

The Internet Of Things Today And Tomorrow

This is a hands-on book about ArcGIS that you work with as much as read. By the end, using Learn ArcGIS lessons, you'll be able to say you made a story map, conducted geographic analysis, edited geographic data, worked in a 3D web scene, built a 3D model of Venice, and more.

Provides comprehensive coverage of the current state of IoT, focusing on data processing infrastructure and techniques Written by experts in the field, this book addresses the IoT technology stack, from connectivity through data platforms to end-user case studies, and considers the tradeoffs between business needs and data security and privacy throughout. There is a particular emphasis on data processing technologies that enable the extraction of actionable insights from data to inform improved decision making. These include artificial intelligence techniques such as stream processing, deep learning and knowledge graphs, as well as data interoperability and the key aspects of privacy, security and trust. Additional aspects covered include: creating and supporting IoT ecosystems; edge computing; data mining of sensor datasets; and crowd-sourcing, amongst others. The book also presents several sections featuring use cases across a range of application areas such as smart energy, transportation, smart factories, and more. The book concludes with a chapter on key considerations when deploying IoT technologies in the enterprise, followed by a brief review of future research directions and challenges. The Internet of Things: From Data to Insight Provides a comprehensive overview of the Internet of Things technology stack with focus on data driven aspects from data modelling and processing to presentation for decision making Explains how IoT technology is applied in practice and the benefits being delivered. Acquaints readers that are new to the area with concepts, components, technologies, and verticals related to and enabled by IoT Gives IoT specialists a deeper insight into data and decision-making aspects as well as novel technologies and application areas Analyzes and presents important emerging technologies for the IoT arena Shows how different objects and devices can be connected to decision making processes at various levels of abstraction The Internet of Things: From Data to Insight will appeal to a wide audience, including IT and network specialists seeking a broad and complete understanding of IoT, CIOs and CIO teams, researchers in IoT and related fields, final year undergraduates, graduate students, post-graduates, and IT and science media professionals.

This is a book for people who want to know what the future is going to look like and for people who want to know how to create the future. Gershensfeld offers a glimpse at the brave new post-computerized world, where microchips work for us instead of against us. He argues that we waste the potential of the microchip when we confine it to a box on our desk: the real electronic revolution will come when computers have all but disappeared into the walls around us. Imagine a digital book that looks like a traditional book printed on paper and is pleasant to read in bed but has all the mutability of a screen display. How about a personal fabricator that can organize digitized atoms into anything you want, or a musical keyboard that can be woven into a denim jacket? In When Things Start to Think, Gershensfeld tells the story of his Things that Think group at MIT's Media Lab, the group of innovative scientists and researchers dedicated to integrating digital technology into the fabric of our lives.

Take your idea from concept to production with this unique guide Whether it's called physical computing, ubiquitous computing, or the Internet of Things, it's a hot topic in technology: how to channel your inner Steve Jobs and successfully combine hardware, embedded software, web services, electronics, and cool design to create cutting-edge devices that are fun, interactive, and practical. If you'd like to create the next must-have product, this unique book is the perfect place to start. Both a creative and practical primer, it explores the platforms you can use to develop hardware or software, discusses design concepts that will make your products eye-catching and appealing, and shows you ways to scale up from a single prototype to mass production. Helps software engineers, web designers, product designers, and electronics engineers start designing products using the Internet-of-Things approach Explains how to combine sensors, servos, robotics, Arduino chips, and more with various networks or the Internet, to create interactive, cutting-edge devices Provides an overview of the necessary steps to take your idea from concept through production If you'd like to design for the future, Designing the Internet of Things is a great place to start.

The widespread availability of technologies has increased exponentially in recent years. This ubiquity has created more connectivity and seamless integration among technology devices. Emerging Trends and Applications of the Internet of Things is an essential reference publication featuring the latest scholarly research on the surge of connectivity between computing devices in modern society, as well as the benefits and challenges of this. Featuring extensive coverage on a broad range of topics such as cloud computing, spatial cognition, and ultrasonic sensing, this book is ideally designed for researchers, professionals, and academicians seeking current research on upcoming advances in the Internet of Things (IoT).

Rethinking the Internet of Things

Technology, Applications and Standardization

Swarm Intelligence for Resource Management in Internet of Things

From Integrated Circuits to Integrated Systems

Systems and Applications

Internet of Things – The Call of the Edge

Delivering Advanced Security Capabilities from Edge to Cloud for IoT

This book provides an overview of the emerging smart connected world, and discusses the roles and the usage of underlying semantic computing and Internet-of-Things (IoT) technologies. The book comprises ten chapters overall, grouped in two parts.

Part I “Smart Connected World: Overview and Technologies” consists of seven chapters and provides a holistic overview of the smart connected world and its supporting tools and technologies. Part II “Applications and Case Studies” consists of three chapters that describe applications and case studies in manufacturing, smart cities, health, and more. Each chapter is self-contained and can be read independently; taken together, readers get a bigger picture of the technological and application landscape of the smart connected world. This book is of interest for researchers, lecturers, and practitioners in Semantic Web, IoT and related fields. It can serve as a reference for instructors and students taking courses in hybrid computing getting abreast of cutting edge and future directions of a connected ecosystem. It will also benefit industry professionals like software engineers or data scientists, by providing a synergy between Web technologies and applications. This book covers the most important topics on the emerging field of the smart connected world. The contributions from leading active researchers and practitioners in the field are thought provoking and can help in learning and further research. The book is a valuable resource that will benefit academics and industry. It will lead to further research and advancement of the field. Bharat K. Bhargava, Professor of Computer Science, Purdue University, United States

Connect your organization to the Internet of Things with solid strategy and a proven implementation plan Building Internet of Things provides front-line business decision makers with a practical handbook for capitalizing on this latest transformation.

