and disappear from the ones who grow to become global giants? The secret is blitzscaling: a set of techniques for scaling up at a dizzying pace that blows competitors out of the water. The objective of Blitzscaling is not to go from zero to one, but from one to one billion –as quickly as possible. When growing at a breakneck pace, getting to next level requires very different strategies from those that got you to where you are today. In a book inspired by their popular class at Stanford Business School, Hoffman and Yeh reveal how to navigate the necessary shifts and weather the unique challenges that arise at each stage of a company's life cycle, such as: how to design business models for igniting and sustaining relentless growth; strategies for hiring and managing; how the role of the founder and company culture must evolve as the business matures, and more. Whether your business has ten employees or ten thousand, Blitzscaling is the essential playbook for winning in a world where speed is the only competitive advantage that matters.

"Scaling Lean offers an invaluable blueprint for modeling startup success. You'll learn the essential metrics that measure the output of a working business model, give you the pulse of your company, communicate its health to investors, and enable you to make precise interventions when things go wrong, "--Amazon.com.

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