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Software Architecture in Practice Beautiful Architecture Fundamentals of Software Architecture Software Architecture in Practice Think Like an Architect The Software Architect Elevator Building Evolutionary Architectures Architecting with RM-ODP Conditional Design Documenting Software Architectures Software Architecture for Product Families Just Enough Software Architecture Exercises in Architecture Software Architecture: The Hard Parts Designing Your Perfect House: Lessons from an Architect In Search of Elegance Practical Software Architecture Software Architect's Handbook EnCoding Architecture2013 Operative Design Survey The Language of Architecture Your Architecture Career Toward an Architecture How to Architect Book Architecture Toward an Architecture of Enjoyment A Process Algebraic Approach to Software Architecture Design The Future of Architecture in 100 Buildings Software Architecture The Architecture of Persistence From the Temple to the Castle The Architecture of Privacy Architecture Continuous Architecture Structure As Architecture IT Architecture For Dummies arc42 by Example 500 Lines Or Less Information Architecture for the World Wide Web

The founder of Architizer.com and practicing architect draws on his unique position at the crossroads of architecture and social media to highlight 100 important buildings that embody the future of architecture. We're asking more of architecture than ever before; the response will define our future. A pavilion made from paper. A building that eats smog. An inflatable concert hall. A research lab that can walk through snow. We're entering a new age in architecture—one where we expect our buildings to deliver far more than just shelter. We want buildings that inspire us while helping the environment; buildings that delight our senses while serving the needs of a community; buildings made possible both by new technology and repurposed materials. Like an architectural cabinet of wonders, this book collects the most innovative buildings of today and tomorrow. The buildings hail from all seven continents (to say nothing of other planets), offering a truly global perspective on what lies ahead. Each page captures the soaring confidence, the thoughtful intelligence, the space-age wonder, and at times the sheer whimsy of the world's most inspired buildings—and the questions they provoke: Can a building breathe? Can a skyscraper be built in a day? Can we 3D-print a house? Can we live on the moon? Filled with gorgeous imagery and witty insight, this book is an essential and delightful guide to the future being built around us—a future that matters more, and to more of us, than ever. Toward an Architecture of Enjoyment is the first publication in any language of the only book devoted to architecture by Henri Lefebvre. Written in 1973 but only recently discovered in a private archive, this work extends Lefebvre's influential theory of urban space to the question of architecture. Taking the practices and perspective of habitation as his starting place, Lefebvre redefines architecture as a mode of imagination rather than a specialized process or a collection of monuments. He calls for an architecture of jouissance—of pleasure or enjoyment—centered on the body and its rhythms and based on the possibilities of the senses. Examining architectural examples from the Renaissance to the postwar period, Lefebvre investigates the bodily pleasures of moving in and around buildings and monuments, urban spaces, and gardens and landscapes. He argues that areas dedicated to enjoyment, sensuality, and desire are important sites for a society passing beyond industrial modernization. Lefebvre's theories on space and urbanization fundamentally reshaped the way we understand cities. Toward an Architecture of Enjoyment promises a similar impact on how we think about, and live within, architecture. Visiting Britain in the mid-18th century, Andre Rouquet wrote that ""in England more than in any other country, every man would fain be his own architect."" Not surprisingly, then, several of the most important 18th-century British authors were also practicing architects: John Vanbrugh, a playwrite, designed Blenheim Palace; the poet Alexander Pope offered architectural drawings for redesigning the houses of friends; and Horace Walpole claimed that the home he renovated, Strawberry Hill, inspired his Novel ""The Castle of Otranto"". The work of John Milton and Thomas Gray also exhibits an abiding interest in architecture. By examining the connections between literature and

architecture in the work of these writers and by viewing architecture in literary terms, Lee Morissey traces a narrative of cultural change in the Augustan age and beyond. A literary scholar with a strong background in architectural theory and practice, Morissey examines architectural references made by these authors and architectural publications familiar to them. Each chapter establishes a connection with architecture in the careers of an author and then describes how a principal text - ""Paradise Lost"", ""The Provok'd Wife"", ""An Essay on Man"", ""Elegy Written in a Country Churchyard"", and ""The Castle of Otranto"" - focuses the literary and historical issues of the period in architectural terms. While some 20th-century architectural theorists have worried that treating architecture in literary terms robs it of its social function, Morrissey argues that architecture can be a language and still participate in political and social contexts, because language itself is political and social. The fruit of his argument is a unique intellectual history of late 17th- and early 18th-century Britain of use to scholars of architectural history and landscape architecture as well as of literature. There are no easy decisions in software architecture. Instead, there are many hard parts--difficult problems or issues with no best practices--that force you to choose among various compromises. With this book, you'll learn how to think critically about the trade-offs involved with distributed architectures. Architecture veterans and practicing consultants Neal Ford, Mark Richards, Pramod Sadalage, and Zhamak Dehghani discuss strategies for choosing an appropriate architecture. By interweaving a story about a fictional group of technology professionals--the Sysops Squad--they examine everything from how to determine service granularity, manage workflows and orchestration, manage and decouple contracts, and manage distributed transactions to how to optimize operational characteristics, such as scalability, elasticity, and performance. By focusing on commonly asked questions, this book provides techniques to help you discover and weigh the trade-offs as you confront the issues you face as an architect. Analyze trade-offs and effectively document your decisions Make better decisions regarding service granularity Understand the complexities of breaking apart monolithic applications Manage and decouple contracts between services Handle data in a highly distributed architecture Learn patterns to manage workflow and transactions when breaking apart applications A comprehensive guide to exploring software architecture concepts and implementing best practices Key Features Enhance your skills to grow your career as a software architect Design efficient software architectures using patterns and best practices Learn how software architecture relates to an organization as well as software development methodology Book Description The Software Architect’s