

Distributed Systems Architecture

The LOCUS Distributed System Architecture
Distributed Real-Time Architecture for Mixed-Criticality Systems
Developing Intelligent Agents for Distributed Systems
Guide to Reliable Distributed Systems
Distributed Object Architectures with CORBA
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Distributed Computing Database Systems Distributed Systems Security

The LOCUS Distributed System Architecture

Computer Systems Organization -- Computer-Communication Networks.

Distributed Real-Time Architecture for Mixed-Criticality Systems

This book teaches you how to evaluate a distributed system from the perspective of immutable objects. You will understand the problems in existing designs, know how to make small modifications to correct those problems, and learn to apply the principles of immutable architecture to your tools. Most software components focus on the state of objects. They store the current state of a row in a relational database. They track changes to state over time, making several basic assumptions: there is a single latest version of each object, the state of an object changes sequentially, and a system of record exists. This is a challenge when it comes to building distributed systems. Whether dealing with autonomous microservices or disconnected mobile apps, many of the problems we try to solve come down to synchronizing an ever-changing state between isolated components. Distributed systems would be a lot easier to build if objects could not change. After

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reading *The Art of Immutable Architecture*, you will come away with an understanding of the benefits of using immutable objects in your own distributed systems. You will learn a set of rules for identifying and exchanging immutable objects, and see a collection of useful theorems that emerges and ensures that the distributed systems we build are eventually consistent. Using patterns, you will find where the truth converges, see how changes are associative, rather than sequential, and come to feel comfortable understanding that there is no longer a single source of truth. Practical hands-on examples reinforce how to build software using the described patterns, techniques, and tools. By the end, you will possess the language and resources needed to analyze and construct distributed systems with confidence. The assumptions of the past were sufficient for building single-user, single-computer systems. But as we expand to multiple devices, shared experiences, and cloud computing, they work against us. It is time for a new set of assumptions. Start with immutable objects, and build better distributed systems.

What You Will Learn

- Evaluate a distributed system from the perspective of immutable objects
- Recognize the problems in existing designs, and make small modifications to correct them
- Start a new system from scratch, applying patterns
- Apply the principles of immutable architecture to your tools, including SQL databases, message queues, and the network protocols that you already use
- Discover new tools that natively apply these principles

Who This Book Is For

Software architects and senior developers. It contains examples in SQL and languages such as JavaScript and C#.

Past experience with distributed computing,

data modeling, or business analysis is helpful.

Developing Intelligent Agents for Distributed Systems

To understand the power of distributed systems, it is necessary to understand their inherent limitations: what problems cannot be solved in particular systems, or without sufficient resources (such as time or space). This book presents key techniques for proving such impossibility results and applies them to a variety of different problems in a variety of different system models. Insights gained from these results are highlighted, aspects of a problem that make it difficult are isolated, features of an architecture that make it inadequate for solving certain problems efficiently are identified, and different system models are compared. Table of Contents: Acknowledgments / Introduction / Indistinguishability / Shifting and Scaling / Scenario Arguments / Information Theory Arguments / Covering Arguments / Valency Arguments / Combinatorial Arguments / Reductions and Simulations / Bibliography / Authors' Biographies

Guide to Reliable Distributed Systems

Computer Systems Organization -- Computer-Communication Networks.

Distributed Object Architectures with CORBA

Without established design patterns to guide them, developers have had to build distributed systems from scratch, and most of these systems are very unique indeed. Today, the increasing use of containers has paved the way for core distributed system patterns and reusable containerized components. This practical guide presents a collection of repeatable, generic patterns to help make the development of reliable distributed systems far more approachable and efficient. Author Brendan Burns—Director of Engineering at Microsoft Azure—demonstrates how you can adapt existing software design patterns for designing and building reliable distributed applications. Systems engineers and application developers will learn how these long-established patterns provide a common language and framework for dramatically increasing the quality of your system. Understand how patterns and reusable components enable the rapid development of reliable distributed systems Use the side-car, adapter, and ambassador patterns to split your application into a group of containers on a single machine Explore loosely coupled multi-node distributed patterns for replication, scaling, and communication between the components Learn distributed system patterns for large-scale batch data processing covering work-queues, event-based processing, and coordinated workflows

The LOCUS Distributed System Architecture

Now professional software developers working in highly complex distributed environments can learn how to create agents for client/server environments. This book clearly explains the programming of agents for improving user interfaces, for improving performance and usability of LANS and WANS, for managing mail, and even for assisting in the development of other software.