Focusing on the business implications of Internet of Things (IoT), this book describes the sheer impact, spread, and opportunities arising every day, and how business leaders can implement IoT today to realize tangible business advantages. The discussion delves into IoT from a business, strategy and organizational standpoint, and includes use-cases that illustrate the ripple effect that this latest disruption brings; you'll learn how to fashion a viable IoT plan that works with your organization's strategy and direction, and how to implement that strategy successfully by integrating IoT into your organization tomorrow. For business managers, the biggest question surrounding the Internet of Things is what to do with it. This book examines the way IoT is being used today—and will be used in the future—to help you craft a robust plan for your organization. Grasp the depth and breadth of the Internet of Things Create a secure IoT recipe that aligns with your company's strategy Capitalize on advances while avoiding disruption from others Leverage the technical, organizational, and social impact of IoT In the past five years, the Internet of Things has become the new frontier of technology that has everyone talking. It seems that almost every week a major vendor announces a new IoT strategy or division; is your company missing the boat? Learn where IoT fits into your organization, and how to turn disruption into profit with the expert guidance in Building the Internet of Things.

The Internet of Things (IoT) is one of the core technologies of current and future information and communications technology (ICT) sectors. IoT technologies will be deployed in numerous industries, including health, transport, smart cities, utility sectors, environment, security, and many other areas. In a manner suitable to a broad range of readers, this book introduces various key IoT technologies focusing on algorithms, process algebra, network architecture, energy harvesting, wireless communications, and network security. It presents IoT system design techniques, international IoT standards, and recent research outcomes relevant to the IoT system developments and provides existing and emerging solutions to the design and development of IoT platforms for multi-sector industries, particularly for Industry 4.0. The book also addresses some of the regulatory issues and design challenges related to IoT system deployments and proposes guidelines for possible future applications.

The definitive guide to hacking the world of the Internet of Things (IoT) – Internet connected devices such as medical devices, home assistants, smart home appliances and more. Drawing from the real-life exploits of five highly regarded IoT security researchers, Practical IoT Hacking teaches you how to test IoT systems, devices, and protocols to mitigate risk. The book begins by walking you through common threats and a threat modeling framework. You'll develop a security testing methodology, discover the art of passive reconnaissance, and assess security on all layers of an IoT system. Next, you'll perform VLAN hopping, crack MQTT authentication, abuse UPnP, develop an mDNS poisoner, and craft WS-Discovery attacks. You'll tackle both hardware hacking and radio hacking, with in-depth coverage of attacks against embedded IoT devices and RFID systems. You'll also learn how to: • Write a DICOM service scanner as an NSE module • Hack a microcontroller through the UART and SWD interfaces • Reverse engineer firmware and analyze mobile companion apps • Develop an NFC fuzzer using Proxmark3 • Hack a smart home by jamming wireless alarms, playing back IP camera feeds, and controlling a smart treadmill The tools and devices you'll use are affordable and readily available, so you can easily practice what you learn. Whether you're a security researcher, IT team member, or hacking hobbyist, you'll find Practical IoT Hacking indispensable in your efforts to hack all the things REQUIREMENTS: Basic knowledge of Linux command line, TCP/IP, and programming

This book provides an in-depth understanding of Internet of Things (IoT) technology. It highlights several of today's research and technological challenges of translating the concept of the IoT into a practical, technologically feasible, and business-viable solution. It introduces two novel technologies—sensor-cloud and fog computing—as the crucial enablers for the sensing and compute backbone of the IoT. The book discusses these two key enabling technologies of IoT that include a wide range of practical design issues and the futuristic possibilities and directions involving sensor networks and cloud and fog computing environments towards the realization and support of IoT. Classroom presentations and solutions to end of chapter questions are available to instructors who use the book in their classes.

Internet of Things A to Z

Getting Started with the Internet of Things

Designing IoT solutions with the IoT Architectural Reference Model

Technologies, Applications, Challenges and Solutions

Second IFIP International Cross-Domain Conference, IFIPIoT 2019, Tampa, FL, USA, October 31 – November 1, 2019, Revised Selected Papers

Emerging 2D Materials and Devices for the Internet of Things

The Cloud-to-Thing Continuum

Advancement in sensor technology, smart instrumentation, wireless sensor networks, miniaturization, RFID and information processing is helping towards the realization of Internet of Things (IoT). IoTs are finding applications in various area applications including environmental monitoring, intelligent buildings, smart grids and so on. This book provides design challenges of IoT, theory, various protocols, implementation issues and a few case study. The book will be very useful for postgraduate students and researchers to know from basics to implementation of IoT.

The term "Internet of Things" (IoT) refers to an ecosystem of interconnected physical objects and devices that are accessible through the Internet and can communicate with each other. The main strength of the IoT vision is the high impact it has created and will continue to do so on several aspects of the everyday life and behavior of its potential users. This book presents some of the state-of-the-art research work in the field of the IoT, especially on the issues of communication protocols, interoperability of protocols and semantics, trust security and privacy issues, reference architecture design, and standardization. It will be a valuable source of knowledge for researchers, engineers, practitioners, and graduate and doctoral students who are working in various fields of the IoT. It will also be useful for faculty members of graduate schools and universities.

How the Internet of Things will change your life: all you need to know, in plain English! The Internet of Things (IoT) won't just connect people: It will connect "smart" homes, appliances, cars, offices, factories, cities... the world. You need to know what's coming: It might just transform your life. Now, the world's #1 author of beginning technology books has written the perfect introduction to IoT for everyone. Michael Miller shows how connected smart devices will help people do more, do it smarter, do it faster. He also reveals the potential risks—to your privacy, your freedom, and maybe your life. Make no mistake: IoT is coming quickly. Miller explains why you care, helps you use what's already here, and prepares you for the world that's hurtling toward you. --What is IoT? How does it work? How will it affect me? --What's realistic, and what's just hype? --How smart is my "smart TV" really? (And, is it watching me?) --Can smart IoT devices make me healthier? --Will smart appliances ever be useful? --How much energy could I save with a smart home? --What's the future of wearable tech? --When will I have a self-driving car? --When will I have a nearly self-driving car? (Hint: Surprisingly soon.) --Is IoT already changing the way I shop? --What's the future of drones, at war and in my neighborhood? --Could smart cities lower my taxes? --Who gets the data my devices are collecting? --How can I privacy from the Internet of Things? --What happens when the whole world is connected? --Will I have any privacy left at all?

