



Internet of Things - IoT Training

About Cognixia

Cognixia- A Digital Workforce Solutions Company is dedicated to delivering exceptional trainings and certifications in digital technologies. Founded in 2014, we provide interactive, customized training courses to individuals and organizations alike, and have served more than 100,000 professionals across 37 countries worldwide.

Our team of more than 4,500 industry experts facilitate more than 400 comprehensive digital technologies courses, along with state-of-the-art infrastructure, to deliver the best learning experience for everyone. Our comprehensive series of instructor-led online trainings, classroom trainings and on-demand self-paced online trainings cover a wide array of specialty areas, including all of the following:

- IoT
- Big Data
- Cloud Computing
- Cyber Security
- Machine Learning
- AI & Deep Learning
- Blockchain Technologies
- DevOps

Cognixia is ranked amongst the top five emerging technologies training companies by various prestigious bodies. We're also an MAPR Advantage Partner, Hortonworks Community Partner, RedHat Enterprise Partner, Microsoft Silver Learning Partner and an authorized training partner for Dell EMC, Pivotal, VMware and RSA technologies.



OUR AWARDS & AFFILIATIONS

 **Best Workplace Amongst Emerging Enterprises** Awarded By
Great Indian Workplace Awards – 2018
Mumbai, India



 **Best Training Provider of the Year**
Awarded By
The Golden Globe Tiger Awards – 2018
Kuala Lumpur, Malaysia



World HRD Congress has awarded
for Excellence in Training (Asia) 



Cognixia is awarded as
Training Company of the Year, 2018



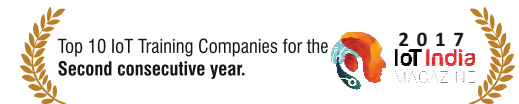
ISO 9001:2015 Certified
Quality Management System



ISO/IEC 27001:2013 Certified
Information Security Management System



Best Emerging Technology Training Organization
at the Middle East Training &
Development Leadership Awards 2018



AUTHORIZED TRAINING PARTNERS FOR



Red Hat



Silver
**Microsoft
Partner**



WHO SHOULD STUDY INTERNET OF THINGS

There are certain software/hardware skills which can prove beneficial for developers in an IoT environment.

Being a software developer allows a professional to program in various languages ranging from low-level assembly languages like C or C++ to high-level languages such as Java or Node.js. Besides these, the knowledge of communication protocol is also required. As far as the knowledge of hardware is concerned, one must have a basic understanding of electronics. To know how basic components such as capacitors, resistors, and LEDs work in a circuit is quite important.

In addition to basic hardware and software knowledge, an IoT developer must be able to read data sheets, and have a knowhow of timing diagrams, clocking, logic gates and transistors. Apart from software and hardware engineers, there are IT professionals, designers and solution architects who can become IoT Developers. Fresh IT graduates can also opt for a career in IoT Development.