Principles and Applications of Distributed Event-Based Systems

Parallel and distributed computing has been one of the most active areas of research in recent years. The techniques involved have found significant applications in areas as diverse as engineering, management, natural sciences, and social sciences. This book reports state-of-the-art topics and advances in this emerging field. Completely up-to-date, aspects it examines include the following: 1) Social networks; 2) Smart grids; 3) Graphic processing unit computation; 4) Distributed software development tools; 5) Analytic hierarchy process and the analytic network process

Designing Distributed Systems

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Systems Programming: Designing and Developing Distributed Applications explains how the development of distributed applications depends on a foundational understanding of the relationship among operating systems, networking, distributed systems, and programming. Uniquely organized around four viewpoints (process, communication, resource, and architecture), the fundamental and essential characteristics of distributed systems are explored in ways which cut across the various traditional subject area boundaries. The structures, configurations and behaviours of distributed systems are all examined, allowing readers to explore concepts from different perspectives, and to understand systems in depth, both from the component level and holistically. Explains key ideas from the ground up, in a self-contained style, with material carefully sequenced to make it easy to absorb and follow. Features a detailed case study that is designed to serve as a common point of reference and to provide continuity across the different technical chapters. Includes a 'putting it all together' chapter that looks at interesting distributed systems applications across their entire life-cycle from requirements analysis and design specifications to fully working applications with full source code. Ancillary materials include problems and solutions, programming exercises, simulation experiments, and a wide range of fully working sample applications with complete source code developed in C++, C# and Java. Special editions of the author's established 'workbenches' teaching and learning tools suite are included. These tools have been specifically designed to facilitate practical experimentation and simulation of complex and dynamic

aspects of systems.

Distributed Systems Architecture

This book is written for computer programmers, analysts and scientists, as well as computer science students, as an introduction to the principles of distributed system design. The emphasis is placed on a clear understanding of the concepts, rather than on details; and the reader will learn about the structure of distributed systems, their problems, and approaches to their design and development. The reader should have a basic knowledge of computer systems and be familiar with modular design principles for software development. He should also be aware of present-day remote-access and distributed computer applications. The book consists of three parts which deal with principles of distributed systems, communications architecture and protocols, and formal description techniques. The first part serves as an introduction to the broad meaning of "distributed system". We give examples, try to define terms, and discuss the problems that arise in the context of parallel and distributed processing. The second part presents the typical layered protocol architecture of distributed systems, and discusses problems of compatibility and interworking between heterogeneous computer systems. The principles of the lower layer functions and protocols are explained in some detail, including link layer protocols and network transmission services. The third part deals with specification issues. The role of specifications in

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the design of distributed systems is explained in general, and formal methods for the specification, analysis and implementation of distributed systems are discussed.

Distributed File Systems

Distributed file systems are network file systems where the server can be distributed across several physical computer nodes. File systems that share access to the same block storage are shared disk file systems.

Distributed Systems for System Architects

The rapid growth in mobile communications has led to an increasing demand for wideband high data rate communications services. In recent years, the Distributed Antenna System (DAS) has emerged as a promising candidate beyond 3G and 4G mobile communications. Distributed Antenna Systems: Open Architecture for Future Wireless Communications is a comprehensive technical guide that covers the fundamental concepts, recent advances and open issues of the DAS. The topic is explored with various key challenges in diverse scenarios, including architecture, capacity, connectivity, scalability, medium access control, scheduling, dynamic channel assignment and cross-layer optimization. The primary focus of this book is

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the introduction of concepts, effective protocols, system integration, performance analysis techniques, simulations and experiments, and more importantly, future research directions in the DAS. The first part of the book introduces DAS fundamentals, including channel models and theoretical issues, examining the capacity of the DAS with different structures. Concentrating on the MAC and protocols for the DAS, the second part of the book includes information on distributed signal processing, optimal resource allocation, cooperative MAC protocols, cross layer design, and distributed organization. The third part presents case studies and applications of the DAS, including experiment, RF engineering, and applications.

