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Distributed Systems Architecture A Middleware Approach Corba In Theory And Practice

The eagerly awaited Pattern-Oriented Software Architecture (POSA) Volume 4 is about a pattern language for distributed computing. The authors will guide you through the best practices and introduce you to key areas of building distributed software systems. POSA 4 connects many stand-alone patterns, pattern collections and pattern languages from the existing

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body of literature found in the POSA series. Such patterns relate to and are useful for distributed computing to a single language. The panel of experts provides you with a consistent and coherent holistic view on the craft of building distributed systems. Includes a foreword by Martin Fowler A must read for practitioners who want practical advice to develop a comprehensive language integrating patterns from key literature.

The challenges of designing, building, and maintaining large-scale, distributed enterprise systems are truly daunting. Written for all IT professionals, The Complete Book of Middleware will aid in resolving new business objectives, new technologies, and vendor disputes. This book focuses on the essential principles and priorities of system design and

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emphasizes the new requirements brought forward by the rise of e-commerce and distributed integrated systems. This reference highlights the changes to middleware technologies and standards. It offers a concise overview of middleware technology alternatives and distributed systems. Many increasingly complex examples are incorporated throughout and the book concludes with guidelines on the practice of IT architecture. Performance considerations such as caching and monitoring are reviewed and the appendix includes middleware resources and new modeling standards. The scope includes traditional middleware and also next-generation techniques that serve to glue disparate systems in the ever-expanding world of distributed network systems. Provided with concepts,

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principles, and alternatives discussed in The Complete Book of Middleware, systems architects, systems analysts, systems designers, systems developers, and programmers, can proceed with greater confidence in designing complex enterprise systems. The new edition of this bestselling title on Distributed Systems has been thoroughly revised throughout to reflect the state of the art in this rapidly developing field. It emphasizes the principles used in the design and construction of distributed computer systems based on networks of workstations and server computers. 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,

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Approach Corba In Theory And Practice. 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

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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

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*Practices for Building Large,
Integrated Systems*

Hypermedia and Systems Architecture

Fundamentals and Operation

Principles, Algorithms, and Systems

Distributed System Design

*Distributed Real-Time Architecture for
Mixed-Criticality Systems*

Introduction to Middleware

This book offers a unified treatment of mobile middleware technology. Mobile Middleware: Architecture, Patterns and Practice provides a comprehensive overview of mobile middleware technology. The focus is on understanding the key design and architectural patterns, middleware layering, data

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presentation, specific technological solutions, and standardization. The author addresses current state of the art systems including Symbian, Java 2 Micro Edition, W3C technologies and many others, and features a chapter on widely deployed middleware systems. Additionally, the book includes a summary of relevant mobile middleware technologies, giving the reader an insight into middleware architecture design and well-known, useful design patterns. Several case studies are included in order to demonstrate how the presented patterns,

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solutions, and architectures are applied in practice. The case studies pertain to mobile service platforms, mobile XML processing, thin clients, rich clients, and mobile servers. Chapters on Architectures and Platforms, Mobile Messaging, Publish/Subscribe, Data Synchronization and Security are also included. Key Features: Provides a comprehensive overview of mobile middleware technology Unified treatment of three core topical areas: messaging, publish/subscribe, and data synchronization Discusses the role of middleware in the protocol stack Focus on

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both standards and research systems including current state-of-the-art systems such as Symbian, Java 2 Micro Edition, W3C technologies Contains concrete examples showing the presented architectures and solutions in practice Includes an accompanying website with links to open source software, and other resources This book serves as an invaluable guide to systems architects, researchers, and developers. It will also be of interest to graduate and undergraduate students studying computer science (distributed systems, computer networks).