Handbook is a comprehensive guide to help developers, architects, and senior programmers advance their career in the software architecture domain. This book takes you through all the important concepts, right from design principles to different considerations at various stages of your career in software architecture. The book begins by covering the fundamentals, benefits, and purpose of software architecture. You will discover how software architecture relates to an organization, followed by identifying its significant quality attributes. Once you have covered the basics, you will explore design patterns, best practices, and paradigms for efficient software development. The book discusses which factors you need to consider for performance and security enhancements. You will learn to write documentation for your architectures and make appropriate decisions when considering DevOps. In addition to this, you will explore how to design legacy applications before understanding how to create software architectures that evolve as the market, business requirements, frameworks, tools, and best practices change over time. By the end of this book, you will not only have studied software architecture concepts but also built the soft skills necessary to grow in this field. What you will learn Design software architectures using patterns and best practices Explore the different considerations for designing software architecture Discover what it takes to continuously improve as a software architect Create loosely coupled systems that can support change Understand DevOps and how it affects software architecture Integrate, refactor, and re-architect legacy applications Who this book is for The Software Architect’s Handbook is for you if you are a software architect, chief technical officer (CTO), or senior developer looking to gain a firm grasp of software architecture. Architecture is crucial to the success of any large software system -- but even a superb architecture will fail if it isn't communicated well. Now, there's a language- and notation-independent guide to capturing architecture so it can be used successfully by every analyst, software designer, and developer. The authors review the diverse goals and uses of

software architecture documentation, providing documentation strategies for several common scenarios. They identify the basic unit of software architecture documentation: the viewtype, which specifies the type of information to be provided in an architectural view. For each viewtype -- Modules, Component-and-Connectors, and Allocation -- they offer detailed guidance on documenting what really matters. Next, they demonstrate how to package architecture documentation in coherent, usable form: augmenting architectural views with documentation of interfaces and behavior; accounting for architectural variability and dynamic systems; and more. Inthe?eldofformalmethodsincomputerscience,concurrencytheoryisreceivinga constantlyincreasinginterest.Thisisespeciallytrueforprocessalgebra.Althoughit had been originally conceived as a means for reasoning about the semantics of c- current programs, process algebraic formalisms like CCS, CSP, ACP, ?-calculus, and their extensions (see, e.g., [154,119,112,22,155,181,30]) were soon used also for comprehendingfunctionaland nonfunctionalaspects of the behaviorof com- nicating concurrent systems. The scienti?c impact of process calculi and behavioral equivalences at the base of process algebra is witnessed not only by a very rich literature. It is in fact worth mentioningthe standardizationprocedurethat led to the developmentof the process algebraic language LOTOS [49], as well as the implementation of several modeling and analysis tools based on process algebra, like CWB [70] and CADP [93], some of which have been used in industrial case studies. Furthermore, process calculi and behavioral equivalencesare by now adopted in university-levelcourses to teach the foundations of concurrent programming as well as the model-driven design of concurrent, distributed, and mobile systems. Nevertheless, after 30 years since its introduction, process algebra is rarely adopted in the practice of software development. On the one hand, its technica- ties often obfuscate the way in which systems are modeled. As an example, if a process term comprises numerous occurrences of the parallel composition operator, it is hard to understand the communicationscheme among the varioussubterms. On the other hand, process algebra is perceived as being dif?cult to learn and use by practitioners, as it is not close enough to the way they think of software systems. Architecture is a doing word. You can learn a great deal about the workings of architecture through analysing examples but a fuller understanding of its powers and potential comes through practice, by trying to do it... This book offers student architects a series of exercises that will develop their capacity for doing architecture. Exercises in Architecture builds on and supplements the methodology for architectural analysis presented in the author's previous book Analysing Architecture (third edition, Routledge, 2009) and demonstrated in his Twenty Buildings Every Architect Should Understand (Routledge, 2010). The three books taken together deal with the three aspects of learning: description, analysis of examples, and practice. The book offers twelve exercises, each divided into a short series of tasks aimed at developing a particular theme or area of architectural capacity. The exercises deal with themes such as place-making, learning through drawing, framing, light, , uses of geometry, stage setting, eliciting emotional responses, the genetics of detail and so forth. The post-Ajaxian Web 2.0 world of wikis, folksonomies, and mashups makes well-planned information architecture even more essential. How do you present large volumes of information to people who need to find what they're looking for quickly? This classic primer shows information architects, designers, and web site developers how to build large-scale and maintainable web sites that are appealing and easy to navigate. The new edition is thoroughly updated to address emerging technologies -- with recent examples, new scenarios, and information on best practices -- while maintaining its focus on fundamentals. With topics that range from aesthetics to mechanics, Information Architecture for the World Wide Web explains how to create interfaces that users can understand right away. Inside, you'll find: An overview of information architecture for both newcomers and experienced practitioners The fundamental components of an architecture, illustrating the interconnected nature of these systems. Updated, with updates for tagging, folksonomies, social classification, and guided navigation Tools, techniques, and methods that take you from research to strategy and design to implementation. This edition discusses blueprints, wireframes and the role of diagrams in the design phase A series of short essays that provide practical tips and philosophical advice for those who work on information architecture The business context of practicing and promoting information architecture, including recent lessons on how to handle enterprise architecture Case studies on the evolution of two large and very different information architectures, illustrating best practices