Distributed Computing in Java 9

Distributed systems have helped application development teams deal with failures, downtime, and poor scaling, but these systems bring technical challenges of their own. With this unique cookbook, system architects will get a detailed understanding of reactive systems, along with proven recipes for dealing with different architectural issues. Each self-contained chapter covers the architecture of an entire reactive system, and--since these systems share many of the same architectural issues--each chapter also focuses on a particular area, such as delivery semantics or monitoring & tracing, with detailed solutions for problems that commonly arise. Learn the architecture and implementation tips for an entire

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reactive microservices-based system in each chapter Understand the challenges of long-term running and evolution of your distributed system Explore different failure modes of distributed systems and the approaches to address them Learn about proper site reliability and production readiness

The Art of Immutable Architecture

Distributed Systems for System Architects

Distributed Storage Networks

Middleware is the bridge that connects distributed applications across different physical locations, with different hardware platforms, network technologies, operating systems, and programming languages. This book describes middleware from two different perspectives: from the viewpoint of the systems programmer and from the viewpoint of the applications programmer. It focuses on the use of open source solutions for creating middleware and the tools for developing distributed applications. The design principles presented are universal and apply to all middleware platforms, including CORBA and Web Services. The authors have

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created an open-source implementation of CORBA, called MICO, which is freely available on the web. MICO is one of the most successful of all open source projects and is widely used by demanding companies and institutions, and has also been adopted by many in the Linux community. * Provides a comprehensive look at the architecture and design of middleware the bridge that connects distributed software applications * Includes a complete, commercial-quality open source middleware system written in C++ * Describes the theory of the middleware standard CORBA as well as how to implement a design using open source techniques

Distributed Systems

Due to the decreasing production costs of IT systems, applications that had to be realised as expensive PCBs formerly, can now be realised as a system-on-chip. Furthermore, low cost broadband communication media for wide area communication as well as for the realisation of local distributed systems are available. Typically the market requires IT systems that realise a set of specific features for the end user in a given environment, so called embedded systems. Some examples for such embedded systems are control systems in cars, airplanes, houses or plants, information and communication devices like digital TV, mobile phones or autonomous systems like service- or edutainment robots. For the design of embedded systems the designer has to tackle three major aspects: The

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application itself including the man-machine interface, The (target) architecture of the system including all functional and non-functional constraints and, the design methodology including modelling, specification, synthesis, test and validation. The last two points are a major focus of this book. This book documents the high quality approaches and results that were presented at the International Workshop on Distributed and Parallel Embedded Systems (DIPES 2000), which was sponsored by the International Federation for Information Processing (IFIP), and organised by IFIP working groups WG10.3, WG10.4 and WG10.5. The workshop took place on October 18-19, 2000, in Schloß Eringerfeld near Paderborn, Germany. Architecture and Design of Distributed Embedded Systems is organised similar to the workshop. Chapters 1 and 4 (Methodology I and II) deal with different modelling and specification paradigms and the corresponding design methodologies. Generic system architectures for different classes of embedded systems are presented in Chapter 2. In Chapter 3 several design environments for the support of specific design methodologies are presented. Problems concerning test and validation are discussed in Chapter 5. The last two chapters include distribution and communication aspects (Chapter 6) and synthesis techniques for embedded systems (Chapter 7). This book is essential reading for computer science researchers and application developers.