The Internet of Things offers massive societal and economic opportunities while at the same time significant challenges, not least the delivery and management of the technical infrastructure underpinning it, the deluge of data generated from it, ensuring privacy and security, and capturing value from it. This Open Access Pivot explores these challenges, presenting the state of the art and future directions for research but also frameworks for making sense of this complex area. This book provides a variety of perspectives on how technology innovations such as fog, edge and dew computing, 5G networks, and distributed intelligence are making us rethink conventional cloud computing to support the Internet of Things. Much of this book focuses on technical aspects of the Internet of Things, however, clear methodologies for mapping the business value of the Internet of Things are still missing. We provide a value mapping framework for the Internet of Things to address this gap. While there is much hype about the Internet of Things, we have yet to reach the tipping point. As such, this book provides a timely entrée for higher education educators, researchers and students, industry and policy makers on the technologies that promise to reshape how society interacts and operates. Theo Lynn is Full Professor of Digital Business at DCU Business School, Ireland and Director of the Irish Institute of Digital Business. John G. Mooney is Associate Professor of Information Systems and Technology Management at the Pepperdine Graziadio Business School, United States. Brian Lee is Director of the Software Research Institute at Athlone Institute of Technology. Patricia Takako Endo is a Postdoctoral Research Fellow at the Irish Institute of Digital Business, Dublin City University, Ireland, and a Professor at Universidade de Pernambuco, Brazil.

The book aims to provide a broad overview of various topics of the Internet of Things (IoT) from the research and development priorities to enabling technologies, architecture, security, privacy, interoperability and industrial applications. It is intended to be a stand-alone book in a series that covers the Internet of Things activities of the IERC - Internet of Things European Research Cluster - from technology to international cooperation and the global "state of play." The book builds on the ideas put forward by the European Research Cluster on the Internet of Things Strategic Research and Innovation Agenda and presents views and state of the art results on the challenges facing the research, development and deployment of IoT at the global level. Today we see the integration of Industrial, Business and Consumer Internet which is bringing together the Internet of People, Internet of Things, Internet of Energy, Internet of Vehicles, Internet of Media, Services and Enterprises in forming the backbone of the digital economy, the digital society and the foundation for the future knowledge and innovation based economy. These developments are supporting solutions for the emerging challenges of public health, aging population, environmental protection and climate change, the conservation of energy and scarce materials, enhancements to safety and security and the continuation and growth of economic prosperity. Penetration of smartphones and advances in nanoelectronics, cyber-physical systems, wireless communication, software, and Cloud computing technology will be the main drivers for IoT development. The IoT contribution is seen in the increased value of information created by the number of interconnections among things and the transformation of the processed information into knowledge shared into the Internet of Everything. The connected devices are part of ecosystems connecting people, processes, data, and things which are communicating in the Cloud using the increased storage and computing power while attempting to standardize communication and metadata. In this context, the next generation of Cloud computing technologies will need to be flexible enough to scale autonomously, adaptive enough to handle constantly changing connections and resilient enough to stand up to the huge flows of data that will occur. In 2025, analysts forecast that there will be six devices per human on the planet, which means around 50 billion more connected devices over the next 12 years. The Internet of Things market is connected to this anticipated device growth from industrial Machine to Machine (M2M) systems, smart meters and wireless sensors. Internet of Things technology will generate new services and new interfaces by creating smart environments and smart spaces with applications ranging from Smart Cities, Smart Transport, Buildings, Energy, Grid, to Smart Health and Life.

Everything Intelligent Everywhere

Emerging Trends and Applications of the Internet of Things

Designing the Internet of Things

Architectures, Security, and Applications

Enabling Things to Talk

The Internet of Things

When Things Start to Think

Master powerful techniques and approaches for securing IoT systems of all kinds—current and emerging Internet of Things (IoT) technology adoption is accelerating, but IoT presents complex new security challenges. Fortunately, IoT standards and standardized architectures are emerging to help technical professionals systematically harden their IoT environments. In Orchestrating and Automating Security for the Internet of Things, three Cisco experts show how to safeguard current and future IoT systems by delivering security through new NFV and SDN architectures and related IoT security standards. The authors first review the current state of IoT networks and architectures, identifying key security risks associated with nonstandardized early deployments and showing how early adopters have attempted to respond. Next, they introduce more mature architectures built around NFV and SDN. You'll discover why these lend themselves well to IoT and IoT security, and master advanced approaches for protecting them. Finally, the authors preview future approaches to improving IoT security and present real-world use case examples. This is an indispensable resource for all technical and security professionals, business security and risk managers, and consultants who are responsible for systems that incorporate or utilize IoT devices, or expect to be responsible for them. · Understand the challenges involved in securing current IoT networks and architectures · Master IoT security fundamentals, standards, and modern best practices · Systematically plan for IoT security · Leverage Software-Defined Networking (SDN) and Network Function Virtualization (NFV) to harden IoT networks · Deploy the advanced IoT platform, and use MANO to manage and orchestrate virtualized network functions · Implement platform security services including identity, authentication, authorization, and accounting · Detect threats and protect data in IoT environments · Secure IoT in the context of remote access and VPNs · Safeguard the IoT platform itself · Explore use cases ranging from smart cities and advanced energy systems to the connected car · Preview evolving concepts that will shape the future of IoT security

A guided tour through the Internet of Things, a networked world of connected devices, objects, and people that is changing the way we live and work. We turn on the lights in our house from a desk in an office miles away. Our refrigerator alerts us to buy milk on the way home. A package of cookies on the supermarket shelf suggests that we buy it, based on past purchases. The cookies themselves are on the shelf because of a "smart" supply chain. When we get home, the thermostat has already adjusted the temperature so that it's toasty or bracing, whichever we prefer. This is the Internet of Things—a networked world of connected devices, objects, and people. In this book, Samuel Greengard offers a guided tour through this emerging world and how it will change the way we live and work. Greengard explains that the Internet of Things (IoT) is still in its early stages. Smart phones, cloud computing, RFID (radio-frequency identification) technology, sensors, and miniaturization are converging to make possible a new generation of embedded and immersive technology. Greengard traces the origins of the IoT from the early days of personal computers and the Internet and examines how it creates the conceptual and practical framework for a connected world. He explores the industrial Internet and machine-to-machine communication, the basis for smart manufacturing and end-to-end supply chain visibility; the growing array of smart consumer devices and services—from Fitbit fitness wristbands to mobile apps for banking; the practical and technical challenges of building the IoT; and the risks of a connected world, including a widening digital divide and threats to privacy and security. Finally, he considers the long-term impact of the IoT on society, narrating an eye-opening "Day in the Life" of IoT connections circa 2025.