along the way How do you document the rich interfaces of web applications? How do you design for multiple platforms and mobile devices? With emphasis on goals and approaches over tactics or technologies, this enormously popular book gives you knowledge about information architecture with a framework that allows you to learn new approaches -- and unlearn outmoded ones. Published in 1923, Toward an Architecture had an immediate impact on architects throughout Europe and remains a foundational text for students and professionals. This edition includes a new translation of the original text, a scholarly introduction, and background notes that illuminate the text and illustrations. Document the architecture of your software easily with this highly practical, open-source template. Key FeaturesGet to grips with leveraging the features of arc42 to create insightful documentsLearn the concepts of software architecture documentation through real-world examplesDiscover techniques to create compact, helpful, and easy-to-read documentationBook Description When developers document the architecture of their systems, they often invent their own specific ways of articulating structures, designs, concepts, and decisions. What they need is a template that enables simple and efficient software architecture documentation. arc42 by Example shows how it's done through several real-world examples. Each example in the book, whether it is a chess engine, a huge CRM system, or a cool web system, starts with a brief description of the problem domain and the quality requirements. Then, you'll discover the system context with all the external interfaces. You'll dive into an overview of the solution strategy to implement the building blocks and runtime scenarios. The later chapters also explain various cross-cutting concerns and how they affect other aspects of a program. What you will learnUtilize arc42 to document a system's physical infrastructureLearn how to identify a system's scope and boundariesBreak a system down into building blocks and illustrate the relationships between themDiscover how to describe the runtime behavior of a systemKnow how to document design decisions and their reasonsExplore the risks and technical debt of your systemWho this book is for This book is for software developers and solutions architects who are looking for an easy, open-source tool to document their systems. It is a useful reference for those who are already using arc42. If you are new to arc42, this book is a great learning resource. For those of you who want to write better technical documentation will benefit from the general concepts covered in this book. The Architecture of Persistence argues that continued human use is the ultimate measure of sustainability in architecture, and that expanding the discourse about adaptability to include continuity as well as change offers the architectural manifestation of resilience. Why do some buildings last for generations as beloved and useful places, while others do not? How can designers today create buildings that remain useful into the future? While architects and theorists have offered a wide range of ideas about building for change, this book focuses on persistent architecture: the material, spatial, and cultural processes that give rise to long-lived buildings. Organized in three parts, this book examines material longevity in the face of constant physical and cultural change, connects the dimensions of human use and contemporary program, and discusses how time informs the design process. Featuring dozens of interviews with people who design and use buildings, and a close analysis of over a hundred historic and contemporary projects, the principles of persistent architecture introduced here address urgent challenges for contemporary practice while pointing towards a more sustainable built environment in the future. The Architecture of Persistence: Designing for Future Use offers practitioners, students, and scholars a set of principles and illustrative precedents exploring architecture's unique ability to connect an instructive past, a useful present, and an unknown future. Master the business side of architecture with advice from an expert. In Your Architecture Career, Gary Unger provides tips and guidance to students, interns, architects, and firm owners to help them understand and master the business side of architecture and interior design. Students in school are not taught to manage process, projects, and clients—the emphasis is on design. However, most graduates will not finish their careers as designers. Rather, their focus will be on marketing, programming, project management, cost estimating, rendering, virtual reality, drawing documentation, specifications, workplace strategy, and construction administration. Gary Unger expertly describes the creative aspects of these disciplines and the considerable value they bring to a firm. In order to accurately represent how an architecture firm successfully operates, Gary stresses the importance of teamwork. With project teams made up of architects, engineers, realtors, building owners, contractors, furniture dealers, and more, it is important to note that a

project's success is measured by how well handoffs of information are executed both inside a firm as well as from firm to firm. Spanning a wide variety of topics, chapters include: Completing architectural school Deciding on a career path Landing your first job Building your reputation Managing handoffs RFPs and proposals Reassessing your career Starting your own firm Whether you're a student about to graduate or a seasoned professional, Your Architecture Career is an invaluable resource for the business side of architecture. DIVLearning a new discipline is similar to learning a new language; in order to master the foundation of architecture, you must first master the basic building blocks of its language – the definitions, function, and usage. Language of Architecture provides students and professional architects with the basic elements of architectural design, divided into twenty-six easy-to-comprehend chapters. This visual reference includes an introductory, historical view of the elements, as well as an overview of how these elements can and have been used across multiple design disciplines./divDIV /divDIVWhether you're new to the field or have been an architect for years, you'll want to flip through the pages of this book throughout your career and use it as the go-to reference for inspiration, ideas, and reminders of how a strong knowledge of the basics allows for meaningful, memorable, and beautiful fashions that extend beyond trends./divDIV /divDIVThis comprehensive learning tool is the one book you'll want as a staple in your library./divDIV /div This is the eagerly-anticipated revision to one of the seminal books in the field of software architecture which clearly defines and explains the topic. What is architecture? How is it made? How is it judged? These fundamental questions have intrigued architects for centuries. While the questions are philosophical, the answers have important ramifications for architectural practice. In Search of Elegance provides answers to these complex questions and, in so doing, develops a new theory for the practice of architecture and urban design. The basics of the profession and practice of architecture, presented in illustrated A-Z form. The word "architect" is a noun, but Doug Patt uses it as a verb—coining a term and making a point about using parts of speech and parts of buildings in new ways. Changing the function of a word, or a room, can produce surprise and meaning. In How to Architect, Patt—an architect and the creator of a series of wildly popular online videos about architecture—presents