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Designing application and middleware software to run in concurrent and networked environments is a significant challenge to software developers. The patterns catalogued in this second volume of Pattern-Oriented Software Architectures (POSA) form the basis of a pattern language that addresses issues associated with concurrency and networking. The book presents 17 interrelated patterns ranging from idioms through architectural designs. They cover core elements of building concurrent and network systems: service access and configuration,

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event handling, synchronization, and concurrency. All patterns present extensive examples and known uses in multiple programming languages, including C++, C, and Java. The book can be used to tackle specific software development problems or read from cover to cover to provide a fundamental understanding of the best practices for constructing concurrent and networked applications and middleware. About the Authors This book has been written by the award winning team responsible for the first POSA volume "A System of Patterns", joined in this

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volume by Douglas C. Schmidt
from University of
California, Irvine (UCI),
USA. Visit our Web Page
Location-based Services
(LBSs) are mobile services
for providing information
that has been created,
compiled, selected or
filtered under consideration
of the users' current
locations or those of other
persons or mobile devices.
Typical examples are
restaurant finders, buddy
trackers, navigation
services or applications in
the areas of mobile
marketing and mobile gaming.
The attractiveness of LBSs
is due to the fact that
users are not required to

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enter location information manually but are automatically pinpointed and tracked. This book explains the fundamentals and operation of LBSs and gives a thorough introduction to the key technologies and organizational procedures, offering comprehensive coverage of positioning methods, location protocols and service platforms, alongside an overview of interfaces, languages, APIs and middleware with examples demonstrating their usage. Explanation and comparison of all protocols and architectures for location services In-depth coverage of satellite, cellular and

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local positioning All embracing introduction to 3GPP positioning methods, such as Cell-Id, E-OTD, U-TdoA, OTDoA-IPDL and Assisted GPS Explains the operation of enhanced emergency services such as E-911 Identifies unsolved research issues and challenges in the area of LBSs This comprehensive guide will be invaluable to undergraduate and postgraduate students and lecturers in the area of telecommunications. It will also be a useful resource to developers and researchers seeking to expand their knowledge in this field. A state-of-the-art guide to

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middleware technologies, and their pivotal role in communications networks.

Middleware is about integration and interoperability of applications and services running on heterogeneous computing and communications devices. The services it provides - including identification, authentication, authorization, soft-switching, certification and security - are used in a vast range of global appliances and systems, from smart cards and wireless devices to mobile services and e-Commerce. Qusay H. Mahmoud has created an

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invaluable reference tool that explores the origins and current uses of middleware (highlighting the importance of such technologies as CORBA, J2EE and JMS) and has thus compiled the roadmap to future research in this area. Middleware for Communications: discusses the emerging fields of Peer-to-Peer (P2P) and grid middleware detailing middleware platforms such as JXTA and the Globus middleware toolkit. shows how Middleware will play a significant role in mobile computing. presents a Platform Supporting Mobile Applications (PLASMA) - a

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middleware platform that consists of components for location, event, and profile handling of Location-Based Services. introduces middleware security focusing on the appropriate aspects of CORBA, J2EE, and .NET and demonstrates how to realize complex security capabilities such as role-based access control (RBAC) and mandatory access control (MAC). discusses how Quality of Service (QoS) component middleware can be combined with Model Driven Architecture (MDA) technologies to rapidly develop, generate, assemble and deploy flexible communications applications.

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This incomparable overview of middleware for communications is suitable for graduate students and researchers in communications and computing departments. It is also an authoritative guide for engineers and developers working on distributed systems, mobile computing and networked appliances.

4th IFIP WG6.1 International Conference, DAIS 2003, Paris, France, November 17-21, 2003, Proceedings
Web Services, Object Components, and Cloud Computing
C++ Network Programming, Volume I
Technology Integration

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Advancements in Distributed
Systems and Computing
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Middleware

Middleware Architecture

From Parallel Processing to
the Internet of Things

**Distributed and Cloud
Computing: From Parallel
Processing to the Internet
of Things offers complete
coverage of modern
distributed computing
technology including
clusters, the grid, service-
oriented architecture,
massively parallel
processors, peer-to-peer
networking, and cloud
computing. It is the first
modern, up-to-date
distributed systems
textbook; it explains how to**

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create high-performance, scalable, reliable systems, exposing the design principles, architecture, and innovative applications of parallel, distributed, and cloud computing systems. Topics covered by this book include: facilitating management, debugging, migration, and disaster recovery through virtualization; clustered systems for research or ecommerce applications; designing systems as web services; and social networking systems using peer-to-peer computing. The principles of cloud computing are discussed using examples from open-

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source and commercial applications, along with case studies from the leading distributed computing vendors such as Amazon, Microsoft, and Google. Each chapter includes exercises and further reading, with lecture slides and more available online. This book will be ideal for students taking a distributed systems or distributed computing class, as well as for professional system designers and engineers looking for a reference to the latest distributed technologies including cloud, P2P and grid computing. Complete coverage