Architecture and Design of Distributed Embedded Systems

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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

Reasoning in Event-Based Distributed Systems

Explore the power of distributed computing to write concurrent, scalable applications in Java About This Book Make the best of Java 9 features to write

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succinct code Handle large amounts of data using HPC Make use of AWS and Google App Engine along with Java to establish a powerful remote computation system Who This Book Is For This book is for basic to intermediate level Java developers who is aware of object-oriented programming and Java basic concepts. What You Will Learn Understand the basic concepts of parallel and distributed computing/programming Achieve performance improvement using parallel processing, multithreading, concurrency, memory sharing, and hpc cluster computing Get an in-depth understanding of Enterprise Messaging concepts with Java Messaging Service and Web Services in the context of Enterprise Integration Patterns Work with Distributed Database technologies Understand how to develop and deploy a distributed application on different cloud platforms including Amazon Web Service and Docker CaaS Concepts Explore big data technologies Effectively test and debug distributed systems Gain thorough knowledge of security standards for distributed applications including two-way Secure Socket Layer In Detail Distributed computing is the concept with which a bigger computation process is accomplished by splitting it into multiple smaller logical activities and performed by diverse systems, resulting in maximized performance in lower infrastructure investment. This book will teach you how to improve the performance of traditional applications through the usage of parallelism and optimized resource utilization in Java 9. After a brief introduction to the fundamentals of distributed and parallel computing, the book moves on to explain different ways of communicating with remote systems/objects in a distributed architecture. You will learn about

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asynchronous messaging with enterprise integration and related patterns, and how to handle large amount of data using HPC and implement distributed computing for databases. Moving on, it explains how to deploy distributed applications on different cloud platforms and self-contained application development. You will also learn about big data technologies and understand how they contribute to distributed computing. The book concludes with the detailed coverage of testing, debugging, troubleshooting, and security aspects of distributed applications so the programs you build are robust, efficient, and secure. Style and approach This is a step-by-step practical guide with real-world examples.

Delta-4: A Generic Architecture for Dependable Distributed Computing

REST continues to gain momentum as the best method for building Web services, and this down-to-earth book delivers techniques and examples that show how to design and implement integration solutions using the REST architectural style.

Reliable Distributed Systems

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

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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.

REST in Practice

The worldwide market for SAN and NAS storage is anticipated to grow from US \$2 billion in 1999 to over \$25 billion by 2004. As business-to-business and business-to-consumer e-commerce matures, even greater demands for management of stored data will arise. With the rapid increase in data storage requirements in the last

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decade, efficient management of stored data becomes a necessity for the enterprise. A recent UC-Berkeley study predicts that 150,000 terabytes of disk storage will be shipped in 2003. Most financial, insurance, healthcare, and telecommunications institutions are in the process of implementing storage networks that are distributed to some degree. For these institutions, data integrity is critical, and they will spend much time and money on planning. One of the primary obstacles to implementing a storage network cited by enterprise IT managers is a lack of knowledge about storage networking technology and the specific issues involved in extending a Storage Area Network (SAN) or Network Attached Storage (NAS) over the Metropolitan Area Networks (MAN) or Wireless Area Networks (WAN). Distributed Storage Networks : Architecture, Protocols and Management addresses the "terminology gap" between enterprise network planners and telecommunications engineers, who must understand the transport requirements of storage networks in order to implement distributed storage networks. Jepsen comprehensively provides IT managers, planners, and telecommunications professionals with the information they need in order to choose the technologies best suited for their particular environment. * Addresses a hot topic that will become increasingly important in the coming years * Enables high-level managers and planners to make intelligent decisions about network needs. * Includes example network configurations providing solutions to typical user scenarios * Fills the "terminology gap" between enterprise network managers and telecommunications engineers who must understand the transport

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requirements of storage networks in order to implement distributed storage area networks A fundamental resource for all network managers, planners and network design engineers, as well as telecommunications engineers and engineering, computer science, and information technology students.

Distributed Network Systems

Client/server and distributed technologies have made great strides since their emergence in the late 1980s to become very popular in the IT industry today. This book illustrates techniques not only for designing GUI client/server applications, but also for managing complex application environments containing both legacy and new applications. Topics covered in this book include - The what, when and how of the three tier client/server model - Coupling and dependency: key design factors in distributed systems - Distributed application design alternatives for the enterprise - The Federated application structure for integrating the applications of the enterprise - A real-life case study of a major financial institution - Systems Architects and senior technical staff Project Managers and Software Engineers involved with or interested in client/server computing, and final year undergraduate and postgraduate students will find this book useful.