ELIGIBILITY / PRE-REQUISITES

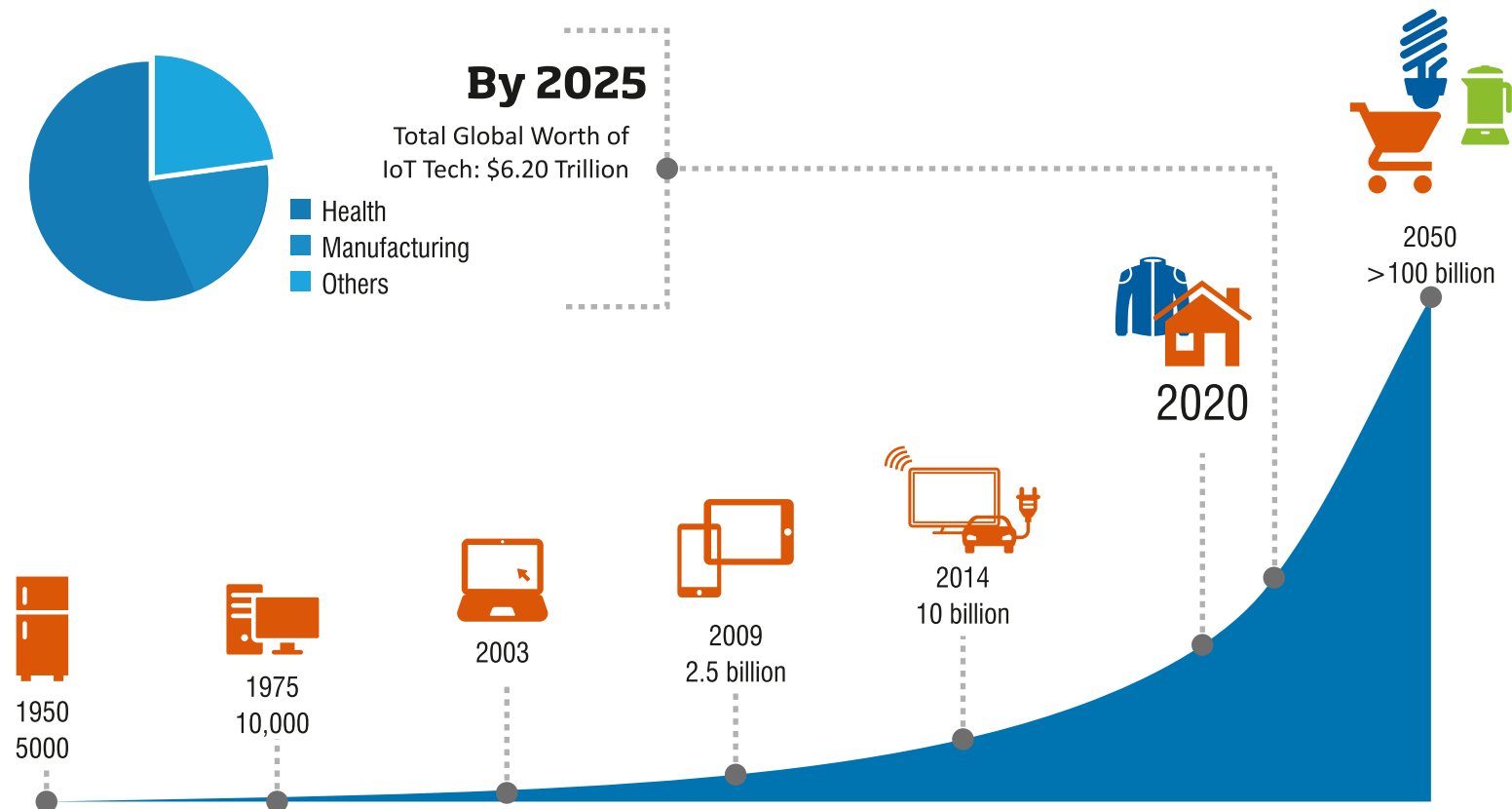
Basic Computer Knowledge.

Knowledge of C / C++ / Embedded C would be beneficial, however, not mandatory.



THE WORLD OF INTERNET OF THINGS

Internet of Things is an interconnected network of objects equipped with sensors, microcomputers, actuators and communication interfaces open to exchange data and control signals. Ubiquitous availability of internet, unprecedented fall in cost of sensors, and highly integrated high-performance SoC (System on Chip) computing solutions are key driving forces behind massive growth of IoT. Several research reports estimate number of connected things will be more than 50 billion by 2020. In the industrial sectors, convergence of IT and OT technologies has created tremendous opportunities for businesses to innovate in terms of services, products and consumer experiences. Internet research firm IDC foresees IoT development pending to touch \$1.7 Trillion by 2020. Moreover, massive adoption of IoT in consumer and enterprise sectors will create more than 2 billion jobs in coming years.



LATEST TRENDS IN INTERNET OF THINGS

"Mainstream vendors such as Cisco Systems CSCO, Dell EMC and Hewlett Packard Enterprise (HPE) will recognize this and push smarter IoT edge devices." Forbes

"6.4 billion new connected things will be in use in 2016." Gartner

"McKinsey forecasts an economic impact of as much as \$11.1 trillion per year in 2025 with its analysis of IoT applications leading to high job opportunities." McKinsey



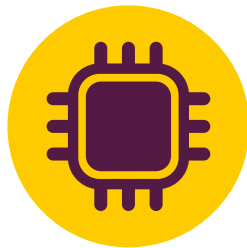
PROGRAM STRUCTURE & PLATFORMS



48 hours live online training with an Industry Expert Instructor



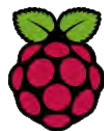
POC support and multiple assignments to gain thorough understanding