This book constitutes the refereed post-conference proceedings of the Second IFIP International Cross-Domain Conference on Internet of Things, IFIPIoT 2019, held in Tampa, USA, in October/ November 2019.

The 11 full papers presented were carefully reviewed and selected from 22 submissions. Also included in this volume are 8 invited papers. The papers are organized in the following topical sections: IoT applications; context reasoning and situational awareness; IoT security; smart and low power IoT; smart network architectures; and smart system design and IoT education.

This book explains IoT technology, its potential applications, the security and privacy aspects, the key necessities like governance, risk management, regulatory compliance needs, the philosophical aspects of this technology that are necessary to support an ethical, safe and secure digitally enhanced environment in which people can live smarter. It describes the inherent technology of IoT, the architectural components and the philosophy behind this emerging technology. Then it shows the various potential applications of the Internet of Things that can bring benefits to the human society.

Finally, it discusses various necessities to provide a secured and trustworthy IoT service.

This book presents a comprehensive framework for IoT, including its architectures, security, privacy, network communications, and protocols. The book starts by providing an overview of the aforementioned research topics, future directions and open challenges that face the IoT development. The authors then discuss the main architectures in the field, which include Three- and Five-Layer Architectures, Cloud and Fog Based Architectures, a Social IoT Application Architecture. In the security chapter, the authors outline threats and attacks, privacy preservation, trust and authentication, IoT data security, and social awareness. The final chapter presents case studies including smart home, wearables, connected cars, industrial Internet, smart cities, IoT in agriculture, smart retail, energy engagement, IoT in healthcare, and IoT in poultry and farming. Discusses ongoing research into the connection of the physical and virtual worlds; Includes the architecture, security, privacy, communications, and protocols of IoT; Presents a variety of case studies in IoT including wearables, smart cities, and energy management.

Smart Connected World

How the Internet of Things May Set Us Free Or Lock Us Up
Information, Sensing and Energy Applications

Internet of Things (IoT) in 5G Mobile Technologies
Technologies and Applications

Practical IoT Hacking

Building the Internet of Things

Rethinking the Internet of ThingsA Scalable Approach to Connecting EverythingApress

Emerging 2D Materials and Devices for the Internet of Things: Information, Sensing and Energy Applications summarizes state-of-the-art technologies in applying 2D layered materials, discusses energy and sensing device applications as essential infrastructure solutions, and explores designs that will make internet-of-things devices faster, more reliable and more accessible for the creation of mass-market products. The book focuses on information, energy and sensing applications, showing how different types of 2D materials are being used to create a new generation of products and devices that harness the capabilities of wireless technology in an eco-efficient, reliable way. This book is an important resource for both materials scientists and engineers, who are designing new wireless products in a variety of industry sectors. Explores how 2D materials are being used to create faster and more reliable wireless network solutions Discusses how graphene-based nanocomposites are being used for energy harvesting and storage applications Outlines the major challenges for integrating 2D materials in electronic sensing devices

Enterprise Information Architecture for a New Age: Big Data and The Internet of Things, provides guidance in designing an information architecture to accommodate increasingly large amounts of data, massively large amounts of data, not only from traditional sources, but also from novel sources such everyday objects that are fast becoming wired into global Internet. No business can afford to be caught out by missing the value to be mined from the increasingly large amounts of available data generated by everyday devices. The text provides background as to how analytical solutions and enterprise architecture methodologies and concepts have evolved (including the roles of data warehouses, business intelligence tools, predictive analytics, data discovery, Big Data, and the impact of the Internet of Things). Then you ' re taken through a series of steps by which to define a future state architecture and create a plan for how to reach that future state. Enterprise Information Architecture for a New Age: Big Data and The Internet of Things helps you gain an understanding of the following: Implications of Big Data from a variety of new data sources (including data from sensors that are part of the Internet of Things) upon an information architecture How establishing a vision for data usage by defining a roadmap that aligns IT with line-of-business needs is a key early step The importance and details of taking a step-by-step approach when dealing with shifting business challenges and changing technology capabilities How to mitigate risk when evaluating existing infrastructure and designing and deploying new infrastructure Enterprise Information Architecture for a New Age: Big Data and The Internet of Things combines practical advice with technical considerations. Author Robert Stackowiak and his team are recognized worldwide for their expertise in large data solutions, including analytics. Don ' t miss your chance to read this book and gain the benefit of their advice as you look forward in thinking through your own choices and designing your own architecture to accommodate the burgeoning explosion in data that can be analyzed and converted into valuable information to drive your business forward toward success.

Internet of Things (IoT) is a recent technology paradigm that creates a global network of machines and devices that are capable of communicating with each other. Security cameras, sensors, vehicles, buildings, and software are examples of devices that can exchange data between each other. IoT is recognized as one of the most important areas of future technologies and is gaining vast recognition in a wide range of applications and fields related to smart homes and cities, military, education, hospitals, homeland security systems, transportation and autonomous connected cars, agriculture, intelligent shopping systems, and other modern technologies. This book explores the most important IoT automated and smart applications to help the reader understand the principle of using IoT in such applications.

Internet of Things (IoT) is a new platform of various physical objects or " things equipped with sensors, electronics, smart devices, software, and network connections. IoT represents a new revolution of the Internet network which is driven by the recent advances of technologies such as sensor networks (wearable and implantable), mobile devices, networking, and cloud computing technologies. IoT permits these the smart devices to collect, store and analyze the collected data with limited storage and processing capacities. Swarm Intelligence for Resource Management in the Internet of Things presents a new approach in Artificial Intelligence that can be used for resources management in IoT, which is considered a critical issue for this network. The authors demonstrate these resource management applications using swarm intelligence techniques. Currently, IoT can be used in many important applications which include healthcare, smart cities, smart homes, smart hospitals, environment monitoring, and video surveillance. IoT devices cannot perform complex on-site data processing due to their limited battery and processing. However, the major processing unit of an application can be transmitted to other nodes, which are more powerful in terms of storage and processing. By applying swarm intelligence algorithms for IoT devices, we can provide major advantages for energy saving in IoT devices. Swarm Intelligence for Resource Management in the Internet of Things shows the reader how to overcome the problems and challenges of creating and implementing swarm intelligence algorithms for each application Examines the development and application of swarm intelligence systems in artificial intelligence as applied to the Internet of Things Discusses intelligent techniques for the implementation of swarm intelligence in IoT Prepared for researchers and specialists who are interested in the use and integration of IoT and cloud computing technologies

Connecting Sensors and Microcontrollers to the Cloud

Implement New Business Models, Disrupt Competitors, Transform Your Industry

Converging Technologies for Smart Environments and Integrated Ecosystems

From Data to Insight

Pax Technica

Enabling the Internet of Things

A Scalable Approach to Connecting Everything

This hands-on introductory guide will quickly show how to program embedded devices using the .NET Micro Framework and the Netduino Plus board, and then connect these devices to the Internet using Pachube, a cloud platform for sharing real-time sensor data.