SOA in Practice

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Delta-4 is a 5-nation, 13-partner project that has been investigating the achievement of dependability in open distributed systems, including real-time systems. This book describes the design and validation of the distributed fault-tolerant architecture developed within this project. The key features of the Delta-4 architecture are: (a) a distributed object-oriented application support environment; (b) built-in support for user-transparent fault tolerance; (c) use of multicast or group communication protocols; and (d) use of standard off the-shelf processors and standard local area network technology with minimum specialized hardware. The book is organized as follows: The first 3 chapters give an overview of the architecture's objectives and of the architecture itself, and compare the proposed solutions with other approaches. Chapters 4 to 12 give a more detailed insight into the Delta-4 architectural concepts. Chapters 4 and 5 are devoted to providing a firm set of general concepts and terminology regarding dependable and real-time computing. Chapter 6 is centred on fault-tolerance techniques based on distribution. The description of the architecture itself commences with a description of the Delta-4 application support environment (Deltase) in chapter 7. Two variants of the architecture - the Delta-4 Open System Architecture (OSA) and the Delta-4 Extra Performance Architecture (XPA) - are described respectively in chapters 8 and 9. Both variants of the architecture have a common underlying basis for dependable multicasting, i. e.

Distributed Systems--architecture and Implementation

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The primary audience for this book are advanced undergraduate students and graduate students. Computer architecture, as it happened in other fields such as electronics, evolved from the small to the large, that is, it left the realm of low-level hardware constructs, and gained new dimensions, as distributed systems became the keyword for system implementation. As such, the system architect, today, assembles pieces of hardware that are at least as large as a computer or a network router or a LAN hub, and assigns pieces of software that are self-contained, such as client or server programs, Java applets or protocol modules, to those hardware components. The freedom she/he now has, is tremendously challenging. The problems alas, have increased too. What was before mastered and tested carefully before a fully-fledged mainframe or a closely-coupled computer cluster came out on the market, is today left to the responsibility of computer engineers and scientists invested in the role of system architects, who fulfil this role on behalf of software vendors and integrators, add-value system developers, R&D institutes, and final users. As system complexity, size and diversity grow, so increases the probability of inconsistency, unreliability, non-responsiveness and insecurity, not to mention the management overhead. What System Architects Need to Know The insight such an architect must have includes but goes well beyond, the functional properties of distributed systems.

XML Distributed Systems Design

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This book is a guide to creating a software architecture comprised of distributed components. While it is based on OMG's CORBA standard, the principles also apply to architecture built with other technology, such as Microsoft's DCOM.

Architectural Transformations in Network Services and Distributed Systems

Both authors have taught the course of “Distributed Systems” for many years in the respective schools. During the teaching, we feel strongly that “Distributed systems” have evolved from traditional “LAN” based distributed systems towards “Internet based” systems. Although there exist many excellent textbooks on this topic, because of the fast development of distributed systems and network programming/protocols, we have difficulty in finding an appropriate textbook for the course of “distributed systems” with orientation to the requirement of the undergraduate level study for today’s distributed technology. Specifically, from - to-date concepts, algorithms, and models to implementations for both distributed system designs and application programming. Thus the philosophy behind this book is to integrate the concepts, algorithm designs and implementations of distributed systems based on network programming. After using several materials of other textbooks and research books, we found that many texts treat the distributed systems with separation of concepts, algorithm design and network

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programming and it is very difficult for students to map the concepts of distributed systems to the algorithm design, prototyping and implementations. This book intends to enable readers, especially postgraduates and senior undergraduate level, to study up-to-date concepts, algorithms and network programming skills for building modern distributed systems. It enables students not only to master the concepts of distributed network system but also to readily use the material introduced into implementation practices.