the basics of architecture in A-Z form, starting with "A is for Asymmetry" (as seen in Chartres Cathedral and Frank Gehry), detouring through "N is for Narrative," and ending with "Z is for Zeal" (a quality that successful architects tend to have, even in fiction—see The Fountainhead's architect-hero Howard Roark.) How to Architect is a book to guide you on the road to architecture. If you are just starting on that journey or thinking about becoming an architect, it is a place to begin. If you are already an architect and want to remind yourself of what drew you to the profession, it is a book of affirmation. And if you are just curious about what goes into the design and construction of buildings, this book tells you how architects think. Patt introduces each entry with a hand-drawn letter, and accompanies the text with illustrations that illuminate the concept discussed: a fallen Humpty Dumpty illustrates the perils of fragile egos; photographs of an X-Acto knife and other hand tools remind us of architecture's nondigital origins. How to Architect offers encouragement to aspiring architects but also mounts a defense of architecture as a profession—by calling out a defiant verb: architect! Annotation Technology's influence on privacy has become a matter of everyday concern for millions of people, from software architects designing new products to political leaders and consumer groups. This book explores the issue from the perspective of technology itself: how privacy-protective features can become a core part of product functionality, rather than added on late in the development process. Salary surveys worldwide regularly place software architect in the top 10 best jobs, yet no real guide exists to help developers become architects. Until now. This book provides the first comprehensive overview of software architecture's many aspects. Aspiring and existing architects alike will examine architectural characteristics, architectural patterns, component determination, diagramming and presenting architecture, evolutionary architecture, and many other topics. Mark Richards and Neal Ford—hands-on practitioners who have taught software architecture classes professionally for years—focus on architecture principles that apply across all technology stacks. You'll explore software architecture in a modern light, taking into account all the innovations of the past decade. This book examines: Architecture patterns: The technical basis for many architectural decisions Components: Identification, coupling, cohesion, partitioning, and granularity Soft skills: Effective team management, meetings, negotiation, presentations, and

more Modernity: Engineering practices and operational approaches that have changed radically in the past few years Architecture as an engineering discipline: Repeatable results, metrics, and concrete valuations that add rigor to software architecture A #1 best seller for years, Bill Hirsch's Designing Your Perfect House: Lessons from an Architect has been called an essential read for Homeowners as well as Professionals. Bill's flowing style of writing makes you feel like you are sitting with him having a chat about your project. The philosophy behind design decisions is explained with stories, photos, sketches, and checklists. The book is divided into Twelve Lessons, with an additional Bonus Lesson ," Building Green, Naturally". You will learn how to evaluate your needs and work towards creating a suitable design, perfect for you and your family. The experience of home design and construction should be controllable, gratifying and enjoyable. With the valuable advice that Designing Your Perfect House: Lessons from an Architect provides, it can be. A solid introduction to the practices, plans, and skills required for developing a smart system architecture Information architecture combines IT skills with business skills in order to align the IT structure of an organization with the mission, goals, and objectives of its business. This friendly introduction to IT architecture walks you through the myriad issues and complex decisions that many organizations face when setting up IT systems to work in sync with business procedures. Veteran IT professional and author Kirk Hausman explains the business value behind IT architecture and provides you with an action plan for implementing IT architecture procedures in an organization. You'll explore the many challenges that organizations face as they attempt to use technology to enhance their business's productivity so that you can gain a solid understanding of the elements that are required to plan and create an architecture that meets specific business goals. Defines IT architecture as a blend of IT skills and business skills that focuses on business optimization, business architecture, performance management, and organizational structure Uncovers and examines every topic within IT architecture including network, system, data, services, application, and more Addresses the challenges that organizations face when attempting to use information technology to enable profitability and business continuity While companies look to technology more than ever to enhance productivity, you should look to IT Architecture For Dummies for guidance in this field. In Book Architecture: How to Plot and Outline Without Using a Formula, Stuart Horwitz returns with his trademark clarity to help writers craft a powerful plot and an effective outline for their works-in-progress. Along the way, Horwitz offers detailed, concrete examples that reveal how the Book Architecture Method works with everything from literary classics to blockbuster films. As the digital economy changes the rules of the game for enterprises, the role of software and IT architects is also transforming. Rather than focus on technical decisions alone, architects and senior technologists need to combine organizational and technical knowledge to effect change in their company's structure and processes. To accomplish that, they need to connect the IT engine room to the penthouse, where the business strategy is defined. In this guide, author Gregor Hohpe shares real-world advice and hard-learned lessons from actual IT transformations. His anecdotes help architects, senior developers, and other IT professionals prepare for a more complex but rewarding role in the enterprise. This book is ideal for: Software architects and senior developers looking to shape the company's technology direction or assist in an organizational transformation Enterprise architects and senior technologists searching for practical advice on how to navigate technical and organizational topics CTOs and senior technical architects who are devising an IT strategy that impacts the way the organization works IT managers who want to learn what's worked and what hasn't in large-scale transformation Dana Cuff delves into the architect's everyday world in "Architecture" to uncover an intricate social art of design, resulting in a new portrait of the profession that sheds light on what it means to become an architect. As we pointed out in The Architecture of Open Source Applications, architects look at thousands of buildings during their training, and study the critiques of many more. But most software developers only ever get to know a handful of programs well - usually programs they wrote themselves. This book provides you with the chance to study how 26 experienced programmers think when they are building something new. The programs you will read about in this book were all written from scratch to solve difficult problems. A web server, a pedometer, a Python interpreter, a web-based spreadsheet, and many more applications are written, in 500 lines of code or less, and described by their creators so that you can learn from their insights and their mistakes. Structure As Architecture provides readers with