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of modern distributed computing technology including clusters, the grid, service-oriented architecture, massively parallel processors, peer-to-peer networking, and cloud computing Includes case studies from the leading distributed computing vendors: Amazon, Microsoft, Google, and more Explains how to use virtualization to facilitate management, debugging, migration, and disaster recovery Designed for undergraduate or graduate students taking a distributed systems course—each chapter includes exercises and further reading, with lecture slides

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and more available online
Research in context-aware
computing has produced a
number of middleware systems
for context management.
However, development of
ubiquitous context-aware
applications is still a
challenge because most
current middleware systems
are still focused on
isolated and static context-
aware environments. Context-
aware environments are
inherently dynamic as a
result of occasional
additions or upgrade of
sensors, applications or
context inference
mechanisms. Context
Management for Distributed
and Dynamic Context-Aware

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Computing proposes a novel architecture for context management based on the concept of context domains, allowing applications to keep context interests across distributed context management systems. The authors describe a distributed middleware that implements the aforementioned concepts, without compromising scalability and efficiency of context access. Middleware is everywhere. Ever since the advent of sockets and other virtual-circuit abstractions, researchers have been looking for ways to incorporate high- value

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concepts into distributed systems platforms. Most distributed applications, especially Internet applications, are now programmed using such middleware platforms. Prior to 1998, there were several major conferences and workshops at which research into middleware was reported, including ICODP (International Conference on Open Distributed Processing), ICDP (International Conference on Distributed Platforms) and SDNE (Services in Distributed and Networked - vironments). Middleware'98 was a synthesis of these three conferences.

Middleware 2000 continued the excellent tradition of Middleware'98. It provided a single venue for reporting state-of-the-art results in the provision of distributed systems platforms. The focus of Middleware 2000 was the design, implementation, deployment, and evaluation of distributed systems platforms and architectures for future networked environments. Among the 70 initial submissions to Middleware 2000, 21 papers were selected for inclusion in the technical program of the conference. Every paper was reviewed by four members of the program committee. The papers were judged -

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According to their originality, presentation quality, and relevance to the conference topics. The accepted papers cover various subjects such as caching, reflection, quality of service, and transactions.

The challenges of designing, building, and maintaining large-scale, distributed enterprise systems are truly daunting. Written by and for IT professionals, *IT Architectures and Middleware, Second Edition*, will help you rise above the conflicts of new business objectives, new technologies, and vendor wars, allowing you to think

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clearly and productively about the particular challenges you face. This book focuses on the essential principles and priorities of system design and emphasizes the new requirements emerging from the rise of e-commerce and distributed, integrated systems. It offers a concise overview of middleware technology alternatives and distributed systems. Numerous increasingly complex examples are incorporated throughout, and the book concludes with some short case studies. Topics covered include: Middleware technology review Key principles of distributed

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systems: resiliency,
performance and scalability,
security, and systems
management Information
access requirements and data
consistency Application
integration design Recasting
existing applications as
services In this new
edition, with updates
throughout, coverage has
been expanded to include:
Service-oriented
architecture concepts Web
services and .NET technology
A more structured approach
to system integration design
Pattern-Oriented Software
Architecture, Patterns for
Concurrent and Networked
Objects
Systems Programming

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**Supporting Controlled
Interaction**

**Distributed Systems
Location-Based Services
Distributed Systems for
System Architects
Engineering Distributed
Objects**

Designing distributed computing systems is a complex process requiring a solid understanding of the design problems and the theoretical and practical aspects of their solutions. This comprehensive textbook covers the fundamental principles and models

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underlying the theory, algorithms and systems aspects of distributed computing. Broad and detailed coverage of the theory is balanced with practical systems-related issues such as mutual exclusion, deadlock detection, authentication, and failure recovery.

Algorithms are carefully selected, lucidly presented, and described without complex proofs. Simple explanations and illustrations are used to elucidate the

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algorithms. Important emerging topics such as peer-to-peer networks and network security are also considered. With vital algorithms, numerous illustrations, examples and homework problems, this textbook is suitable for advanced undergraduate and graduate students of electrical and computer engineering and computer science. Practitioners in data networking and sensor networks will also find this a valuable resource.

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Additional resources are available online at www.cambridge.org/9780521876346.