Distributed Systems-architecture and Implementation

This book describes a cross-domain architecture and design tools for networked complex systems where application subsystems of different criticality coexist and interact on networked multi-core chips. The architecture leverages multi-core platforms for a hierarchical system perspective of mixed-criticality applications. This system perspective is realized by virtualization to establish security, safety and real-time performance. The impact further includes a reduction of time-to-market, decreased development, deployment and maintenance cost, and the exploitation of the economies of scale through cross-domain components and tools. Describes an end-to-end architecture for hypervisor-level, chip-level, and cluster level. Offers a solution for different types of resources including processors, on-chip communication, off-chip communication, and I/O. Provides a cross-domain approach with examples for wind-power, health-care, and avionics. Introduces

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hierarchical adaptation strategies for mixed-criticality systems Provides modular verification and certification methods for the seamless integration of mixed-criticality systems. Covers platform technologies, along with a methodology for the development process. Presents an experimental evaluation of technological results in cooperation with industrial partners. The information in this book will be extremely useful to industry leaders who design and manufacture products with distributed embedded systems in mixed-criticality use-cases. It will also benefit suppliers of embedded components or development tools used in this area. As an educational tool, this material can be used to teach students and working professionals in areas including embedded systems, computer networks, system architecture, dependability, real-time systems, and avionics, wind-power and health-care systems.

Open Distributed Systems

This book provides graduate students and practitioners with knowledge of the CORBA standard and practical experience of implementing distributed systems with CORBA's Java mapping. With tested code examples that will run immediately!

Reactive Systems Architecture

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Although much has been made of the impact XML is having on Web development, the most significant changes brought about by XML have been in the way distributed systems store and exchange information. XML Distributed Systems Design offers in-depth architectural models for devising open-ended systems and provides templates for complex data interchange and mining theories as related to XML. XML Distributed Systems Design addresses core XML technologies such as XSL, DTD, XML Query, Data Warehouses, Data Mining, Distributed Systems Architecture, Web-based system design, Distributed Systems Framework, SOAP, SAX and using XML enabled tools for development and problem solving. Close attention is given to the way XML changes existing development patterns and paradigms. In addition, the book presents the new patterns and strategies emerging in XML system design.

Designing Data-Intensive Applications

The primary audience for this book are advanced undergraduate students and graduate students. Computer architecture, as it happened in other fields such as electronics, evolved from the small to the large, that is, it left the realm of low-level hardware constructs, and gained new dimensions, as distributed systems became the keyword for system implementation. As such, the system architect, today, assembles pieces of hardware that are at least as large as a computer or a network router or a LAN hub, and assigns pieces of software that are self-

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Implementing Distributed Systems with Java and CORBA

This book demonstrates service-oriented architecture (SOA) as a concrete discipline rather than a hopeful collection of cloud charts. Built upon the author's firsthand experience rolling out a SOA at a major corporation, SOA in Practice explains how SOA can simplify the creation and maintenance of large-scale applications. Whether your project involves a large set of Web Services-based components, or connects legacy applications to modern business processes, this book clarifies how -- and whether -- SOA fits your needs. SOA has been a vision for

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years. This book brings it down to earth by describing the real-world problems of implementing and running a SOA in practice. After defining SOA's many facets, examining typical use patterns, and exploring how loose coupling helps build stronger applications, SOA in Practice presents a framework to help you determine when to take advantage of SOA. In this book you will: Focus squarely on real deployment and technology, not just standards maps Examine business problems to determine which ones fit a SOA approach before plastering a SOA solution on top of them Find clear paths for building solutions without getting trapped in the mire of changing web services details Gain the experience of a systems analyst intimately involved with SOA "The principles and experiences described in this book played an important role in making SOA at T-Mobile a success story, with more than 10 million service calls per day." --Dr. Steffen Roehn, Member of the Executive Committee T-Mobile International (CIO) "Nicolai Josuttis has produced something that is rare in the over-hyped world of SOA; a thoughtful work with deep insights based on hands-on experiences. This book is a significant milestone in promoting practical disciplines for all SOA practitioners." --John Schmidt, Chairman, Integration Consortium "The book belongs in the hands of every CIO, IT Director and IT planning manager." --Dr. Richard Mark Soley, Chairman and CEO, Object Management Group; Executive Director, SOA Consortium

Impossibility Results for Distributed Computing

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This book describes the key concepts, principles and implementation options for creating high-assurance cloud computing solutions. The guide starts with a broad technical overview and basic introduction to cloud computing, looking at the overall architecture of the cloud, client systems, the modern Internet and cloud computing data centers. It then delves into the core challenges of showing how reliability and fault-tolerance can be abstracted, how the resulting questions can be solved, and how the solutions can be leveraged to create a wide range of practical cloud applications. The author's style is practical, and the guide should be readily understandable without any special background. Concrete examples are often drawn from real-world settings to illustrate key insights. Appendices show how the most important reliability models can be formalized, describe the API of the Isis2 platform, and offer more than 80 problems at varying levels of difficulty.