an accessible insight into the relationship between structure and architecture, focusing on the design principles that relate to both fields. Over one hundred case studies of contemporary buildings from countries across the globe including the UK, the US, France, Germany, Spain, Hong Kong and Australia are interspersed throughout the book. The author has visited and photographed each of these examples and analyzed them to show how structure plays a significant architectural role, as well as bearing loads. This is a highly illustrated sourcebook, providing a new insight into the role of structure, and discussing the point where the technical and the aesthetic meet to create the discipline of 'architecture'. PrefaceTo understand anything, you should not try to understand everything. — Aristotle The whole is greater than the sum of the parts; the part is greater than a fraction of the whole. — Aristotle Architecting is a challenging process of abstraction, composition, modularity, and simplification to create an architecture specification. An architecture specification captures the essence and definition of the system: understanding, parts, and the relationships among the parts. An architecture specification defines how a system solves a business problem within the scope of the business. — Putman Leave the beaten track occasionally and dive into the woods. You will be certain to find something that you have never seen before. — Alexander Graham Bell There are large gaps in the theory and practice of software architecture and engineering. Much is published about the representation of a software architecture, such as the Unified Modeling Language (UML), but little is available about the specification for a software architecture. Software engineering methods of domain engineering, process modeling languages, and well-formed patterns of reasoning aid in the specification of an architecture. The Reference Model of Open Distributed Processing (RM-ODP) defines the standard reference model for distributed software systems architectures, based on object-oriented techniques, accepted at the international level. RM-ODP is a standard adopted by the International Standards Organization (ISO) and the International Telecommunications Union (ITU). RM-ODP is embedded and used actively in mission-critical systems industries such as in telecommunications, in health care, on Wall Street (financial services industry), in various Government systems (Logistics), in European Government Agencies such as UK Aviation control systems, as a foundation for the Object Management Group (OMG) Object Management Architecture (OMA), for defining enterprise architectures, and for defining software architectures. The software systems architecture work that is emerging, and is focused either at the component level or at the systems level, provides a key resource for architecting. This is enhanced by the architecting techniques of RM-ODP. This book assembles these great ideas, explains what they mean, and shows how to use them for practical benefit, along with real-world case study examples. By using the RM-ODP specification constructs, associated languages, architecture patterns of reasoning, semantic behavior specification, and conformance testing abilities, readers will be able to architect their specific systems based on the RM-ODP specification foundations, and specify architectures that work. One of the purposes of this book is to provide the approach to using the RM-ODP foundations in architecting and specifying a distributed processing system that addresses such key properties as interoperability, dependability, portability, integration, composability, scalability, transparency, behavior specification, quality of service, policy management, federation, and conformance validation. Another purpose of this book is to explain the underlying foundations for creating an architectural specification. These foundations come not only from RM-ODP, but also from the current work in software systems architecture. Another purpose is to guide the reader to understand the importance and benefits of creating an architecture specification for an enterprise. Yet another purpose is to provide the reader with the principles to construct software systems architecture (at both introductory and in-depth levels). By applying the proven techniques of RM-ODP for what makes a good architecture, readers will be able to build their own tailored architectures, and clearly represent them in UML or some other tool, with an understanding of the underlying principles. Practitioners of RM-ODP have found that the standard is extremely beneficial in guiding architecture definition and providing standard terminology/principles for distributed object applications and infrastructures from an enterprise perspective. Outstanding Features This book is intended to provide valuable insight into successful architecture specification by describing an unprecedented foundation to accomplish this task, describing the use of the foundation, explaining the relationships of the concepts of architecting, explaining the relationships of the concepts of distributed processing, and

identifying the right methods and possible tools for architecting. All material for the book has been derived from actual experiences. A medical case study is used throughout the book in ever increasing detailed specification. This medical case study is based on actual experience of the author. In addition, many metamodels are provided to represent the concepts of RM-ODP. All of these metamodels are contributions from the author. This is information that readers can use and apply in their architecting today. RM-ODP provides a reference framework, grammars, methods of abstraction and composition, and separation of concerns to achieve an architecture specification of the system. RM-ODP provides a framework for this separation, using viewpoints, as well as separating out certain decisions (e.g., product decisions) until later. Further, the reference model provides a set of definitions, which always aids in communicating with others. There is little in the literature about RM-ODP or architecture specification, and certainly not a book dedicated as a tutorial of these subjects. Now there is. In summary, this book offers the following: How to manage the architecting process in the lifecycle of a system How to solve many architecture reuse and cost-effectiveness problems How to create a business specification How to understand and use the concepts of distributed processing in an architecture How to architect effectively How to specify an architecture How to understand and specify semantic behavior and nonfunctional properties of a system (the "ilities") How to provide the right level of detail in an architecture specification How to ensure the implementation conforms to the architecture specification How to use RM-ODP effectively How to use popular tools, such as UML, to describe an architecture A definitive tutorial of RM-ODP Audience This book is designed for: Those in the Distributed Software Systems Architecture community who are interested in a methodology for using proven architecture principles. Professional software architects who are looking for new ideas about architecting