The Internet of Things (IoT) is transforming the way organizations communicate, collaborate, and coordinate. This report suggests ways in which the U.S. military could better leverage the IoT to improve efficiency and effectiveness.

The term IoT, which was first proposed by Kevin Ashton, a British technologist, in 1999 has the potential to impact everything from new product opportunities to shop floor optimization to factory worker efficiency gains, that will power top-line and bottom-line gains. As IoT technology is being put to diversified use, the current technology needs to be improved to enhance privacy and built secure devices by adopting a security-focused approach, reducing the amount of data collected, increasing transparency and providing consumers with a choice to opt out. Therefore, the current volume has been compiled, in an effort to draw the various issues in IoT, challenges faced and existing solutions so far. Key Points: • Provides an overview of basic concepts and technologies of IoT with communication technologies ranging from 4G to 5G and its architecture. • Discusses recent security and privacy studies and social behavior of human beings over IoT. • Covers the issues related to sensors, business model, principles, paradigms, green IoT and solutions to handle relevant challenges. • Presents the readers with practical ideas of using IoT, how it deals with human dynamics, the ecosystem, the social objects and their relation. • Deals with the challenges involved in surpassing diversified architecture, protocol, communications, integrity and security.

Apress is proud to announce that Rethinking the Internet of Things was a 2014 Jolt Award Finalist, the highest honor for a programming book. And the amazing part is that there is no code in the book. Over the next decade, most devices connected to the Internet will not be used by people in the familiar way that personal computers, tablets and smart phones are. Billions of interconnected devices will be monitoring the environment, transportation systems, factories, farms, forests, utilities, soil and weather conditions, oceans and resources. Many of these sensors and actuators will be networked into autonomous sets, with much of the information being exchanged machine-to-machine directly and without human involvement. Machine-to-machine communications are typically terse. Most sensors and actuators will report or act upon small pieces of information - "chirps". Burdening these devices with current network protocol stacks is inefficient, unnecessary and unduly increases their cost of ownership. This must change. The architecture of the Internet of Things must evolve now by incorporating simpler protocols toward at the edges of the network, or remain forever inefficient. Rethinking the Internet of Things describes reasons why we must rethink current approaches to the Internet of Things. Appropriate architectures that will coexist with existing networking protocols are described in detail. An architecture comprised of integrator functions, propagator nodes, and end devices, along with their interactions, is explored. What you'll learn Discusses the difference between the "normal" Internet and the Internet of Things. Describes a new architecture and its components in the "chirp" context. Explains the shortcomings of IP for IoT. Describes the anatomy of the IoT. Describes how to build a suitable network to maximize the amazing potential of the IoT. Who this book is for Thought leaders, executives, architectural, standards and development leaders in the evolving IoT industry. Corporations and organizations whose commercial products could be adapted simply to be functioning devices on the IoT while saving billions of dollars in unnecessary costs or proprietary designs. Those who wish to capitalize on technology change and those interested in the Internet, its capabilities and the need to improve it. Table of ContentsForeword Preface Chapter Goal: The reader will understand the new demands and opportunities of the Internet of Things (IoT). The preface introduces the idea of a new, simplified architectural approach that draws on nature. Chapter 1: It's Different Out Here Chapter Goal: Reader should understand the difference between traditional Internet networking and the Internet of Things. What are the unique characteristics of the IoT that demand a new architecture? Why traditional architectures such as IP are a poor fit. Characteristics of an IoT-optimized architecture. Chapter 2: Anatomy of the Internet of Things Chapter Goal: Reader will understand the underlying principles of the emerging IoT architecture. Fundamental concepts are: the division of networking complexity among different devices; the make-up of the "Chirp" and how they are propagated; distinctions between transport and functional topologies; the concept of neighborhoods or zones of interest. Chapter 3: On the Edge Chapter Goal: Reader will learn the principles and characteristics of the End Devices in the IoT and how these will often differ from our present understanding of the Smartphone, tablet, and laptop. How the minimal networking needs of many IoT devices dictate elements of the architecture. Chapter 4: Building a Web of Things Chapter Goal: Reader will learn the characteristics and functionality of the Propagator node in the IoT Architecture. Some communications principles are introduced which will be more fully explored in Chapter 6. Chapter 5: Small Data, Big Data, and Human Interaction Chapter Goal: Reader will understand the role of integrator functions in the IoT, the point in the IoT where humans interact to gain information from IoT data and to set parameters and control end devices. An explanation of zones of interest and neighborhoods, with a discussion of incorporating "small data" from chirps into big data analysis. Chapter 6: An Architecture for the Frontier Chapter Goal: Reader will gain an understanding of the challenges inherent in a communications architecture for the massive scale of the IoT. Exploiting the opportunities inherent in a machine-to-machine environment, a much simpler architecture is described in detail that readily scales to the required scope. This chapter adds technical depth to ideas introduced in Chapters 3-5. Chapter 7: IoT Examples and Applications Chapter Goal: Reader will learn about current and emerging applications in the Internet of Things. Reference wile b made to new applications enabled by the simpler architecture described in this book that are difficult or not possible with traditional networking protocols. Chapter 8: Blueprint to the Internet of Things Chapter Goal: Exploring the steps to IoT deployment. Standards based versus ad hoc approaches, call for industry cooperation and consortia.

Intermediate incremental steps to broader adoption.