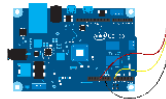
Training within IoT Ecosystem



ARDUINO



RASPBERRY PI



SENSORS



WIFI MODULE



BREADBOARD



BLUETOOTH MODULE



NODEMCU

LEARNING OUTCOME

- In depth understanding of IoT system, architectures, components and supporting technologies
- Architecting end to end IoT system.
- Understanding business needs and translating requirements into supporting architecture and models.
- Analyzing existing business processes to understand and build technical strategy to develop need aligned technical solutions.
- Understanding available technologies and selection criteria to define integrated solutions addressing scalability, interoperability and reliability.
- Translation of customer requirements into technical specifications and Developing proof of concepts and prototypes
- Expert level knowledge of IoT technology, tools and trends.
- Sound understanding of core concepts, background technologies and sub-domains of IoT.
- Knowledge and skills of sensors, microcontrollers, Single Board Computers (SBCs) - Raspberry Pi as prototyping platform and communication interfaces (WiFi/Bluetooth) to design and build IoT devices.
- Knowledge and skills to design and build network based on client-server and publish-subscribe to connect, collect data, monitor and manage assets.
- Knowledge and skill to write device, gateway and server side scripts and apps to aggregate and analyze sensor data.
- Knowledge and skills to select/consume APIs, application layer protocols and web services architectures for seamless integration of various components (Device, Network & Cloud) of an IoT ecosystem.
- Knowledge of standard development initiatives and reference architectures.
- Understanding of deploying various types of analytics/Machine learning on sensor data to define context, find faults, ensure quality, and extract actionable insights.
- Understanding of cloud infrastructure, services, APIs, and architectures of commercial and industrial cloud platforms.
- Integration of IoT with enterprise and user applications (Mobile Phone/SCADA/Enterprise Apps)
- Understanding of prevalent computing architectures - distributed, centralized, edge and Fog. (AWS Greengrass and Azure IoT Edge SDK edge gateway services)
- End to End IoT Solution development and deployment on cloud platform.

DETAILED CURRICULUM

Introduction- Concepts and Technologies behind Internet of Things (IoT)

- **Concepts & Definitions –**

Internet of Things – history and evolution, IoT use cases, economic potentials, Future trends

IoT Reference Architectures

- IoT Network, Device, Platform and Application Architecture, Open source initiatives, Industry 4.0, Reference Architecture, Reference Architectural Model Industrie 4.0, IIRC, Industrial Internet Consortium (IIC), Industrial Internet Reference Architecture (IIRA)

IoT Device Design and Management

- Sensors – Classification & selection criteria based on nature, frequency and amplitude of signal
- Microcontroller and SoCs – Selection criteria, Leading manufactures
- Greenfield and Brownfield development – Challenges and Solutions
- Embedded Development Boards – Arduino, Raspberry Pi, NodeMCU
- Interfacing peripherals & Programming GPIOs – Input/output peripherals, Sensor modules
- Design Considerations – Cost, Performance & Power Consumption tradeoffs

Communication Technologies and Protocols

- IoT networks, protocol stacks
- Emergence of low-power, long-range data link layer technologies
- Wired Communication Protocols - UART, USART, I2C, SPI
- Wireless Communication Protocols - Bluetooth, WiFi, Overview of LPWAN (LoRa, NBIoT)
- Networking Protocols - OSI Reference Model, TCP/IP
- Application Protocols – HTTP, MQTT
- IoT network architecture – Client-Server vs Publish-Subscribe

DETAILED CURRICULUM

Data Representation & Modeling

- Understanding Data, Information, knowledge and Wisdom (DIKW Pyramid), Types of Data, Physical and logical representation of Data, Natural languages – Symbolic representation, Computer languages – Data Encoding, Storage and interpretation Structured and unstructured data

Edge Computing and IoT Brokers

- Understanding IoT Enterprise Architecture, Data aggregation, processing and analytics at the edge, addressing IT and OT integration, IoT brokers, AWS Greengrass and Azure IoT edge solutions