a system. Within this book, the reader will find discussions of the techniques for architecting, for creating an architecture specification, and RM-ODP's relationship to other architecture frameworks. Program managers interested in how to create a cost-effective architecture within their enterprise that focuses on the needs of the enterprise and solves an enterprise problem. They will learn how do to do this through an overview of RM-ODP, the program benefits for using it, and where RM-ODP fits in the system lifecycle process. Systems engineers interested in the lifecycle approach to enterprise architecture specification. Experienced engineers interested in expanding their understanding of how to create a valid architecture specification and gain an understanding of the distributed processing system concepts, why certain constructions are valid and why some are not, what is to be specified and how, and some new ideas and approaches to architecting a system. The reader will be able to develop a collection of useful distributed processing architecting techniques that expand upon the current software systems architecture capabilities. Developers interested in the practice of architecture specification and aligning current technology to achieve a workable system, while allowing evolutionary changes in technology solutions. Researchers interested in solutions and aids for furthering the research work in architecture specification. Individuals in the software community who are generally interested in the application of an architecture method. Readers will find examples of the applications of RM-ODP and specific analysis techniques. The expected audience will be novice and mid-level program managers, software engineers, those in the IEEE, DoD, research communities, consortia, and general architecture readers. This book can be used as a textbook and reference book for studies in the methods of architecture; for graduate studies in software architecture specification; for training information about software architecture and RM-ODP; for further education of consultants, integration specialists, and acquisition managers who need to approve and fund such work; and for researchers who are expanding the discipline of software architecture. The inclusion of RM-ODP will bring to the U.S., principally, the outstanding work that was accomplished by the international standards working group. In brief, the RM-ODP principles form a solution set and foundation for all software architecting endeavors. It is the formalized framework for this topic, and at the International Standard (IS) level of acceptance. It forms a solution set and foundation for reuse of design patterns to provide cost-effective software architecture. It is the process for this topic, but has never before been described in a book. Many program managers (who typically set the stage as to the methodology of choice for a project), software engineers, and researchers in academia and in DARPA are unaware of the power and solutions provided by the standard, or the process of identifying and instantiating reuse of all the

expensive assets of architecture. Many do not realize that there is a language for specifying software-intensive distributed processing, and that language is precisely and rigorously defined in RM-ODP for reuse. Those debating definitions for architecture, system, interface, and others can reuse the internationally agreed upon definitions. Finally, with the inclusion of RM-ODP and its relationship to other architecture frameworks, it is expected that many software engineers will benefit from reading this work, since it will be the first time these subjects are discussed in print. How to Use This Book This book is divided into four parts, aimed at increasing levels of detail. Part One provides an overview of the field of software architecture, an RM-ODP primer for managers, and an RM-ODP primer for architects. Part Two provides an in-depth study of RM-ODP and how to use it. Areas of importance and utility from RM-ODP are highlighted. Ambiguity in RM-ODP is highlighted. Warnings in the use of RM-ODP are highlighted. Part Three provides a discussion of the principal architecture patterns of use, arranged by topic. Several of these patterns of use come from emerging work under the initiative of RM-ODP, as well as lessons learned from the practice of RM-ODP. These patterns of reasoning used by the architect are founded on the principals of RM-ODP, as discussed in Part Two of the book. Part Four concludes with relating RM-ODP to other architecture methods. It also provides emerging technologies to further the patterns of reasoning for use in architecting, and a set of architecting heuristics. The information contained in this book is organized in a manner that provides clear insight into the world of distributed software-intensive processing architecture for designers and developers who are familiar with information systems technology, but want to know more about how to build a good architecture. Starting with a tutorial about software architecture, and then a tutorial about the standard for software architecture, the reader need not be an expert in the area of international standards, RM-ODP, software architecture, or specific technologies. The book goes on to address the needs of the variety of readers for which it is intended. Each chapter in the book provides an overview of the subject of the chapter, as well as a summary. For those who wish a broad brush exposure to RM-ODP, the primers of Part One provide this, as well as the overviews and summaries in each chapter of interest. As each chapter progresses, in Parts Two and Three, more and more in-depth detail is provided. The readings of these chapters are aimed at those who wish to know the technical details of a topic. There are two case studies used throughout the book, at various levels of detail. The primary case study is a Hospital enterprise, based upon the author's experience with the medical profession. A secondary case study is an airline reservation system, also based upon the author's experience. These case studies are used to describe the concepts of RM-ODP, and to show how they might be used. The core idea for this book is the use of operative verbs as tools for designing space. These operative verbs abstract the idea of spatial formation to its most basic terms, allowing for an objective approach to create the foundation for subjective spatial design. Examples of these verbs are expand, inflate, nest, wist, lift, embed, merge and many more. Together they form a visual dictionary decoding the syntax of spatial verbs. The verbs are illustrated with three-dimensional diagrams and pictures of designs which show the verbs 'in action'. This approach was devised, tested, and applied to architectural studio instruction by Anthony Di Mari and Nora Yoo while teaching at Harvard University's Career Discovery Program in Architecture in 2010. As instructors and as recent graduates, they saw a need for this kind of catalogue from both sides - as a reference manual applicable to design students in all stages of their studies, as well as a teaching tool for instructors to help students understand the strong spatial potential of abstract operations. Continuous Architecture provides a broad architectural perspective for continuous delivery, and describes a new architectural approach that supports and enables it. As the pace of innovation and software releases increases, IT departments are tasked to deliver value quickly and inexpensively to their business partners. With a focus on getting software into end-users hands faster, the ultimate goal of daily software updates is in sight to allow teams to ensure that they can release every change to the system simply and efficiently. This book presents an architectural approach to support modern application delivery methods and provide a broader architectural perspective, taking architectural concerns into account when deploying agile or continuous delivery approaches. The authors explain how to solve the challenges of implementing continuous delivery at the project and enterprise level, and the impact on IT processes including application testing, software deployment and software architecture. Covering the application of enterprise and software architecture concepts to the