This book reports on the latest advances in the modeling, analysis and efficient management of information in Internet of Things (IoT) applications in the context of 5G access technologies. It presents cutting-edge applications made possible by the implementation of femtocell networks and millimeter wave communications solutions, examining them from the perspective of the universally and constantly connected IoT. Moreover, it describes novel architectural approaches to the IoT and presents the new framework possibilities offered by 5G mobile networks, including middleware requirements, node-centrality and the location of extensive functionalities at the edge. By providing researchers and professionals with a timely snapshot of emerging mobile communication systems, and highlighting the main pitfalls and potential solutions, the book fills an important gap in the literature and will foster the further developments of 5G hosting IoT devices.

Internet of Things

Enterprise Information Architecture for A New Age

Technologies and Applications Shaping the Future

The Definitive Guide to Attacking the Internet of Things

How Smart TVs, Smart Cars, Smart Homes, and Smart Cities Are Changing the World

10 Big Ideas about Applying the Science of where

This book offers the first comprehensive view on integrated circuit and system design for the Internet of Things (IoT), and in particular for the tiny nodes at its edge. The authors provide a fresh perspective on how the IoT will evolve based on recent and foreseeable trends in the semiconductor industry, highlighting the key challenges, as well as the opportunities for circuit and system innovation to address them. This book describes what the IoT really means from the design point of view, and how the constraints imposed by applications translate into integrated circuit requirements and design guidelines. Chapter contributions equally come from industry and academia. After providing a system perspective on IoT nodes, this book focuses on state-of-the-art design techniques for IoT applications, encompassing the fundamental sub-systems encountered in Systems on Chip for IoT: ultra-low power digital architectures and circuits low- and zero-leakage memories (including emerging technologies) circuits for hardware security and authentication System on Chip design methodologies on-chip power management and energy harvesting ultra-low power analog interfaces and analog-digital conversion short-range radios miniaturized battery technologies packaging and assembly of IoT integrated systems (on silicon and non-silicon substrates). As a common thread, all chapters conclude with a prospective view on the foreseeable evolution of the related technologies for IoT. The concepts developed throughout the book are exemplified by two IoT node system demonstrations from industry. The unique balance between breadth and depth of this book: enables expert readers quickly to develop an understanding of the specific challenges and state-of-the-art solutions for IoT, as well as their evolution in the foreseeable future provides non-experts with a comprehensive introduction to integrated circuit design for IoT, and serves as an excellent starting point for further learning, thanks to the broad coverage of topics and selected references makes it very well suited for practicing engineers and scientists working in the hardware and chip design for IoT, and as textbook for senior undergraduate, graduate and postgraduate students (familiar with analog and digital circuits). Securing the Internet of Things provides network and cybersecurity researchers and practitioners with both the theoretical and practical knowledge they need to know regarding security in the Internet of Things (IoT). This booming field, moving from strictly research to the marketplace, is advancing rapidly, yet security issues abound. This book explains the fundamental concepts of IoT security, describing practical solutions that account for resource limitations at IoT end-node, hybrid network architecture, communication protocols, and application characteristics. Highlighting the most important potential IoT security risks and threats, the book covers both the general theory and practical implications for people working in security in the Internet of Things. Helps researchers and practitioners understand the security architecture in IoT and the state-of-the-art in IoT security countermeasures Explores how the threats in IoT are different from traditional ad hoc or infrastructural networks Provides a comprehensive discussion on the security challenges and solutions in RFID, WSNs, and IoT Contributed material by Dr. Imed Romdhani

A comprehensive overview of the Internet of Things' core concepts, technologies, and applications Internet of Things A to Z offers a holistic approach to the Internet of Things (IoT) model. The Internet of Things refers to uniquely identifiable objects and their virtual representations in an Internet-like structure. Recently, there has been a rapid growth in research on IoT communications and networks, that confirms the scalability and broad reach of the core concepts. With contributions from a panel of international experts, the text offers insight into the ideas, technologies, and applications of this subject. The authors discuss recent developments in the field and the most current and emerging trends in IoT. In addition, the text is filled with examples of innovative applications and real-world case studies. Internet of Things A to Z fills the need for an up-to-date volume on the topic. This important book: Covers in great detail the core concepts, enabling technologies, and implications of the Internet of Things Addresses the business, social, and legal aspects of the Internet of Things Explores the critical topic of security and privacy challenges for both individuals and organizations Includes a discussion of advanced topics such as the need for standards and interoperability Contains contributions from an international group of experts in academia, industry, and research Written for ICT researchers, industry professionals, and lifetime IT learners as well as academics and students, Internet of Things A to Z provides a much-needed and comprehensive resource to this burgeoning field.

"Written by prominent thought leaders in the global FinTech investment space, The LegalTech Book aggregates diverse expertise into a single, informative volume. Key industry developments are explained in detail, and critical insights from cutting-edge practitioners offer first-hand information and lessons learned. Coverage includes: The current status of LegalTech, why now is the time for it to boom, the drivers behind it, and how it relates to FinTech, RegTech, InsurTech and WealthTech Applications of AI, machine learning and deep learning in the practice of law; e-discovery and due diligence; AI as a legal predictor LegalTech making the law accessible to all; online courts, online dispute resolution The Uberization of the law; hiring and firing through apps Lawbots; social media meets legal advice To what extent does LegalTech make lawyers redundant? Cryptocurrencies, distributed ledger technology and the law The Internet of Things, data privacy, automated contracts Cybersecurity and data Technology vs. the law; driverless cars and liability, legal rights of robots, ownership rights over works created by technology Legislators as innovators"--