Principles of Transaction Processing is a comprehensive guide to developing applications, designing systems, and evaluating engineering products. The book provides detailed discussions of the internal workings of transaction processing systems, and it discusses how these systems work and how best to utilize them. It

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covers the architecture of Web Application Servers and transactional communication paradigms. The book is divided into 11 chapters, which cover the following: Overview of transaction processing application and system structure Software abstractions found in transaction processing systems Architecture of multitier applications and the functions of transactional middleware and database servers

Queued transaction processing and its internals, with IBM's Websphere MQ and Oracle's Stream AQ as examples Business process management and its mechanisms Description of the two-phase locking function, B-tree locking and multigranularity locking used in SQL database systems and nested transaction locking System recovery and its failures Two-phase commit protocol Comparison between the

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tradeoffs of replicating servers versus replication resources
Transactional middleware products and standards
Future trends, such as cloud computing platforms, composing scalable systems using distributed computing components, the use of flash storage to replace disks and data streams from sensor devices as a source of transaction requests. The text meets the needs of systems professionals, such as IT application

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programmers who
construct TP
applications,
application analysts,
and product developers.
The book will also be
invaluable to students
and novices in
application programming.
Complete revision of the
classic "non
mathematical"
transaction processing
reference for systems
professionals. Updated
to focus on the needs of
transaction processing
via the Internet-- the
main focus of business

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data processing investments, via web application servers, SOA, and important new TP standards. Retains the practical, non-mathematical, but thorough conceptual basis of the first edition.

As networks, devices, and systems continue to evolve, software engineers face the unique challenge of creating reliable distributed applications within frequently changing environments.

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C++ Network Programming,

Volume 1, provides practical solutions for developing and optimizing complex distributed systems using the ADAPTIVE Communication Environment (ACE), a revolutionary open-source framework that runs on dozens of hardware platforms and operating systems. This book guides software professionals through the traps and pitfalls of developing efficient, portable, and flexible

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networked applications. It explores the inherent design complexities of concurrent networked applications and the tradeoffs that must be considered when working to master them. C++ Network Programming begins with an overview of the issues and tools involved in writing distributed concurrent applications. The book then provides the essential design dimensions, patterns, and principles needed to develop flexible and

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efficient concurrent networked applications. The book's expert author team shows you how to enhance design skills while applying C++ and patterns effectively to develop object-oriented networked applications. Readers will find coverage of: C++ network programming, including an overview and strategies for addressing common development challenges

The ACE Toolkit
Connection protocols, message exchange, and

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message-passing versus
shared memory
Implementation methods
for reusable networked
application services
Concurrency in object-
oriented network
programming Design
principles and patterns
for ACE wrapper facades
With this book, C++
developers have at their
disposal the most
complete toolkit
available for developing
successful,
multiplatform,
concurrent networked
applications with ease

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and efficiency.

For this third edition of -Distributed Systems, - the material has been thoroughly revised and extended, integrating principles and paradigms into nine chapters: 1. Introduction 2. Architectures 3. Processes 4. Communication 5. Naming 6. Coordination 7. Replication 8. Fault tolerance 9. Security A separation has been made between basic material and more specific subjects. The latter

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have been organized into boxed sections, which may be skipped on first reading. To assist in understanding the more algorithmic parts, example programs in Python have been included. The examples in the book leave out many details for readability, but the complete code is available through the book's Website, hosted at www.distributed-systems.net. A personalized digital copy of the book is

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available for free, as
well as a printed
version through
Amazon.com.

Mobile Middleware
Energy Management of
Distributed Generation
Systems
Principles and Paradigms
Enterprise Software
Architecture and Design
IFIP/ACM International
Conference on
Distributed Systems
Platforms and Open
Distributed Processing
New York, NY, USA, April
4-7, 2000 Proceedings
an architecture for

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distributed system
services

Advanced Distributed
Computing: From
Algorithms to Systems

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 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.