Systems Programming

With the rapid expansion of the Internet over the last 20 years, event-based distributed systems are playing an increasingly important role in a broad range of application domains, including enterprise management, environmental monitoring, information dissemination, finance, pervasive systems, autonomic computing, collaborative working and learning, and geo-spatial systems. Many different architectures, languages and technologies are being used for implementing event-based distributed systems, and much of the development has been undertaken

independently by different communities. However, a common factor is an ever-increasing complexity. Users and developers expect that such systems are able not only to handle large volumes of simple events but also to detect complex patterns of events that may be spatially distributed and may span significant periods of time. Intelligent and logic-based approaches provide sound foundations for addressing many of the research challenges faced and this book covers a broad range of recent advances, contributed by leading experts in the field. It presents a comprehensive view of reasoning in event-based distributed systems, bringing together reviews of the state-of-the art, new research contributions, and an extensive set of references. It will serve as a valuable resource for students, faculty and researchers as well as industry practitioners responsible for new systems development.

Distributed Antenna Systems

How to solve security issues and problems arising in distributed systems. Security is one of the leading concerns in developing dependable distributed systems of today, since the integration of different components in a distributed manner creates new security problems and issues. Service oriented architectures, the Web, grid computing and virtualization – form the backbone of today’s distributed systems. A lens to security issues in distributed systems is best provided via deeper exploration of security concerns and solutions in these technologies.

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Distributed Systems Security provides a holistic insight into current security issues, processes, and solutions, and maps out future directions in the context of today's distributed systems. This insight is elucidated by modeling of modern day distributed systems using a four-tier logical model –host layer, infrastructure layer, application layer, and service layer (bottom to top). The authors provide an in-depth coverage of security threats and issues across these tiers. Additionally the authors describe the approaches required for efficient security engineering, alongside exploring how existing solutions can be leveraged or enhanced to proactively meet the dynamic needs of security for the next-generation distributed systems. The practical issues thereof are reinforced via practical case studies.

Distributed Systems Security: Presents an overview of distributed systems security issues, including threats, trends, standards and solutions. Discusses threats and vulnerabilities in different layers namely the host, infrastructure, application, and service layer to provide a holistic and practical, contemporary view of enterprise architectures. Provides practical insights into developing current-day distributed systems security using realistic case studies. This book will be of invaluable interest to software engineers, developers, network professionals and technical/enterprise architects working in the field of distributed systems security. Managers and CIOs, researchers and advanced students will also find this book insightful.

Distributed Applications Engineering

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The key area of open communications in distributed computing systems is explained in this authoritative text. International standards and management strategies are explained in the context of both global and local network developments.

Concepts for Distributed Systems Design

Fundamentals of Software Architecture

This second edition of Distributed Systems, Principles & Paradigms, covers the principles, advanced concepts, and technologies of distributed systems in detail, including: communication, replication, fault tolerance, and security. Intended for use in a senior/graduate level distributed systems course or by professionals, this text systematically shows how distributed systems are designed and implemented in real systems.

Recent Progress in Parallel and Distributed Computing

With the given work we decided to help not only the readers but ourselves, as the professionals who actively involved in the networking branch, with understanding

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the trends that have developed in recent two decades in distributed systems and networks. Important architecture transformations of distributed systems have been examined. The examples of new architectural solutions are discussed.

Database Systems

Explains fault tolerance in clear terms, with concrete examples drawn from real-world settings Highly practical focus aimed at building "mission-critical" networked applications that remain secure

Distributed Systems Security

Principles and Applications of Distributed Event-Based Systems showcases event-based systems in real-world applications. Containing expert international contributions, this advanced publication provides professionals, researchers, and students in systems design with a rich compendium of latest applications in the field.

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