Presents an Cyber-Assurance approach to the Internet of Things (IoT) This book discusses the cyber-assurance needs of the IoT environment, highlighting key information assurance (IA) IoT issues and identifying the associated security implications. Through contributions from cyber-assurance, IA, information security and IoT industry practitioners and experts, the text covers fundamental and advanced concepts necessary to grasp current IA issues, challenges, and solutions for the IoT. The future trends in IoT infrastructures, architectures and applications are also examined. Other topics discussed include the IA protection of IoT systems and information being stored, processed or transmitted from unauthorized access or modification of machine-2-machine (M2M) devices, radio-frequency identification (RFID) networks, wireless sensor networks, smart grids, and supervisory control and data acquisition (SCADA) systems. The book also discusses IA measures necessary to detect, protect, and defend IoT information and networks/systems to ensure their availability, integrity, authentication, confidentiality, and non-repudiation. Discusses current research and emerging trends in IA theory, applications, architecture and information security in the IoT based on theoretical aspects and studies of practical applications Aids readers in understanding how to design and build cyber-assurance into the IoT Exposes engineers and designers to new strategies and emerging standards, and promotes active development of cyber-assurance Covers challenging issues as well as potential solutions, encouraging discussion and debate amongst those in the field Cyber-Assurance for the Internet of Things is written for researchers and professionals working in the field of wireless technologies, information security architecture, and security system design. This book will also serve as a reference for professors and students involved in IA and IoT networking. Tyson T. Brooks is an Adjunct Professor in the School of Information Studies at Syracuse University; he also works with the Center for Information and Systems Assurance and Trust (CISAT) at Syracuse University, and is an information security technologist and science-practitioner. Dr. Brooks is the founder/Editor-in-Chief of the International Journal of Internet of Things and Cyber-Assurance, an associate editor for the Journal of Enterprise Architecture, the International Journal of Cloud Computing and Services Science, and the International Journal of Information and Network Security.

Cyber-Assurance for the Internet of Things

The Legal Technology Handbook for Investors, Entrepreneurs and FinTech Visionaries

Securing the Internet of Things

How Smart TVs, Smart Cars, Smart Homes, and Smart Cities are Changing the World

Integrating Digital Technology into the Fabric of Our Lives

Frameworks for Enabling and Emerging Technologies

The Enabling Technologies for the Internet of Things

Today, Internet of Things (IoT) is ubiquitous as it is applied in practice in everything from Industrial Control Systems (ICS) to e-Health, e-commerce, Cyber Physical Systems (CPS), smart cities, smart parking, healthcare, supply chain management and many more. Numerous industries, academics, alliances and standardization organizations make an effort on IoT standardization, innovation and development. But there is still a need for a comprehensive framework with integrated standards under one IoT vision. Furthermore, the existing IoT systems are vulnerable to huge range of malicious attacks owing to the massive numbers of deployed IoT systems, inadequate data security standards and the resource-constrained nature. Existing security solutions are insufficient and therefore it is necessary to enable the IoT devices to dynamically counter the threats and save the system. Apart from illustrating the diversified IoT applications, this book also addresses the issue of data safekeeping along with the development of new security-enhancing schemes such as blockchain, as well as a range of other advances in IoT. The reader will discover that the IoT facilitates a multidisciplinary approach dedicated to create novel applications and develop integrated solutions to build a sustainable society. The innovative and fresh advances that demonstrate IoT and computational intelligence in practice are discussed in this book, which will be helpful and informative for scientists, research scholars, academicians, policymakers, industry professionals, government organizations and others. This book is intended for a broad target audience, including scholars of various generations and disciplines, recognized scholars (lecturers and professors) and young researchers (postgraduate and undergraduates) who study the legal and socio-economic consequences of the emergence and dissemination of digital technologies such as IoT. Furthermore, the book is intended for researchers, developers and operators working in the field of IoT and eager to comprehend the vulnerability of the IoT paradigm. The book will serve as a comprehensive guide for the advanced-level students in computer science who are interested in understanding the severity and implications of the accompanied security issues in IoT. Dr. Bharat Bhushan is an Assistant Professor of Department of Computer Science and Engineering (CSE) at School of Engineering and Technology, Sharda University, Greater Noida, India. Prof. (Dr.) Sudhir Kumar Sharma is currently a Professor and Head of the Department of Computer Science, Institute of Information Technology & Management affiliated to GGSIPU, New Delhi, India. Prof. (Dr.) Bhuvan Unhelkar (BE, MDBA, MSc, PhD; FACS; PSM-I, CBAP®) is an accomplished IT professional and Professor of IT at the University of South Florida, Sarasota-Manatee (Lead Faculty). Dr. Muhammad Fazal Ijaz is working as an Assistant Professor in Department of Intelligent Mechatronics Engineering, Sejong University, Seoul, Korea. Prof. (Dr.) Lamia Karim is a professor of computer science at the National School of Applied Sciences Berrechid (ENSAB), Hassan 1st University.

A technology expert describes a possible future, and its repercussions in the area of privacy, social control and political manipulation, of a world where more and more things, like eyeglasses, thermostats and home security systems are reliant on the Internet.

A practical, indispensable security guide that will navigate you through the complex realm of securely building and deploying systems in our IoT-connected world About This Book Learn to design and implement cyber security strategies for your organization Learn to protect cyber-physical systems and

utilize forensic data analysis to beat vulnerabilities in your IoT ecosystem Learn best practices to secure your data from device to the cloud Gain insight into privacy-enhancing techniques and technologies Who This Book Is For This book targets IT Security Professionals and Security Engineers (including pentesters, security architects and ethical hackers) who would like to ensure security of their organization's data when connected through the IoT. Business analysts and managers will also find it useful. What You Will Learn Learn how to break down cross-industry barriers by adopting the best practices for IoT deployments Build a rock-solid security program for IoT that is cost-effective and easy to maintain Demystify complex topics such as cryptography, privacy, and penetration testing to improve your security posture See how the selection of individual components can affect the security posture of the entire system Use Systems Security Engineering and Privacy-by-design principles to design a secure IoT ecosystem Get to know how to leverage the burdgening cloud-based systems that will support the IoT into the future. In Detail With the advent of Intenet of Things (IoT), businesses will be faced with defending against new types of threats. The business ecosystem now includes cloud computing infrastructure, mobile and fixed endpoints that open up new attack surfaces, a desire to share information with many stakeholders and a need to take action quickly based on large quantities of collected data. . It therefore becomes critical to ensure that cyber security threats are contained to a minimum when implementing new IoT services and solutions. . The interconnectivity of people, devices, and companies raises stakes to a new level as computing and action become even more mobile, everything becomes connected to the cloud, and infrastructure is strained to securely manage the billions of devices that will connect us all to the IoT. This book shows you how to implement cyber-security solutions, IoT design best practices and risk mitigation methodologies to address device and infrastructure threats to IoT solutions. This book will take readers on a journey that begins with understanding the IoT and how it can be applied in various industries, goes on to describe the security challenges associated with the IoT, and then provides a set of guidelines to architect and deploy a secure IoT in your Enterprise. The book will showcase how the IoT is implemented in early-adopting industries and describe how lessons can be learned and shared across diverse industries to support a secure IoT. Style and approach This book aims to educate readers on key areas in IoT security. It walks readers through engaging with security challenges and then provides answers on how to successfully manage IoT security and build a safe infrastructure for smart devices. After reading this book, you will understand the true potential of tools and solutions in order to build real-time security intelligence on IoT networks.