This book fills a gap between high-level overview texts that are

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often too general and low-level detail oriented technical handbooks that lose sight the "big picture". This book discusses SOA from the low-level perspective of middleware, various XML-based technologies, and basic service design. It also examines broader implications of SOA, particularly where it intersects with business process management and process modeling. Concrete overviews will be provided of the methodologies in those fields, so that students will have a hands-on grasp of how they may be used in the context of SOA. Welcome to Middleware'98 and to one of England's most beautiful regions. In recent years the distributed systems community has witnessed a growth in the number of conferences, leading to

difficulties in tracking the literature and a consequent loss of awareness of work done by others in this important field. The aim of Middleware'98 is to synthesise many of the smaller workshops and conferences in this area, bringing together research communities which were becoming fragmented. The conference has been designed to maximise the experience for attendees. This is reflected in the choice of a resort venue (rather than a big city) to ensure a strong focus on interaction with other distributed systems researchers. The programme format incorporates a question-and-answer panel in each session, enabling significant issues to be discussed in the context of related papers and presentations. The invited speakers

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and tutorials are intended to not only inform the attendees, but also to stimulate discussion and debate. This book constitutes the refereed proceedings of the ACM/IFIP/USENIX International Conference on Distributed Systems Platforms, Middleware 2005, held in Grenoble, France in November/December 2005. The 18 revised full papers and 6 short papers presented were carefully reviewed and selected from 112 submissions. The papers are organized in topical sections on security and privacy, peer-to-peer computing, XML and service discovery, distribution and real time processing, publish/subscribe systems and content distribution, and middleware architecture.

Distributed Systems with Node.js

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**Operating Systems and Middleware
Mastering Complexity with ACE and
Patterns, Portable Documents
Demystifying Embedded Systems**

Middleware

REST in Practice

Entities, Services, and Resources

The Role of Middleware in

Distributed Energy Systems

Integrated in the Smart Grid

In the race to compete in today's fast-moving markets, large enterprises are busy adopting new technologies for creating new products, processes, and business models. But one obstacle on the road to digital transformation is placing too much emphasis on technology, and not enough on the types of processes technology enables. What if different lines of business could build their own services and applications—and

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decision-making was distributed rather than centralized? This report explores the concept of a digital business platform as a way of empowering individual business sectors to act on data in real time. Much innovation in a digital enterprise will increasingly happen at the edge, whether it involves business users (from marketers to data scientists) or IoT devices. To facilitate the process, your core IT team can provide these sectors with the digital tools they need to innovate quickly. This report explores: Key cultural and organizational changes for developing business capabilities through cross-functional product teams A platform for integrating applications, data sources, business partners, clients, mobile apps, social

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networks, and IoT devices Creating internal API programs for building innovative edge services in low-code or no-code environments Tools including Integration Platform as a Service, Application Platform as a Service, and Integration Software as a Service The challenge of integrating microservices and serverless architectures Event-driven architectures for processing and reacting to events in real time You'll also learn about a complete pervasive integration solution as a core component of a digital business platform to serve every audience in your organization.

In 1992 we initiated a research project on large scale distributed computing systems (LSDCS). It was a collaborative project involving research institutes and universities in

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Bologna, Grenoble, Lausanne, Lisbon, Rennes, Rocquencourt, Newcastle, and Twente. The World Wide Web had recently been developed at CERN, but its use was not yet as common place as it is today and graphical browsers had yet to be developed. It was clear to us (and to just about everyone else) that LSDCS comprising several thousands to millions of individual computer systems (nodes) would be coming into existence as a consequence both of technological advances and the demands placed by applications. We were excited about the problems of building large distributed systems, and felt that serious rethinking of many of the existing computational paradigms, algorithms, and structuring principles for distributed computing was called for. In our

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research proposal, we summarized the problem domain as follows: “We expect LSDCS to exhibit great diversity of node and communications capability. Nodes will range from (mobile) laptop computers, workstations to supercomputers. Whereas mobile computers may well have unreliable, low bandwidth communications to the rest of the system, other parts of the system may well possess high bandwidth communications capability. To appreciate the problems posed by the sheer scale of a system comprising thousands of nodes, we observe that such systems will be rarely functioning in their entirety.

