

# Design and Simulation of IoT Systems Using the Cisco Packet Tracer

**Pratiksha Chandrakant Bhosale**

Department of Information Technology

Sir Sitaram and Lady Shantabai Patkar College of Arts and Science, Mumbai, Maharashtra, India

pratskenjale123@gmail.com

**Abstract:** Nowadays, the term IoT (internet of things) have become extremely important in our life. This technology is used in many fields such as education, health, industries, agriculture and infrastructures. In order to learn and understand how this technology works, many practical learning tools are used. The tool used is Cisco packet tracer which is a software developed by Cisco that is used to create and simulate a virtual network, basically a wireless network, without the need for any network hardware. Design and implementation of Internet of Things (IoT) systems require platforms with smart things and components. Two dominant architectural approaches for developing IoT systems are mashup-based and model-based approaches. Mashup approaches use existing services and are mainly suitable for less critical, personalized applications. Web development tools are widely used in mashup approaches. Model-based techniques describe a system on a higher level of abstraction, resulting in very expressive modelling of systems. The article uses Cisco packet tracer 7.2 version, which consists of four subcategories of smart things home, smart city, industrial and power grid, to design an IoT based control system for a fertilizer manufacturing plant. The packet tracer also consists of boards microcontrollers (MCU-PT), and single boarded computers (SBC-PT), as well as actuators and sensors. The model facilitates flexible communication opportunities among things machines, databases, and Human Machine Interfaces (HMIs). The model developed focuses on three process plants; steam raising, nitric acid, and ammonium nitrate plants. The parameters need to be monitored in order to ensure quality, safety, and efficiency. Through the Cisco packet tracer platform, a use case, physical layout, network layout, IoT layout, configuration, and simulation interface were developed.

**Keywords:** Internet of Things (IoT), Smart Sensors, Wireless Sensors, Process Control, Cisco Packet Tracer, Smart Factory.

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