Agile and Continuous Delivery models Explains how to create an architecture that can evolve with applications Incorporates techniques including refactoring, architectural analysis, testing, and feedback-driven development Provides insight into incorporating modern software development when structuring teams and organizations As a software architect you work in a wide-ranging and dynamic environment. You have to understand the needs of your customer, design architectures that satisfy both functional and non-functional requirements, and lead development teams in implementing the architecture. And it is an environment that is constantly changing: trends such as cloud computing, service orientation, and model-driven procedures open up new architectural possibilities. This book will help you to develop a holistic architectural awareness and knowledge base that extends beyond concrete methods, techniques, and technologies. It will also help you to acquire or expand the technical, methodological, and social competences that you need. The authors place the spotlight on you, the architect, and offer you long-term architectural orientation. They give you numerous guidelines, checklists, and best practices to support you in your practical work. "Software Architecture" offers IT students, software developers, and software architects a holistic and consistent orientation across relevant topics. The book also provides valuable information and suggestions for system architects and enterprise architects, since many of the topics presented are also relevant for their work. Furthermore, IT project leads and other IT managers can use the book to acquire an enhanced understanding of architecture. Further information is available at www.software-architecture-book.org. Getting Architecture Just Right: Detailed Practical Guidance for Architecting Any Real-World IT Project To build effective architectures, software architects must tread a fine line between precision and ambiguity (a.k.abig animal pictures). This is difficult but crucial: Failure to achieve this balance often leads directly to poor systems design and implementation. Now, pioneering IBM Distinguished Engineer and Chief Technology Officer Tilak Mitra offers the first complete guide to developing end-to-end solution architectures that are “just enough”--identifying and capturing the most important artifacts, without over-engineering or excessive documentation, and providing a practical approach to consistent and repeated success in defining software architectures. Practical Software Architecture provides detailed prescriptive and pragmatic guidance for architecting any real-world IT project, regardless of system, methodology, or environment. Mitra specifically identifies the artifacts that require emphasis and shows how to communicate evolving solutions with stakeholders, bridging the gap between architecture and implementation. Conditional design is the sequel to Operative Design. This book will further explore the operative in a more detailed, intentional, and perhaps functional manner. Spatially, the conditional is the result of the operative. It is not a blind result however. Both terms work together to satisfy a formal manipulation through a set of opportunities for elements such as connections and apertures. The software development ecosystem is constantly changing, providing a constant stream of new tools, frameworks, techniques, and paradigms. Over the past few years, incremental developments in core engineering practices for software development have created the foundations for rethinking how architecture changes over time, along with ways to protect important architectural characteristics as it evolves. This practical guide ties those parts together with a new way to think about architecture and time. What are the ingredients of robust, elegant, flexible, and maintainable software architecture? Beautiful Architecture answers this question through a collection of intriguing essays from more than a dozen of today's leading software designers and architects. In each essay, contributors present a notable software architecture, and analyze what makes it innovative and ideal for its purpose. Some of the engineers in this book reveal how they developed a specific project, including decisions they faced and tradeoffs they made. Others take a step back to investigate how certain architectural aspects have influenced computing as a whole. With this book, you'll discover: How Facebook's architecture is the basis for a data-centric application ecosystem The effect of Xen's well-designed architecture on the way operating systems evolve How community processes within the KDE project help software architectures evolve from rough sketches to beautiful systems How creeping featurism has helped GNU Emacs gain unanticipated functionality The magic behind the Jikes RVM self-optimizable, self-hosting runtime Design choices and building blocks that made Tandem the choice platform in high-availability environments for over two decades Differences and similarities between object-oriented and functional architectural views How architectures can affect the software's evolution

and the developers' engagement Go behind the scenes to learn what it takes to design elegant software architecture, and how it can shape the way you approach your own projects, with Beautiful Architecture. The design of cities and buildings affects the quality of our lives. Making the built environment useful, safe, comfortable, efficient, and as beautiful as possible is a universal quest. We dream about how we might live, work, and play. From these dreams come some 95 percent of all private and public buildings; professional architects design only about 5 percent of the built environment. While much of what non-architects build is beautiful and useful, the ugliness and inconveniences that blight many urban areas demonstrate that an understanding of good architectural design is vital for creating livable buildings and public spaces. To help promote this understanding among non-architects, as well as among those considering architecture as a profession, award-winning architect and professor Hal Box explains the process of making architecture from concept to completed building, using real-life examples to illustrate the principles involved in designing buildings that enhance the quality of life for those who live with them. To cause what we build to become architecture, we have three choices: hire an architect, become an architect, or learn to think like an architect. Box believes that everyone should be involved in making architecture and has organized this book as a series of letters to friends and students about the process of creating architecture. He describes what architecture should be and