Middleware architectures have proven to be of major importance when dealing with distributed

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systems, as they are able to abstract the inevitable heterogeneity of the hardware devices present in a deployment with the aim of offering a collection of interfaces and resources of homogeneous appearance to the upper, application-oriented layers. In an energy-based distributed system as the Smart Grid, this role is replicated, as the hardware devices that are found, while essentially related to the power grid and the functionalities that can be extracted from it (advanced metering infrastructure, remote terminal units, renewable energy resources, et cetera), still present the same challenges that other distributed systems are expected to deal with, such as heterogeneous features, different information formats, diversity of their performance

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procedures, or integration and interconnectivity issues. Therefore, a middleware architecture is still of major usability in the power grid. This chapter offers information about the common features that are present in a middleware architecture that works under the requirements and use cases typical of the Smart Grid, as well as offers examples on how middleware integrates legacy, proprietary, and newly developed pieces of equipment within the same distributed energy grid.

By using this innovative text, students will obtain an understanding of how contemporary operating systems and middleware work, and why they work that way.

IT Architectures and Middleware
Understanding File Systems,
Databases, Virtual Machines,

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Supporting Applications and Services
Patterns and Paradigms for Scalable,
Reliable Services

Third International Workshop, SEM
2002. Orlando, FL, USA, May 20-21,
2002, Revised Papers

Software Engineering and Middleware
Distributed Systems Architecture

The 3rd International Workshop on
Software Engineering and

Middleware {SEM 2002) was held
May 20-21, 2002, in Orlando,

Florida, as a co-located event of the
2002 International Conference on
Software Engineering. The

workshop attracted 30 participants
from academic and industrial
institutions in many countries.

Twenty-seven papers were

submitted, of which 15 were accepted to create a broad program covering the topics of architectures, specification, components and adaptations, technologies, and services. The focus of the workshop was on short presentations, with substantial discussions afterwards. Thus, we decided to include in this proceedings also a short summary of every technical session, which was written by some of the participants at the workshop. The workshop invited one keynote speaker, Bobby Jadhav of CalKey, who presented a talk on the design and use of model-driven architecture and middleware in industry. We would like to thank all the people who helped organize

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and run the workshop. In particular, we would like to thank the program committee for their careful reviews of the submitted papers, Wolfgang Emmerich for being an excellent General Chair, and the participants for a lively and interesting workshop.

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

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distributed systems are designed and implemented in real systems.

Distributed Systems Architecture A
Middleware Approach Elsevier

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.

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The design principles presented are universal and apply to all middleware platforms, including CORBA and Web Services. The authors have 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-

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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

Concepts and Design

Middleware 2000

Context Management for

Distributed and Dynamic Context-

Aware Computing

Distributed Applications and

Interoperable Systems

ACM/IFIP/USENIX 6th

International Middleware

Conference, Grenoble, France,

November 28 - December 2, 2005,

Proceedings

Distributed Computing

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Designing Distributed Systems

Many companies, from startups to Fortune 500 companies alike, use Node.js to build performant backend services. And engineers love Node.js for its approachable API and familiar syntax. Backed by the world's largest package repository, Node's enterprise foothold is only expected to grow. In this hands-on guide, author Thomas Hunter II proves that Node.js is just as capable as traditional enterprise platforms for building services that are observable, scalable, and resilient. Intermediate to advanced Node.js developers will find themselves integrating application code with a breadth of tooling from each layer of a modern service stack. Learn why running redundant copies of the same

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Node.js service is necessary Know which protocol to choose, depending on the situation Fine-tune your application containers for use in production Track down errors in a distributed setting to determine which service is at fault Simplify app code and increase performance by offloading work to a reverse proxy Build dashboards to monitor service health and throughput Find out why so many different tools are required when operating in an enterprise environment 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

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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

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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.

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

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*integration solutions using the REST
architectural style.*

Middleware refers to the intermediate software layer that bridges the gap between the heterogeneous hardware platforms and the backend applications requirements. It allows providing common services and programming abstractions and hiding the low-level management of the connected hardware. With the recent advances in distributed systems and enabling technologies, such as RFID, WSNs, IoT, IoE, cloud computing, context-aware pervasive computing, ubiquitous computing, etc., middleware design and development has become a necessity, taking increasing importance. This book provides a comprehensive overview of the

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*Approach Corba In Theory And
Practice*
*different design patterns and reference
models used in middleware*

*architectures in general, followed by a
description of specific middleware
architectures dedicated to the use of
the different emerging technologies,
such as IoT, cloud computing, IEEE
802.11, etc. This book intends therefore
to bring together in one place up-to-
date contributions and remaining
challenges in this fast-moving research
area for the benefit of middleware
systems' designers and applications
developers.*