This book provides an overview of the Internet of Things (IoT) ¶ covering new ideas, concepts, research and innovation to enable the development of IoT technologies in a global context. The work is intended as a standalone book in a series covering the activities of the Internet of Things European Research Cluster (IERC) ¶ including research, technological innovation, validation, and deployment. The book chapters build on the developments and innovative ideas put forward by the IERC, the IoT European Large-Scale Pilots Programme and the IoT European Security and Privacy Projects ¶ presenting new concepts, ideas and future IoT trends and ways of integrating open data frameworks and IoT marketplaces into larger deployment ecosystems. The IoT and Industrial Internet of Things technologies are moving towards hyperautomated solutions ¶ combining hyperconnectivity, artificial intelligence (AI), distributed ledger technologies and virtual/augmented extended reality, with edge computing and deep edge processing becoming an assertive factor across industries for implementing intelligent distributed computing resources and data to keep the efficient data exchange and processing local to reduce latency, exploit the sensing/actuating capabilities and enable greater autonomy. Expanding the adoption of consumer, business, industrial and tactile IoT requires further development of hyperautomated IoT concepts for collaborative solutions involving machines and humans to expand augmented creativity at the application level using AI to optimise the industrial processes and progress towards a symbiotic economy based on distributed federated cloud/edge infrastructure allowing resource sharing in the form of computing, memory and analytics capabilities. The advances of autonomous IoT applications delivering services in real-time encompasses development in servitisation, robotisation, automation and hyperconnectivity, which are essential for the rapid evolution of industrial enterprises in the new digital era. The rise of digital twins integrated into IoT platforms as fully interactive elements embedded into the simulation and optimisation environment, as well as the embedment of AI techniques and methods, enhances the accuracy and performance of models in the various IoT and Industrial Internet of Things applications. The convergence of technologies to provide scalable, interoperable IoT-enabled applications pushed the requirements for high bandwidth, low latency and robust and dependable connectivity to support the industry's demand for deeper integration and improved analytics to deliver sustainable competitive advantage products and services, enabling digital transformation with a focus on new business models.Safety and security are interlinked for the next wave of IoT technologies and applications and combined, prove a greater value for rapid adoption. The new IoT technologies are essential for facilitating sustainable development, reducing energy consumption and, by supporting the optimisation of products and processes, mitigating unnecessary carbon emissions ¶ thereby reducing the environmental impact through real-time data collection, analysis, exchange, and processing. The old Internet typically connected personal computers. But a radically new Internet is emerging. Some call it an "Internet of Things" (IoT) or "Internet of Everything" (IoE). The IoT won't just connect people; it'll connect "smart" homes, appliances, cars, aircraft (a.k.a. drones)¶ offices, factories, cities¶ the world. By some estimates, the IoE will explode into a \$19 trillion market in just a few years. If that happens¶ when that happens!¶ it will transform your life. ¿ You need to know what's coming. But, until now, most guides to the Internet of Everything have been written for technical experts. Now, the world's #1 author of beginning technology books has written the perfect introduction for every consumer and citizen. In The Internet of Things, Michael Miller reveals how a new generation of autonomously connected smart devices is emerging, and how it will enable people and devices to do more things, more intelligently, and more rapidly. ¿ Miller demystifies every type of smart device, both current and future. Each chapter ends with a special "...and You" section, offering up-to-the-minute advice for using today's IoE technologies or preparing for tomorrow's. ¿ You'll also discover the potential downsides and risks associated with intelligent, automatic interaction. When all your devices can communicate with each other (and with the companies that sell and monitor them), how private is your private life? Do the benefits outweigh the risks? And what does a connected world do when the connections suddenly go down? Packed with scenarios and insider interviews,The Internet of Things makes our future utterly, vividly real.

The ArcGIS Book

Challenges and Opportunities

Orchestrating and Automating Security for the Internet of Things

Internet of Things (IoT)

Opportunities and Challenges in Cloud, Fog and Edge Computing

Towards the Internet of Things

Sensors, Cloud, and Fog

The Internet of Things (IoT) is an emerging network superstructure that will connect physical resources and actual users. It will support an ecosystem of smart applications and services bringing hyper-connectivity to our society by using augmented and rich interfaces. Whereas in the beginning IoT referred to the advent of barcodes and Radio Frequency Identification (RFID), which helped to automate inventory, tracking and basic identification, today IoT is characterized by a dynamic trend toward connecting smart sensors, objects, devices, data and applications. The next step will be "cognitive IoT," facilitating object and data re-use across application domains and leveraging hyper-connectivity, interoperability solutions and semantically enriched information distribution. The Architectural Reference Model (ARM), presented in this book by the members of the IoT-A project team driving this harmonization effort, makes it possible to connect vertically closed systems, architectures and application areas so as to create open interoperable systems and integrated environments and platforms. It constitutes a foundation from which software companies can capitalize on the benefits of developing consumer-oriented platforms including hardware, software and services. The material is structured in two parts. Part A introduces the general concepts developed for and applied in the ARM. It is aimed at end users who want to use IoT technologies, managers interested in understanding the opportunities generated by these novel technologies, and system architects who are interested in an overview of the underlying basic models. It also includes several case studies to illustrate how the ARM has been used in real-life scenarios. Part B then addresses the topic at a more detailed technical level and is targeted at readers with a more scientific or technical background. It provides in-depth guidance on the ARM, including a detailed description of a process for generating concrete architectures, as well as reference manuals with guidelines on how to use the various models and perspectives presented to create a concrete architecture. Furthermore, best practices and tips on how system engineers can use the ARM to develop specific IoT architectures for dedicated IoT solutions are illustrated and exemplified in reverse mapping exercises of existing standards and platforms.

Internet of Things (IoT) for Automated and Smart Applications

Practical Internet of Things Security

The LegalTech Book

Internet of Things. A Confluence of Many Disciplines

Big Data and The Internet of Things

Internet of Things, for Things, and by Things

Leveraging the Internet of Things for a More Efficient and Effective Military