do; how to look at and appreciate good buildings; and how to understand the design process, work with an architect, or become an architect. He also provides an overview of architectural history, with lists of books to read and buildings to see. For those involved in building projects, Box offers practical guidance about what goes into constructing a building, from the first view of the site to the finished building. For students thinking of becoming architects, he describes an architect's typical training and career path. And for the wide public audience interested in architecture and the built environment, Box addresses how architecture relates to the city, where the art of architecture is headed, and why good architecture matters. This is a practical guide for software developers, and different than other software architecture books. Here's why: It teaches risk-driven architecting. There is no need for meticulous designs when risks are small, nor any excuse for sloppy designs when risks threaten your success. This book describes a way to do just enough architecture. It avoids the one-size-fits-all process tar pit with advice on how to tune your design effort based on the risks you face. It democratizes architecture. This book seeks to make architecture relevant to all software developers. Developers need to understand how to use constraints as guiderails that ensure desired outcomes, and how seemingly small changes can affect a system's properties. It cultivates declarative knowledge. There is a difference between being able to hit a ball and knowing why you are able to hit it, what psychologists refer to as procedural knowledge versus declarative knowledge. This book will make you more aware of what you have been doing and provide names for the concepts. It emphasizes the engineering. This book focuses on the technical parts of software development and what developers do to ensure the system works not job titles or processes. It shows you how to build models and analyze architectures so that you can make principled design tradeoffs. It describes the techniques software designers use to reason about medium to large sized problems and points out where you can learn specialized techniques in more detail. It provides practical advice. Software design decisions influence the architecture and vice versa. The approach in this book embraces drill-down/pop-up behavior by describing models that have various levels of abstraction, from architecture to data structure design. An exploration of the history and significance of the architectural survey drawing through focused studies on John Soane, Charles Robert Cockerell, Detmar Blow, Louis-Hippolyte Lebas, Henri Labrouste, Eugène Viollet-le-Duc, and Peter Märkli. When architects visit a building and want to record or identify what they see, they take out a bundle of folded sheets in search of a blank piece of paper. These sheets may be ground plans, diagrams, sketches, or ordnance maps. In one way or another, all are survey drawings, operating as both documentation and analysis, enabling an architect to examine certain conditions of the built environment, whether geometric, relational, material, or technical. This book explores the history of the survey and its multiple forms in order to understand how the methods of recording what already exists can also be used to imagine what might be. Lavishly illustrated, with works from the collection of Drawing Matter and beyond, it addresses the multiple forms of the survey through focused studies--on John Soane (1753-1837), Charles Robert Cockerell (1788-1863), and

Detmar Blow (1867-1939); French architects Louis-Hippolyte Lebas (1782-1867), Henri Labrouste (1801-75), and Eugène Viollet-le-Duc (1814-79); and Swiss-based Peter Märkli (born 1953)--and an extensive section of plates with commentaries by contemporary architects. In doing so, it maintains that while all surveys begin with the site, the outcomes are as idiosyncratic as their authors--and their methods have much to offer as tools in design practice. Survey is the first volume of Architecture Iconographies, a series that considers architecture through its typologies and unique approaches to drawing, aiming to open up further possibilities for their contemporary use in design and teaching. The series is published in collaboration with Drawing Matter, based in Somerset, England, which is committed to exploring the role of drawing in architectural thought and practice. Software development organizations are now discovering the efficiencies that can be achieved by architecting entire software product families together. In Software Architecture for Product Families, experts from one of the world's most advanced software domain engineering projects share in-depth insights about the techniques that work -- and those that don't. The book offers a solutions-oriented, case-study approach covering the entire development lifecycle, based on advanced work done by three of Europe's leading technology companies and their academic partners. Discover the challenges that drive companies to consider architecting product families, and the new problems they encounter in doing so. Master concepts and terms that can be used to describe the architecture of a product family; then learn how to assess that architecture, and transform it into working applications. The authors also present chapter-length, real-world case studies of domain engineering projects at Nokia, Philips, and ABB. The award-winning and highly influential Software Architecture in Practice, Third Edition, has been substantially revised to reflect the latest developments in the field. In a real-world setting, the book once again introduces the concepts and best practices of software architecture—how a software system is structured and how that system's elements are meant to interact. Distinct from the details of implementation, algorithm, and data representation, an architecture holds the key to achieving system quality, is a reusable asset that can be applied to subsequent systems, and is crucial to a software organization's business strategy. The authors have structured this edition around the concept of architecture influence cycles. Each cycle shows how architecture influences, and is influenced by, a particular context in which architecture plays a critical role. Contexts include technical environment, the life cycle of a project, an organization's business profile, and the architect's professional practices. The authors also have greatly expanded their treatment of quality attributes, which remain central to their architecture philosophy—with an entire chapter devoted to each attribute—and broadened their treatment of architectural patterns. If you design, develop, or manage large software systems (or plan to do so), you will find this book to be a valuable resource for getting up to speed on the state of the art. Totally new material covers Contexts of software architecture: technical, project, business, and professional Architecture competence: what this means both for individuals and organizations The origins of business goals and how this affects architecture Architecturally significant requirements, and how to determine them Architecture in the life cycle, including generate-and-test as a design philosophy; architecture conformance during implementation; architecture and testing; and architecture and agile development Architecture and current technologies, such as the cloud, social networks, and end-user devices

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