Distributed and Cloud Computing

A Middleware Approach

Advances in Distributed Systems

Principles of Transaction Processing

Middleware '98

Second International Workshop, EDO

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Practice
2000 Davis, CA, USA, November 2-3,
2000 Revised Papers

*IFIP International Conference on
Distributed Systems Platforms and
Open Distributed Processing*
*The functionality of distributed
computing systems has
advanced greatly in recent
months, and staying abreast of
the latest research within the field
is difficult. Technology Integration
Advancements in Distributed
Systems and Computing offers a
vital compendium of research
and developments within the field
of distributed computing, giving
case studies, frameworks,
architectures, and best practices
for academics and practitioners*

alike. With authors from around the world and the latest research from experts within the field, this resource acts as both a reference guide and research handbook. The book contains 10 chapters, and it is divided into four sections. The first section includes three chapters, providing an overview of Energy Management of Distributed Systems. It outlines typical concepts, such as Demand-Side Management, Demand Response, Distributed, and Hierarchical Control for Smart Micro-Grids. The second section contains three chapters and presents different control

algorithms, software architectures, and simulation tools dedicated to Energy Management Systems. In the third section, the importance and the role of energy storage technology in a Distribution System, describing and comparing different types of energy storage systems, is shown. The fourth section shows how to identify and address potential threats for a Home Energy Management System. Finally, the fifth section discusses about Economical Optimization of Operational Cost for Micro-Grids, pointing out the effect of renewable energy sources, active

loads, and energy storage systems on economic operation.

Middleware refers to the intermediate software layer that bridges the gap between the heterogeneous hardware platforms and the backend applications requirements. It allows providing common services and programming abstractions and hiding the low-level management of the connected hardware. With the recent advances in distributed systems and enabling technologies, such as RFID, WSNs, IoT, IoE, cloud computing, context-aware pervasive computing, ubiquitous

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computing, etc., middleware design and development has become a necessity, taking increasing importance. This book provides a comprehensive overview of the different design patterns and reference models used in middleware architectures in general, followed by a description of specific middleware architectures dedicated to the use of the different emerging technologies, such as IoT, cloud computing, IEEE 802.11, etc. This book intends therefore to bring together in one place up-to-date contributions and remaining challenges in this fast-moving

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research area for the benefit of middleware systems' designers and applications developers. This practical technical guide to embedded middleware implementation offers a coherent framework that guides readers through all the key concepts necessary to gain an understanding of this broad topic. Big picture theoretical discussion is integrated with down-to-earth advice on successful real-world use via step-by-step examples of each type of middleware implementation. Technically detailed case studies bring it all together, by providing insight into typical engineering situations

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readers are likely to encounter. Expert author Tammy Noergaard keeps explanations as simple and readable as possible, eschewing jargon and carefully defining acronyms. The start of each chapter includes a "setting the stage" section, so readers can take a step back and understand the context and applications of the information being provided. Core middleware, such as networking protocols, file systems, virtual machines, and databases; more complex middleware that builds upon generic pieces, such as MOM, ORB, and RPC; and integrated middleware software

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*packages, such as embedded
JVMs, .NET, and CORBA
packages are all demystified.
Embedded middleware theory
and practice that will get your
knowledge and skills up to speed
Covers standards, networking,
file systems, virtual machines,
and more Get hands-on
programming experience by
starting with the downloadable
open source code examples from
book website*

*Designing and Developing
Distributed Applications
Pattern-Oriented Software
Architecture, A Pattern Language
for Distributed Computing
The Complete Book of*

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Middleware
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Middleware 2005

Middleware for Communications

"A stereotype of computer science textbooks is that they are dry, boring, and sometimes even intimidating. As a result, they turn students' interests off from the subject matter instead of enticing them into it. This textbook is the opposite of such a stereotype. The author presents the subject matter in a refreshing story-telling style and aims to bring the Internet-

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generation of students
closer to her stories."