IoT Analytics

- Selection of sensor to capture right set of data, Handling of sensor data, , Analog to digital conversion, Event detection. Data pre-processing and integration of different data sources, Heterogeneity and distributed nature, Limitations of Sensor Nodes, Real-Time/Streaming Analytics, Descriptive, Diagnostic, Predictive and Prescriptive
- Analytics/Machine Learning using Python advance packages: Numpy, Scipy, Matplotlib, Pandas and Sci-kit learn

Predictive Analytics and Machine Learning using Python

Introduction to Python & Python Fundamentals

Python IDEs – Jupyter/Anaconda package

Python Data Science Packages

- **NumPy**
 - o One-dimensional Arrays, Multi-dimensional Arrays
 - o NumPy Arrays Compared to Python Lists
 - o Modifying Parts of an Array

DETAILED CURRICULUM

- **Pandas**

- o Series and DataFrames
- o Accessing Elements from a Series
- o Series Alignment
- o Element-wise Operations
- o Creating a DataFrame from NumPy Array, Series CSV files
- o Getting Columns and Rows
- o Data wrangling

- IoT data – Descriptive analytics using Pandas

- **Plotting with Matplotlib and Seaborn**

Machine Learning using Python

- o What is Machine Learning?
- o Introduction to Machine Learning
- o Types of Machine Learning
- o Supervised machine learning – Regression, Classification
- o Unsupervised learning – Clustering
- o Model performance evaluation
- o Time series analysis – IoT data
- o **Predictive maintenance IoT system application and case study**

DETAILED CURRICULUM

IoT Cloud platforms

- Cloud computing and platforms
 - Public, Private and Hybrid cloud platforms and deployment strategy
 - IaaS, SaaS, PaaS models
 - Example platforms: AWS IoT, Microsoft Azure

AWS IoT capabilities:

- Cloud components and services
 - Device Connectivity & Management, Cloud brokers, Rules Engines, Databases, Visualization, Reporting, Notification/Alarm management
 - End to End Solution development
- **Overview of Azure services & Solution development**

IoT Security

- Overview of Security and Privacy in Information System, Principles of IoT Security, IoT Security Guidance, Identify the known threats, risks, vulnerabilities and privacy issues,, Security architectures

IoT use cases and case studies

- Asset management and tracking
- Remote monitoring and control
- Intelligent Transport System

COGNIXIA's KEY DIFFERENTIATORS



LIFETIME LMS ACCESS



24 x 7 SUPPORT



REAL-LIFE PROJECTS & CASE STUDIES



INDUSTRY EXPERTS AS TRAINERS



INDUSTRY STANDARD CERTIFICATE



EXIT PROFILE

IoT SOLUTION ARCHITECT

IoT SPECIALIST

IoT SYSTEM ENGINEER



TESTIMONIALS

“ JAGDISH NARAYAN, BENGALURU, KARNATAKA

This is one of the best courses I've ever taken from Cognixia. The courseware is super sorted with an unmatched well-thought learning progression.

“ SUNDER BALASUBRAMANIAN, CHENNAI

This training program is incredible, I made the right decision going in for getting trained on a technology that is quite a hot trend right now. The sessions were virtual but it felt like attending a real classroom training. Every session went smoothly. I got the hardware kit on time too.

“ MADHU SRINIVASA DESIKAN, BENGALURU, KARNATAKA

The trainer was clearly and lucidly explained every concept and practical. I really enjoyed the training sessions and it was very convenient since they were scheduled on the weekends. Moreover the hardware kit was delivered at my place before time!

“ LISA WILLIAMS, AUSTRALIA

I really liked the way the trainer was delivering the practical sessions, even the learning platform was very useful to watch the practical properly. The trainer was an experienced person in this technology. The recorded sessions played a very important role to practice my sessions. I would really thank Cognixia in providing training on this technology.

“ NAZEM, PARIS, FRANCE

The training course on Internet of Things offered by Cognixia has been a great experience. The course curriculum not only includes a theoretical understanding of the different sensors but also a hands-on integration of IoT components with the Cloud platform.

“ SCOTT VILLE, CALIFORNIA, USA

The IoT training offered by Cognixia is incomparable. The kind of interactions and practical knowledge received from the training program are quite commendable.

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To learn more visit
<https://www.cognixia.com/>