--Yingcai Xiao, The
University of Akron
Introduction to
Middleware: Web Services,
Object Components, and
Cloud Computing provides a
comparison of different
middleware technologies
and the overarching
middleware concepts they
are based on. The various
major paradigms of
middleware are introduced
and their pros and cons
are discussed. This
includes modern cloud
interfaces, including the
utility of Service

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Oriented Architectures.
Practice

The text discusses pros and cons of RESTful vs. non-RESTful web services, and also compares these to older but still heavily used distributed object/component middleware. The text guides readers to select an appropriate middleware technology to use for any given task, and to learn new middleware technologies as they appear over time without being greatly overwhelmed by any new concept. The book begins with an introduction to different

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distributed computing paradigms, and a review of the different kinds of architectures, architectural styles/patterns, and properties that various researchers have used in the past to examine distributed applications and determine the quality of distributed applications. Then it includes appropriate background material in networking and the web, security, and encoding necessary to understand detailed discussion in this area. The major

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middleware paradigms are compared, and a comparison methodology is developed. Readers will learn how to select a paradigm and technology for a particular task, after reading this text.

Detailed middleware technology review sections allow students or industry practitioners working to expand their knowledge to achieve practical skills based on real projects so as to become well-functional in that technology in industry. Major technologies examined include: RESTful

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web services (RESTful cloud interfaces such as OpenStack, AWS EC2 interface, CloudStack; AJAX, JAX-RS, ASP.NET MVC and ASP.NET Core), non-RESTful (SOAP and WSDL-based) web services (JAX-WS, Windows Communication Foundation), distributed objects/ components (Enterprise Java Beans, .NET Remoting, CORBA). The book presents two projects that can be used to illustrate the practical use of middleware, and provides implementations of these projects over different technologies.

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This versatile and class-tested textbook is suitable (depending on chapters selected) for undergraduate or first-year graduate courses on client server architectures, middleware, and cloud computing, web services, and web programming.

This book constitutes the thoroughly refereed post-proceedings of the Second International Workshop on Engineering Distributed Objects, EDO 2000, held in November 2000 in Davis, California, USA. The 15 revised full papers

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presented together with session surveys were carefully reviewed and selected from 30 submissions. The book presents topical sections on middleware selection, resource management, architectural reasoning, distributed communication, advanced transactions, and service integration. Future requirements for computing speed, system reliability, and cost-effectiveness entail the development of alternative computers to replace the traditional von Neumann organization. As computing

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networks come into being,
one of the latest dreams
is now possible -
distributed computing.
Distributed computing
brings transparent access
to as much computer power
and data as the user needs
for accomplishing any
given task -
simultaneously achieving
high performance and
reliability. The subject
of distributed computing
is diverse, and many
researchers are
investigating various
issues concerning the
structure of hardware and
the design of distributed

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software. Distributed System Design defines a distributed system as one that looks to its users like an ordinary system, but runs on a set of autonomous processing elements (PEs) where each PE has a separate physical memory space and the message transmission delay is not negligible. With close cooperation among these PEs, the system supports an arbitrary number of processes and dynamic extensions. Distributed System Design outlines the main motivations for building a

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distributed system,
including: inherently
distributed applications
performance/cost resource
sharing flexibility and
extendibility availability
and fault tolerance
scalability Presenting
basic concepts, problems,
and possible solutions,
this reference serves
graduate students in
distributed system design
as well as computer
professionals analyzing
and designing
distributed/open/parallel
systems. Chapters discuss:
the scope of distributed
computing systems general

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distributed programming
languages and a CSP-like
distributed control
description language
(DCDL) expressing
parallelism, interprocess
communication and
synchronization, and fault-
tolerant design two
approaches describing a
distributed system: the
time-space view and the
interleaving view mutual
exclusion and related
issues, including
election, bidding, and
self-stabilization
prevention and detection
of deadlock reliability,
safety, and security as

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well as various methods of handling node, communication, Byzantine, and software faults efficient interprocessor communication mechanisms as well as these mechanisms without specific constraints, such as adaptiveness, deadlock-freedom, and fault-tolerance virtual channels and virtual networks load distribution problems synchronization of access to shared data while supporting a high degree of concurrency
This book constitutes the refereed proceedings of

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the 4th IFIP WG 6.1

International Conference

on Distributed

Applications and

Interoperable Systems,

DAIS 2003, held in Paris,

France, in November 2003.

The 21 revised full papers

and 6 revised short papers

presented were carefully

reviewed and selected from

a total of 88 submissions.

The papers are organized

in topical sections on

adaptation and separation

of concerns; deployment;

security and transactions;

replication; networking

and routing; discovery,

context-awareness, and

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ontologies; and
asynchronous messaging.